THE

SCOTTISH NATURALIST:

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EDITED BY

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

VOLUME V.

"Omnes res creatæ sunt divinæ sapientiæ et potentiæ testes, divitiæ felicitatis humanæ; ex harum usu *bonitas* Creatoris; ex pulchritudine *Sapientia* Domini; ex œconomia in *Conservatione, Proportione, Renovatione,* potentia *Majestatis* elucet.' Earum itaque indagatio ab hominibus sibi relictis semper æstimata: a vere eruditis et sapientibus semper exculta; male doctis et barbaris semper inimica fuit."—LINNÆUS.

WILLIAM BLACKWOOD AND SONS,
EDINBURGH AND LONDON.

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INDEX.

	PAGE
GENERAL INDEX	iii
SPECIES SPECIALLY NOTICED—	
ANIMALS—	
Birds	vi
Insects, &c.	vi
PLANTS—	
Flowering	vii
Cryptogamic	vii
Galled	vii
FAMILIES INCLUDED IN INSECTA SCOTICA	vii
NEW SPECIES—	
Animals	viii
Plants	viii
NEW BRITISH SPECIES—	
Animals	viii
Plants	viii
REVIEWS	ix
LIST OF CONTRIBUTORS	ix
ILLUSTRATION	x
ERRATA	x

GENERAL INDEX.

Acherontia atropos, Capture of larvæ of 36
Ancient Surface-features of the Country, On the value of the names of places in indicating 279, 326
Auriferous Quartz of Wanlockhead 183

Birds'-nesting 49
Birds of the Basin of the Tay and its tributaries . 56, 105, 241, 295, 337
Birds that have occurred near Stanley, in Perthshire, Notes on . 255
Birds, The migration of 309
Boldness of the Common Tern 346
Books, New 94, 235
Botany of Loch Lindores, Fifeshire, Notes on the . . . 131
Bryology, Recent advances in British 125

Canoe in the old alluvium of the Tay at Perth, Discovery of an ancient 1
Capercaillie in Scotland, The 289
Capture of larvæ of Acherontia atropos 36

Chærocampa nerii in Scotland, Capture of 346
Changes of Climate in Post-glacial Times 193
Club-root Fungus, The 209
Coleoptera of Scotland . . 44, 137, 188, 237, 285, 311, 332, 371
Collembola and Thysanura in Scotland in 1876 . . . 204
Cryptogamic Society of Scotland . . . 17, 136, 236, 331
Cryptogamic Society's late Exhibition, Report on the scientific portion of the 20
Curlew, Esquimaux 36

Deiopeia pulchella in Scotland, Occurrence of . . . 36
Description of a new Phlœothrips 310
Descriptions of new Scottish Lichens 16
Discovery of an ancient Canoe in the old alluvium of the Tay at Perth 1

Effect of the late storm on our Wild Animals in the north-east of Scotland, The 84
Effects of the past winter and present summer on hard-wooded Plants 162, 221
Effects of the past winter in the south-east of Scotland, Notes on the 81
Esquimaux Curlew 36

Falcon in Mid-Lothian, Iceland 203
Food-plant of Gelechia acuminatella 118
Fungi found at the Forres meeting of the Cryptogamic Society of Scotland, New and rare 234
Fungi found within the province of Moray, Supplementary list of . 8, 93
" New and rare British 234
" of Perthshire, Preliminary list of . . 173, 270, 320, 361
" The Club-root 209

Gaelic names of Plants, The . . . 119, 167, 228, 262, 312, 351
Gall Insects, The natural history of 27
Galls, Scottish 213
Glen Tilt; its Fauna and Flora 85

Hard-wooded Plants, Effects of the past winter and present summer on 162, 221
Hawthorn, Unusual blooming of the 234
Hymenoptera of the district surrounding Dumfries, The Aculeate . 63

Iceland Falcon in Mid-Lothian 203
In Memoriam—Sir Thomas Moncreiffe, Bart. . . . 145

Jottings from my Note-book—Lepidoptera 116

Lepidoptera in the spring of 1879 115
" Notes on 160
" of Britain: their distribution and its causes, The . 97, 149
" of Moncreiffe Hill, The . . . 24, 69, 117, 118
" of Scotland, The 39

Lichens, Descriptions of new Scottish 16
" New and rare Scottish 217

Moncreiffe, Bart., In memoriam—Sir Thomas . . . 145

New and rare British Fungi 234
" Fungi found at the Forres meeting of the Cryptogamic Society of Scotland 234
" Scottish Lichens 217
New Books 94, 235, 367
Notes of the spring of 1879 132
" on Birds that have occurred near Stanley, in Perthshire . 255
" on Lepidoptera 160
" on the Birds of the Basin of the Tay and its tributaries 56, 105, 241, 294, 337
" on the Botany of Loch Lindores, Fifeshire . . . 131
" on the effects of the past winter in the south-east of Scotland 81
" on 'The Lepidoptera of Moncreiffe Hill' . . 117, 118
" Various 135, 236, 331, 370

Obituary Notices :—
Robert Hislop 331
Sir Thomas Moncreiffe, Bart. 145
Thomas Chapman 236
Occurrence of Deiopeia pulchella in Scotland . . . 36
" White's Thrush in Scotland 78
On the value of the names of places in indicating the ancient Surface-features of the Country 279, 326

Phlœothrips, Description of a new 310
Postal Microscopical Society 38
Post-glacial times, Changes of climate in 193
Preliminary list of the Fungi of Perthshire . . 173, 270, 320, 361
Printed number-labels 136

Recent advances in British Bryology 125
Report on the scientific portion of the Cryptogamic Society's late exhibition 20

Scottish Galls 213
Snowdrops and the frost 94
Spring of 1879, Notes of the 132
Stock-dove breeding in Scotland 36
Supplementary list of Fungi found within the province of Moray . 8, 93

The Aculeate Hymenoptera of the district surrounding Dumfries . 63
The Auriferous Quartz of Wanlockhead 183
The Capercaillie in Scotland 289
The Club-root Fungus 209
The Coleoptera of Scotland . . 44, 137, 188, 237, 285, 332, 371

The effect of the late storm on our Wild Animals in the north-east of Scotland 84
The Gaelic names of Plants . . . 119, 167, 228, 262, 312, 351
The Lepidoptera of Moncreiffe Hill 24, 69
" Scotland 39
The migration of Birds 309
The mountain Lepidoptera of Britain: their distribution and its causes 97, 149
The natural history of Gall Insects 27
Things to be observed in 1879 80
Thysanura in Scotland in 1876, Collembola and . . . 204
Trametes pini in Morayshire 132

Unusual blooming of the Hawthorn 234

Various notes 135, 236, 331, 370

Water-spider in Scotland 311
" near Aberdeen 261

SPECIES MORE SPECIALLY NOTICED.

(*See also New, and New British Species.*)

ANIMALS.

BIRDS.

Ægialitis hiaticula . . 258
Alca torda . . . 258
Bernicla canadensis . . 259
Carduelis elegans . . 256
Columba œnas . . 36
Colymbus septentrionalis . 258
Common Tern . . 346
Dafila acuta . . 260
Fuligula cristata . . 261
" ferina . . 260
" marila . . 261
Gecinus viridis . . 256
Iceland Falcon . . 203
Lanius excubitor . . 255
Numenius borealis . . 36
Picus major . . . 256
Spatula clypeata . . 260
Tringa alpina . . 257
Turdus varius . . 78
Yunx torquilla . . 257

INSECTS, ETC.

Coleoptera.

Magdalinus atramentarius . 311

Collembola.

Lepidocyrtus lanuginosus . 206
Macrotoma plumbea . 206

Diptera.

Cecidomyia destructor . 31

Hymenoptera.

Crabro dimidiatus var. . 64
Neuroterus fumipennis . 29, 34
" lenticularis . 30
" numismatis . 30
Rhodites rosæ . . 29, 32
Spathegaster albipes . 29, 35
" baccarum . 30
" vesicatrix . 30

Lepidoptera.

Acherontia atropos . . 36, 161
Chærocampa nerii . . 346

Deiopeia pulchella . . 36
Gelechia acuminatella . 118
Hybernia rupicapraria . 117
Thecla rubi . . . 117

SPIDERS.

Argyroneta aquatica 261, 311

PLANTS.

FLOWERING PLANTS.

Littorella lacustris . . 132
Naias flexilis . . 131
Typha angustifolia . . 131

CRYPTOGAMIC PLANTS.

Mosses.

Aulacomnium turgidum . 129
Campylopus brevifolius . 128
" brevipilus, var. auriculatus . 130
" paradoxus . 127
" Schwarzii . 126
" setifolius . 127
Cynodontium virens, var. compactum . 131
" virens, var. seratum . 128
" virens, var. Wahlenbergii 131
Dicranum elongatum . 129
Didymodon gemmascens . 130
Encalypta streptocarpa cfr. . 86
Grimmia commutata. . 131
Grimmia contorta . . 131
Hypnum elegans . . 125
Seligeria acutifolia . . 130
" diversifolia . 130

Lichens.

Peltigera canina . . 88

Fungi.

Hypomyces chrysospermus . 234
Milesia polypodii . . 234
Peziza ammophila . . 22
" axillaris . . 89
" strobilina . . 234
Physarum sinuosum . . 234
Plasmodiophora brassicæ . 208
Polyporus reticulatus . 234
Rhytisma empetri . . 234
Trametes pini . . 132
Vibrissea margarita . . 90

GALLED PLANTS.

Acer pseudoplatanus . 214
Cakile maritima . . 213
Lonicera periclymenum . 215
Populus nigra . . 217
Prunus avium . . 215
Ribes nigrum . . 215
" rubrum . . 215
Senecio aquaticus . . 216
" Jacobæa . . 216
Stellaria holostea . . 213
Tilia europæa . . 214
Ulmus montana . . 217

FAMILIES INCLUDED IN INSECTA SCOTICA.

Coleoptera.

Anthicidæ . . . 45
Cantharidæ . . . 47
Curculionidæ . . 47
Melandryadæ . . 44
Mordellidæ . . . 46
Pyrrochroidæ . . 46
Rhipidophoridæ . . 47
Scolytidæ . . . 336

Lepidoptera.

(*Additions to the following Families.*)

Acronyctidæ . . 41
Amphidasidæ . . 42
Arctiidæ . . . 40
Boarmiidæ . . . 44
Catocalidæ . . . 42
Cymatophoridæ . . 41
Eugoniidæ . . . 43

Fidoniidæ . . . 43
Geometridæ . . . 43
Hadenidæ . . . 41
Hypenidæ . . . 42
Larentiidæ . . . 44
Liparididæ . . . 40
Lithosiidæ . . . 41
Lycænidæ . . . 40
Nymphalidæ . . 39
Orthosiidæ . . . 41
Pieridæ . . . 40

NEW SPECIES AND VARIETIES

Described in this volume.

ANIMALS.

INSECTS.

Collembola.

Anurida crassicornis L. & O. M. Reut. . . . 208
Isotoma cœca L. & O. M. Reut. . . . 207
Sminthurus niger Lubb. var. 206

Thysanoptera.

Phlœothrips setinodis Reut. . 310

PLANTS.

Lichens.

Endococcus exoriens, Stirton 220
Lecanora exomila " 217
Lecidea amphiplecta " 219
" dasæa " 219
Lecidea filamentosa, Stirton 218
" fucata " 16
" hypocyanea " 218
" ilyophora " 220
" insita " 17
" mersata " 219
" mucosa " 17
" prostratula " 218
" recensa " 219
" sanguinaria (L.) *sub-sanguinaria, Stirton 218
Opegrapha mirifica, Stirton 17
Pannaria melantera " 16
Verrucaria addubitans " 220
" explicata " 220

Fungi.

Trichobasis Balfouriana B. W. 19

NEW BRITISH SPECIES

Brought forward in this volume.

ANIMALS.

INSECTS.—*Collembola.*

Achorutes viaticus Tullb. . 208
Isotoma crassicauda Tullb. . 207
Lepidocyrtus cyaneus Tullb. 206
Macrotoma vulgaris Tullb. . 206
Sminthurus lineatus Reut. . 205

PLANTS.

FLOWERING PLANT.

Ranunculus confervoides (?) . 350

LICHEN.

Lecidea arceutina f. diminuta Fr. 220

FUNGI.

Agaricus (Crepidotus) calolepis Fr. . . . 21
Craterium Friesii Rost. . 21
Helvella infula Schæff. . 234
Hydnum scabrosum Fr. . 234
Hypomyces violaceus Tul. . 234
Polyporus spongia Fr. . 21
Ustilago succisæ Mœg. . 234

REVIEWS AND NOTICES OF BOOKS.

'A Monographic Revision and Synopsis of the Trichoptera of the European Fauna.' By R. M'Lachlan 370
'An Elementary Text-Book of Botany.' By Dr Prantl. English Edition. Edited by Dr Vines 367
Brooke's 'Popular Botany.' Part. I. 370
'Charles Waterton.' By James Simson 367
'European Butterflies and Moths.' By W. F. Kirby . . 95
Excavation of a Crannog at Lochlee. By Dr Munro . . 369
Fifth and Sixth Annual Reports of the Dundee Naturalists' Society 236
'History of the Berwickshire Naturalists' Club, 1876-78' . . 236
'Le Naturaliste' 136
'Mycologia Scotica.' By Rev. J. Stevenson . . . 235
'Naturæ Novitates' 135
'Nature Cared for and Nature Uncared for: the Result upon the Hearts of Men.' By Dr Hewetson 136
'Notes of Observations of Injurious Insects. Report 1878' By Miss Ormerod 125
'Ornithological Journal.' By J. A. Harvie Brown . . . 370
'Proceedings of the Natural History Society of Glasgow' . 38, 368
'Report of the Botanical Locality Record Club' . . . 94
'Report on the Migration of Birds in the Autumn of 1879.' By Messrs Cordeaux & Harvie Brown . . . .
'The Capercaillie in Scotland:' By J. A. Harvie Brown . . 235
'The Fauna of Scotland'—
'Mammalia.' By E. R. Alston 369
'Fresh and Brackish Water Ostracoda.' By D. Robertson . 369
'The Geological Antiquity of Insects,' and three other Papers on Fossil Insects. By H. Goss 368
'The Great Atlas Moth of Asia.' By P. H. Gosse . . 136
'Transactions and Journal of the Proceedings of the Dumfriesshire and Galloway Scientific, Antiquarian, and Natural History Society' 96
'Transactions of the Natural History Society of Aberdeen, 1878' . 37

LIST OF CONTRIBUTORS.

Barrett, C. G. 117
Bissett, W. 234
Boswell, J. T., LL.D., F.L.S. 311
Brooke, A. B. 36
Brotherston, A. 81
Brown, J. A. Harvie, F.Z.S. 289
Cameron, J. 119, 167, 228, 262, 312, 351
Campbell, J. M. 311

Douglas, D. 203
Drummond Hay, Colonel H. M., C.M.Z.S. 56, 105, 162, 221, 241, 295, 337
Fergusson, Rev. J. 125
Geikie, J., LL.D., F.R.S., F.G.S. 1, 193
Harker, Allen 49
Keith, Rev. J., A.M. 8, 93, 132
Lindsay, W. Lauder, M.D., F.R.S.E., F.L.S. . . . 183
Marshall, T. 36, 255
Milroy, Rev. A., D.D. 279, 326
Moncreiffe, Sir Thomas, Bart. . . 24, 36, 69, 94, 115, 118
Raynor, G. H. 346
Renton, R. 116, 160
Reuter, L. 204
Reuter, O. M. 204, 310
Service, R. 63
Sharp, D., M.B. . . . 44, 137, 188, 237, 285, 332, 371
Sim, G. 36, 84
Stevenson, Rev. J. 20, 234
Stirton, J., M.D., F.L.S. 16, 217
Sturrock, A. 347
Trail, Professor J. W. H., M.A., M.D., F.L.S. . . 213, 261
Traill, W. 346
White, F. Buchanan, M.D., F.L.S. 39, 85, 97, 118, 131, 145, 149, 173
234, 270, 320, 361
Wilson, A. Stephen 209

ILLUSTRATION.

Sir Thomas Moncreiffe, Bart. . . . . *to face p.* 145

ERRATA.

Page 36, line 7 from bottom,	*for*	"**anas**"	*read*	"**œnas.**"
" 36, " 6 "	"	"*anas*"	"	"*œnas.*"
" 133, " 6 "	"	"*Seggiden*"	"	"*Seggieden.*"
" 166, No. 54	"	"*cyprius*"	"	"*ladaniferus.*"
" 275, line 18 from top,	"	"*vernicosum*"	"	"*verrucosum.*"
" 321, " 24 " bottom,	"	"Sk"	"	"Lk."

THE SCOTTISH NATURALIST.

VOLUME THE FIFTH.

GEOLOGY.

DISCOVERY OF AN ANCIENT CANOE IN THE OLD ALLUVIUM OF THE TAY AT PERTH.

By JAMES GEIKIE, LL.D., F.R.S., F.G.S.

IN July last a friend informed me that what was supposed at the time of its discovery to be an old canoe had been dug up a number of years ago at the Friarton Brick-works, Perth. I visited the clay-pit a few days afterwards, in company with Dr Buchanan White and Mr John Young, C.E., when we learned from Mr Wood, the lessee of the clay-workings, that no special care had been taken of the canoe, but that it had been laid aside on a bank, where, having been long exposed to the weather, it had to a considerable extent mouldered away. Upon searching the spot where it had lain so long, however, we were pleased to find that earth, clay, and rubbish had gradually accumulated about it, with the result that a considerable portion still remained in a tolerable state of preservation. With the help of Mr Wood's workmen, we had the "wreck" lifted and carefully examined. It proved to be a veritable old "dug-out" canoe, and although one of its sides had been almost entirely consumed, yet enough remained to enable us to ascertain the general proportions of the old craft. The fragment measured only 10 feet in length, but both ends were considerably decayed, and Mr Wood assured us that the canoe was not less than 15 feet in length when it was first uncovered in the clay-pit. The wood was Scotch fir, and

the trunk in its original condition could hardly have been less than 4 or 4½ feet in diameter. The canoe seems to have measured originally 3½ feet across, and from the top of the gunwale vertically to the bottom we found was 3 feet. The dug-out cavity was 6 feet long by 2 feet in depth. At its bottom it measured 1½ foot in breadth; and if both sides sloped upwards at the same angle as the remaining one, the cavity must have had a breadth between the gunwale of 3 feet. The gunwale was 3 inches thick at the top, but as the wood had decayed, the sides probably rose originally a little higher. Owing to the wasted condition of the two extremities we could not tell whether or not the "dug-out" part was midway between stem and stern. Both side and bottom of the cavity showed evident marks of the action of fire—the wood being distinctly charred in some places. We made several incisions through the charred portions, and found the wood at the depth of a few lines singularly firm and sound—the colour resembling that of a recently-felled tree, but being a somewhat darker red. We had no doubt that the cavity had been excavated by the old canoe-maker in the usual way—the wood had been alternately charred and scraped, until the requisite capacity had been obtained.

As far as I know, this is the first recorded instance of the discovery of a canoe in the old alluvial deposits of the Tay; and therefore a few geological notes on the nature of these deposits, and the exact position in which the canoe was found, may not be without interest.

The section at the brick-works is as follows:—

	Ft.	In.
Silt, ...	1	0
Clay, ...	10	0
Peat, ...	0	6
Fine yellowish white sand, ...	12	0
Gravel, not passed through, ...	—	—

These deposits form what I shall call the second alluvial terrace of the Tay. In the immediate neighbourhood of Perth, there are three such terraces. The first, or that which occupies the lowest level, is the modern alluvial accumulation of the river. It forms the wide flats of the North and South Inches, and by far the larger part of the city is built upon it. Its upper surface seldom exceeds 20 feet above mean-tide level, such parts of the old town as are a few feet higher owing their increased height probably to the superficial accumulation of rubbish. In the immediate neighbourhood of the river the surface of this terrace

does not average more than 12 or 14 feet above mean-tide mark. Here and there along the course of the river there are patches of alluvium at lower levels, but these are all of very recent formation, and need not at present be considered. The deposits of which the first terrace is composed consist of silt, sand, and gravel.

The second terrace is not less well marked than the first. The latter cuts into it, as it were, so as to form a more or less conspicuous bank. Thus the lower flat is almost everywhere bounded by the truncated edge of the second terrace. The upper surface of this second flat rises from 25 feet or so, up to 45 feet or thereabout. At many places, however, where it abuts upon the lower terrace, its surface is as much as 10 or 12 feet above the latter. In the immediate neighbourhood of the city its average level cannot be less than 38 or 40 feet above the sea.

The highest terrace in the vicinity of Perth is not so well marked as either of the lower flats. It ranges from 50 to 90 feet in height above the sea. But it has evidently suffered extreme denudation, so that its terrace-like aspect is conspicuous only here and there. It is composed for the most part of sand and gravel, but now and again is largely made up of fine clay.

The deposits at Friarton Brick-works belong to the second terrace, and are of a fluviatile or estuarine character. The lowest beds consist, as we have seen, of gravel and sand. The only fossils that I have met with at this horizon are fragments of land-plants, and these occurred in the sand. Some of them appeared to be roots, others were twigs which had evidently been floated from some little distance. The sand, however, as a rule, is unfossiliferous. The bed described as *peat* is of variable thickness. It consists of a mass of vegetable matter —the principal or most conspicuous components of which are the leaves and stems of reeds. The peat is considerably compressed, and splits up into laminæ, on the surface of which many small seeds may sometimes be detected. Amongst the vegetable *débris* twigs and fragments of pine are not uncommon, and now and again bits of birch may be detected. But the whole is so much decomposed that the original character of the vegetation is not easily made out. Lying upon and in the peat, and sometimes partly penetrating the sand below, occur now and again trunks of trees, which have all the appearance of having been drifted into their present positions. Many of these

have been laid bare during the working of the clay. When we visited the clay-pit, we saw several fragments of this drift-wood which had been taken out from the very bottom of the clay. One of the fragments (a mere stool) appeared to be rooted in the sand-bed, but of this we could not be certain. It is quite possible that it, too, may have been drifted, and the heavier end sinking first, may have become buried in sand so as to simulate the appearance of having grown *in situ*. Unfortunately, the workmen had dug all round it, with the intention of taking it out, so that we were not able to form any definite opinion upon the subject. As showing the condition of these "trees," I may mention that the workmen usually cut them up and take them home for firewood. Those that we saw appeared to be all pine —probably Scotch fir.

I have no doubt that this peat-bed, with its accompanying "trees," is the same as that which occurs in a similar position under the silt and clay of the old alluvium of the river Earn,[1] and which is likewise conspicuous here and there on the same horizon in the Carse of Gowrie. Of this ancient vegetable deposit I hope to give a detailed account elsewhere, and will therefore mention here only a few of the general results of my observations. The peat represents, I think, an old land-surface, clothed with a kind of marshy vegetation, and resembling in almost every particular those stretches of flat reed-covered ground that border the Tay in the Carse of Gowrie. The remains of trees associated with the peat, which are often extremely abundant, were probably in most cases drifted down the river, but here and there, of course, it may well have been that the low banks themselves supported an arborescent vegetation.

The old canoe occurred on the same horizon as the drifted trees at Friarton. It lay upon the peat and sand, and was buried underneath the whole thickness of the overlying clay and silt. The size of the tree out of which the canoe was fashioned is quite in keeping with what we know of the buried trees in the valley of the Earn, and the lower reaches of the Tay itself. Some of these[2] attained a size which none of our trees in those neighbourhoods can now rival. Mr Wood informed me that the canoe was resting on its bottom when it was laid bare by his workmen.

[1] In this peat-bed, Dr Buchanan White and I detected some insect-remains, which my friend has under examination.

[2] The trees referred to are often rooted in their old soil, showing that they grew *in situ*.

From its association with the drifted trunks it is perhaps most probable that it too was floated from a distance. It is not necessary to suppose, however, that the water in which it sank was deep. It is much more likely that the canoe was stranded on a low sandy beach, where eventually it became silted up. Indeed it is not impossible that it may have been drawn up on the old beach by its owners, and there abandoned.

The clay is a somewhat tough, dark-greyish deposit, which does not show any distinct lamination. In its lower portions it here and there contains a good deal of vegetable *débris*. Higher up, however, it is singularly free from such impurities. Now and again one may detect in it a few small stones, which occur quite sporadically. I have never met with any trace of shells in it.

The overlying silt is a kind of loamy clay, of a darker colour generally than the underlying deposit, but often hardly to be distinguished from it. It closely resembles the silt and loam which are being now accumulated upon the flat shoals in the lower reaches of the Tay. At Friarton it is only 1 foot thick, but in other places it swells out to several yards.

The highest terrace—that, namely, which has its upper limits at 90 feet, or thereabouts, above the sea-level—belongs to late glacial times; for as it is traced up the valley towards the Grampians, it passes into kames and regular drift-gravels. I believe it represents the upper limits reached by the enormous torrents and floods that inundated the low grounds of Perthshire during the final melting of the glaciers and snow-fields of the last cold epoch of the glacial period proper. The same terrace may be traced up the valley of the Earn. It gradually rises to a height of nearly 200 feet, before it merges with the tumultuous gravels at the foot of the mountains.

When the deposits of the second terrace began to be laid down, glacial conditions appear to have passed away. The gravel and sand underlying the peat-bed resemble ordinary river-accumulations, while the vegetation of the peat indicates a climate not unlike that of our own day. It is quite clear, however, that when the plants of which that peat is largely composed were growing, the land stood relatively to the sea at a higher level than now,—but how much higher, the local evidence hardly enables us to say. There can be no doubt, however, that the peat is of the same date as the similar accumulations with buried trees that occur in many other places at and below high-water along our coasts. It is extremely probable,

therefore, that the old canoe at Friarton floated on the river Tay at a time when our shores stretched much further out to sea—at a time, indeed, when Britain is believed to have formed part of the Continent.

The clay and silt above the peat-bed point to a succeeding period of submergence, when the sea rose upon the land to a height of 30 feet, or thereabout, above its present level. The raised beaches that appear along the sea-coast in Fifeshire and Forfarshire at that height are the representatives of the estuarine clay and silt, which, in the valleys of the Earn and Tay, reach to a somewhat higher level. These latter deposits, which rise to a height sometimes of 20 feet above the old sea-level, bear evidence to former very considerable inundations, when the Tay swelled in flood and covered wide tracts of low ground, depositing upon these its fine mud and loam. At that date all the area upon which Perth is built was permanently below water; so that the Tay at Perth was fully a mile in breadth, and the tide must have flowed up to and beyond Stanley. Where the old estuarine flat contracts, we find that the character of its deposits changes; the clay and silt become more and more mixed up with sand and gravel, until the whole accumulation passes into fluviatile beds of the kind that is most commonly met with along the course of our Scottish streams and rivers. The level of the flat also gradually rises as we follow it up the valley. Thus, in the Carse of Gowrie its upper surface averages about 40 feet or so above the present mean tide. At Perth, its limits are about four or five feet higher, while at Luncarty it reaches a height of rather more than 50 feet. There is, in short, a gradual passage from marine into estuarine, and from estuarine into fluviatile deposits.

It is highly probable that when the estuary of the Tay extended up to Perth, local glaciers existed in many of the upper glens of the Highlands; and I am inclined to think that no inconsiderable portion of the fine brick-clays of the second terrace represents the "flour of rocks" formed by the grinding of the glaciers of that period, and carried down by the streams and rivers. These fine clays are overlaid by the loamy silt already described,—a deposit of precisely the same character as the loamy silt which is being carried seawards by the Tay in our own times. Its superposition to the brick-clays would seem to indicate that the snow-fields and glaciers finally disappeared while the second terrace was still covered by the waters of the estuary.

The brick-clays above the peat-bed contain, as I have said, a

few sporadic stones. Perhaps these may have been carried down by shore-ice, or even by ground-ice. With the possible exception of these scattered stones, we have no other evidence of the former presence of floating-ice. But the generally unfossiliferous character of the brick-clays is quite in keeping with the view that the estuary of the Tay was fed by large muddy rivers, flowing from glacier-valleys—such as the Tay, the Isla, the Almond, the Earn, and others. We can understand how, under such conditions, the upper waters of the estuary would be unfavourable to life, and how shore-ice, and even ground-ice, might now and again freeze up and transport gravel-stones and shingle.

At a subsequent period, when the sea had retreated to its present level, the Tay cut its way into the deposits of the second terrace, and gradually formed that succession of alluvial plains which are now seen skirting the river at various heights, from twenty feet or so down to a yard or less above its bed.

PHYTOLOGY.

SUPPLEMENTARY LIST OF FUNGI FOUND WITHIN THE PROVINCE OF MORAY.

By the Rev. JAMES KEITH, A.M.

(*Continued from* vol. iv. p. 348.)

CERATIUM, A. and S.

831. Hydnoides, A. and S. On rotten wood. Kinrara, &c. Aug.

PACHNOCYBE, Berk.

832. Grisea, Berk. On decaying cabbage-stalks. Greeshop. Aug. Verified by Berkeley.

STILBUM, Tode.

833. Orbiculare, B. and Br. On Lindbladia effusa. Rothiemurchus. Sept. Ann. Nat. Hist., Jan. 1878.

VOLUTELLA, Fr.

834. Ciliata, Fr. On potatoes. Sanquhar. April.
835. Setosa, Berk. On decaying thistle-stems. Alvie. Aug.

FUSARIUM, Link.

836. Rhabdophorum, B. and Br. On Valsæ on sticks. Forres. Ann. Nat. Hist., Feb. 1876.
837. Pezizoides, n. s. Ph. in litt. On decaying fir-leaves. Grantown. Aug.

ILLOSPORIUM, Mont.

838. Roseum, Fr. On a Parmelia on an elder-tree in churchyard of Dallas. Feb.

SPOROCYBE, Fr.

839. Nigrella, Berk. On dead Carex-leaves. Greeshop. May.

HELMINTHOSPORIUM, Lk.

840. Folliculatum, Cda. On cabbage-stalks. Greeshop. April.
841. Tiliæ, Fr. On lime-branches. Greeshop. March.
842. Delicatulum, Berk. On stems of Umbellifers. Greeshop.

MACROSPORIUM, Fr.

843. Cheiranthi, Fr. On sweet-william and stock stems in Manse garden. April.

HELICOMA, Cda.

844. Mulleri, Cda. On Bird-cherry stick. Dunphail. Dec.

POLYTHRINCIUM, Kze.

845. Trifolii, Kze. On Trifolium pratense. Duthil. Sept.

CLADOSPORIUM, Link.

846. Epiphyllum, Nees. On oak-leaves. Autumn. Common.

GONATOSPORIUM, Cda.

847. Puccinioides, Cda. On Carices. Grantown. Aug.

PERONOSPORA, De By.

848. Parasitica, Pers. On turnips. Common.

STYSANUS, Cda.

849. Stemonitis, Cda. On decayed herbaceous plants. Greeshop. April-July.

FUSIDIUM, Lk.

850. Flavo-virens, Fr. On oak-leaves. Cluny Hill. Nov.
851. Griseum, Lk. On beech-leaves. Greeshop. Nov.

SPOROTRICHUM, Lk.

852. Aurantiacum, Grev. On old floor-cloth in cellar. Dec.

MENISPORA, Pers.

853. Lucida, Cda. On stick. Waterford. March.
854. Ciliata, Cda. On broom-stick. Sanquhar. May.

SEPEDONIUM, Lk.

855. Roseum, Fr. On decaying Agaric. Edinkillie. Aug.

FUSISPORIUM, Lk.

856. Aurantiacum, Lk. On decaying cabbage-stalks. Greeshop. April. Verified by Berkeley.

EXOBASIDIUM, Wor.

857. Vaccinii, Wor. Abundant on leaves of Vaccinium vitis-idæa wherever it occurs.

ZASMIDIUM, Fr.

858. Cellare, Fr. Wine-cellars in Forres.

ACROSTALAGMUS, Cda.

859. Cinnabarinus. Only the conidiophorous state, Verticillium lateritium. On cabbage-stalk. Greeshop. Verified by Berkeley.

PERISPORIUM, Fr.

860. Vulgare, Cda. On a piece of straw in old dog's dung. Rothiemurchus. Aug.

PHYLLACTINIA, Lev.

861. Guttata, Lev. On birch-leaves. Kinrara, &c. Autumn.

UNCINULA, Lev.

862. Adunca, Lev. On willow-leaves. Greeshop. Sept.
863. Bicornis, Lev. On sycamore-leaves. Greeshop. Sept.

SPHÆROTHECA, Lev.

864. Castagnei, Lev. On meadow-sweet and hop leaves. Common. Autumn.

PODOSPHÆRA, Kze.

865. Kunzei, Lev. On Prunus padus leaves, Rothiemurchus; and Sorbus leaves, Grantown. Autumn.
866. Clandestina, Lev. On hawthorn-leaves. Invererne. Sept.

ERYSIPHE, Hdw.

867. Martii, Lk. On leaves of pea, trefoil, Umbelliferæ, &c. Common. Summer and autumn.
868. Lamprocarpa, Lev. On plantain-leaves. Sanquhar, &c. Sept.-Oct.
869. Linkii, Lev. On mugwort. Invererne. Sept.
870. Montagnei, Lev. On burdock. Cothall. Aug.
871. Horridula, Lev. On Symphytum leaves. Invererne. July.

EUROTIUM, Link.

872. Herbariorum, Lk. On dried plants in my herbarium.

[1] VIBRISSA, Fr.

873. Guernisaci, Crouan. On willow and alder sticks in wet places. Sanquhar, Greeshop, St John's Mead. Spring.

GEOGLOSSUM, P.

874. Hirsutum, P. Altyre garden. Nov.

RHIZINA, Fr.

875. Undulata, Fr. In abundance during the wet autumn of 1877 on a piece of sandy ground beside the railway, two miles south of Forres, where a young plantation had been burnt down. No trace of it in the same spot in 1878.

PEZIZA, L.

876. Reticulata, Gr. On the ground in a fir-wood. Rafford. May. Rare.
877. Badia, Pers. Grassy places in and about woods. All through the district.
878. Rutilans, Fr. On the ground among mosses. Common.
879. Melaloma, A. and S. On spots where brushwood has been burned, at Dalchairn, Duthil. Sept.
880. Subhirsuta, Schum. On refuse from a flour-mill. Forres. Oct.

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[1] Mr Phillips of Shrewsbury has kindly examined and identified many specimens of Elvellacei for me, which I was unable to determine with confidence myself, and many of the following species are given on his authority. I am under similar obligations to Messrs Currey, Cooke, and Plowright, for aid in identifying Sphæriacei.

881. Bovina, n. s. Phillips in litt. On cow's dung. Grantown. Aug.
882. Cervaria, n. s. Phillips in litt. On roe-deer's dung. Grantown. Aug.
883. Keithii, n. s. Phillips in litt. On horse-dung. Waterford. Sept.
884. Fascicularis, A. and S. On mountain-ash at Kinrara, and very fine on Prunus padus at Grantown. Winter. Not common.
885. Melastoma, Sow. On a fallen oak-branch. Darnaway. April. Very rare.
886. Hirta, Sch. On a stump at Edgefield. Oct.
887. Clandestina, Bull. Plentiful on raspberry-stems in Greeshop wood. Spring.
888. Palearum, Desm. On stems of grass. Grantown. Aug.
889. Corticalis, Pers. On ivy-fibrils at Sluie. June.
890. Crucifera, Ph. Gard. Chron., 1878, p. 397, fig. 71. On twigs of Myrica gale, lying among the grass beneath the bushes. Grantown. Aug. This curious species was discovered by Mr Phillips in England, who gave me a hint where to look for it. I found it in considerable abundance.
891. Apala, B. and Br. On rushes and on Eriophorum leaves. Greeshop, Manachie, and Grantown. April, May, and Aug.
892. Versicolor, Desm. On Pteris leaves. Altyre. June.
893. Acuum, Fr. On damp, decaying leaves of Scotch fir. Grantown. Aug.
894. Rufo-olivacea, A. and S. On whin-sticks often, and once on broom. In various places about Forres. Spring.
895. Flammea, A. and S. On dead branches of Salix aurita at Alvie, Aviemore, and Dunphail. All the year.
896. Sulphurea, Pers. On stems of Umbelliferæ. Greeshop. April.
897. Escharodes, B. and Br. On bramble-stems. Greeshop wood. March.
898. Ilicinicola, B. and Br. On holly. Dunphail. Nov. Apparently very rare.
899. Hyalina, Pers. On decorticated fir-sticks. Frequent. Aut.-spring.
900. Variecolor, Fr. Var. albo-lutea, Pers. On stumps at Edgefield and Sanquhar. All the year.
901. Aurelia, Pers. On an oak-stick in Darnaway Forest. April.
902. Rosæ, Pers. Var. prunorum. On sloe. Sanquhar. All the year.
903. Bolaris, Batsch. Abundant on dead twigs of one holly-bush in ravine below the Castle of Dunphail. Nov.
904. Solani, Pers. On withered potato-stems in many places.
905. Clavata, Pers. On Pteris stems. Altyre. June.
906. Concolor, n. s. Ph. in litt. On a hard stick in wood at Suspension Bridge. April.
907. Vexata (De Not.) On stems of grass. Manachie. July.
908. Elaphines, B. and Br. On Heracleum stems in Greeshop wood. March.
909. Ulmariæ, Lasch. On dead stems of Spiræa ulmaria in damp places. Greeshop. Spring.
910. Fœcunda, n. s. Ph. in litt. On Eleocharis at Aviemore and Grantown. Aug.-Sept. Abundant.

911. Erumpens, Grev. On sycamore petioles in Greeshop wood. Spring.
912. Melatephra, Lasch. On Carex. Grantown. Aug.
913. Atrovirens, Pers. On a stick at Loch-an-Eilan. Aug.
914. Excelsior, Karst. On Arundo-stems. Grantown. Aug.
915. Pulla, Ph. On Poa fluitans at Loch Baladren, Aviemore. Sept.
916. Litoralis, Ph. On a bleached stick thrown up from Loch Alvie. Aug.
917. Arenivaga, Desm. On bent at Findhorn and Waterford. June.
918. Compressa, A. and S. On holly. Sanquhar. Jan.
919. Connivens, Fr. On a stick at Dunphail. Feb.
920. Resinæ, Fr. On resin on larch. Rothiemurchus. Sept.

HELOTIUM, Fr.

921. Aciculare, Fr. On a stump. Sanquhar. Nov.
922. Buccina, Pers. On the stump of a small fir-tree in Greeshop wood. Nov.
923. Claro-flavum, Berk. On decayed sticks. Kinrara and Dunphail. Autumn.
924. Pruinosum, Jerd. On Diatrype stigma. Sanquhar. July.
925. Fagineum, Fr. On beech-mast. Greeshop. Oct.

CENANGIUM, Fr.

926. Laricinum, Fckl. On larch. Greeshop.
927. Prunastri, Fr. On sloe and bird-cherry. Sanquhar and Greeshop. Winter.
928. Rubi, Fr. On raspberry-stems. Sanquhar. Spring.

ASCOBOLUS, Tode.

929. Vinosus, Berk. On rabbit's dung. Sanquhar. Sept.
930. Immersus, Pers. On cow's dung. Grantown. Aug.
931. Neglectus, Boud. On cow's dung. Grantown. Aug.
932. Cookei, Crouan. On dog's dung. Forres. Winter.
933. Granuliformis, Crouan. On cow's dung. Grantown. Aug.
934. Argenteus, Cur. On cow's dung. Alvie. Aug.
935. Carneus, Pers. On cow's dung. Rothiemurchus. Sept.

BULGARIA, Fr.

936. Inquinans, Fr. Sent me from Gordon Castle by Mr John Webster. Oct.

AGYRIUM, Fr.

937. Rufum, Pers. On decorticated fir-sticks. Aviemore. Aug.

STICTIS, Pers.

938. Seriata, Lib. On Carex ampullacea. Manachie. June. Phillips.
939. Parallela, Fr. On fir-sticks. Rothiemurchus. Aug.
940. Phacidioides, Fr. On bearberry-leaf. Grantown. Aug.

ELAPHOMYCES, Nees.

941. Variegatus, Vitt. Found by Klotzsch at Aviemore. See Eng. Fl., vol. v. pt. ii. p. 307, and compare with Cooke's 'Handbook,' p. 749.

PHACIDIUM, Fr.

942. Pini, Schum. On Scotch fir. Kinrara. Aug.
943. Vaccinii, Fr. On leaves of bearberry. Aviemore.
944. Coronatum, Fr. On dead leaves of oak and beech. Altyre. Sept.
945. Repandum, Fr. On woodruff-leaves. Cothall. May.
946. Trifolii, Boud. On clover-leaves. Cromdale. Aug.

HYSTERIUM, Tode.

947. Xylomoides, Chev. On hawthorn-leaves. Waterford. May.
948. Eriophori, n. s. Ph. in litt. On Eriophorum leaves. Grantown. Aug.
949. Arundinaceum, Schrad. On Arundo stems. Dalvey and Aviemore. Var. gramineum, B. and Br. On leaves of grass. Greeshop Ann. Nat. Hist., Jan. 1875.

LOPHIUM, Fr.

950. Mytilinum, Fr. On fir bark and wood. All the year. Rothiemurchus and Altyre.
951. Mytilinellum, Fr.? On damp, decaying leaves of Scotch fir. Grantown. Aug. I have submitted specimens of this plant to Mr Plowright, who says, "The Lophium is very interesting. I suppose it is Fries' L. mytilinellum, as you suggest; but I have never seen an authentic specimen, or heard of its fruit being described." The fruit in my specimens is well developed.

EUSTEGIA, Fr.

952. Arundinacea, Fr. On Arundo stems. Grantown. Aug.

HYPOCREA, Fr.

953. Gelatinosa, Fr. On fir-sticks at Loch-an-Eilan. Aug.
954. Rufa, Fr. Conidia, Trichoderma viride. On oak. Darnaway. Ascophore. On birch. Darnaway. Sept.

NECTRIA, Fr.

955. Cucurbitula, Fr. On Prunus padus. Sanquhar.
956. Keithii, B. and Br. On cabbage-stalks. Greeshop. Ann. Nat. Hist., Feb. 1876.
957. Albertini, B. and Br. On a damp, rotten fir-stump. Clunyhill. Sept.
958. Umbrina, Fr. On nettle-stems. Thornhill. Dec.

XYLARIA, Fr.

959. Carpophila, Fr. On beech-mast. Greeshop wood. Winter.

USTULINA, Tul.

960. Vulgaris, Tul. At the base of a plane-tree in churchyard of Cromdale. Winter.

POLYSTIGMA, Pers.

961. Fulvum, D. C. On Prunus padus leaves. Grantown. Sept.

DOTHIDEA, Fr.

962. Angelicæ, Fr. On Angelica leaves. Banks of Findhorn. F. B. White, Scot. Nat., Jan. 1875.
963. Rosæ, Fr. On rose-stems. Frequent.
964. Filicina, Fr. On stems of Pteris aquilina. Common.

DIATRYPE, Fr.

965. Quercina, Tul. On oak-branches. Dunphail.
966. Favacea, Fr. On birch. Greeshop.
967. Inæqualis, Curr. On furze. Altyre.
968. Badhami, Curr. On furze in Greeshop wood.
968². Coramblycola, B. and Br. On cabbage-stalks. Greeshop. April. Ann. Nat. Hist., Jan. 1878.

MELANCONIS, Tul.

969. Lanciformis, Tul. On birch. Greeshop. April.

VALSA, Fr.

970. Kunzei, Fr. On larch. Mondole. March.
971. Dissepta, Fr. On elm. Altyre. Oct.
972. Ambiens, Fr. On apple. Greeshop.
973. Salicina, Fr. On willow-branches. Common.
974. Suffusa, Fr. On alder. Greeshop. June.
975. Leiphemia, Fr. On oak. Sanquhar. May.
976. Tiliæ, Tul. On lime-twigs. Altyre. Nov.
977. Stilbostoma, Fr. On hazel. Kinrara. Aug.
978. Thelebola, Fr. On alder. Greeshop. April.
979. Platanoides, Berk. On sycamore. Greeshop. March.
980. Vestita, Fr. On sloe. Sanquhar. April.

MASSARIA, De Not.

981. Bufonia, Tul. On oak-sticks. Sanquhar. May.

LOPHIOSTOMA, De Not.

982. Macrostoma, Fr. On decorticated branches of Salix aurita. Alvie. August. Frequent.
983. Angustilabra, B. and Br. On furze-branches. Balnageith. Dec.
984. Arundinis, De Not. On stems of Arundo. Kinrara. Frequent.

SPHÆRIA, Hall.

985. Racodium, Fr. On a stick in Darnaway Forest. June.
986. Brassicæ, Klotsch. On cabbage-stalks. Greeshop and Cothall. Oct.-April.
987. Canescens, Pers. On beech-stick. Darnaway. June.
988. Collabens, Curr. On Salix. Aviemore. Aug.
989. Epochnii, B. and Br. Only the Conidia, Sporidesmium atrum, Grev. On a Corticium. Altyre. Nov.
990. Nigerrima, Blox. On Eutypa lata. Darnaway, Dunphail, &c.
991. Obliterans, B. and Br. On fir. Rothiemurchus. Aug.
992. Culmifraga, Fr. On stems of grass. Greeshop, &c.

993. Nardi, Fr. On Nardus leaves in various places.
994. Pilifera, Fr. On a fir board lying on the ground in a cold frame in my garden. No asci or sporidia. May.
995. Livida, Fr. On Salix aurita at Kinrara. Aug.
996. Melanotes, B. and Br. On a stick. Dunphail. March.
997. Hypotephra, B. and Br. On oak. Sanquhar. June.
998. Apiculata, Cur. On a paling-bar. Grantown. July.
999. Inquilina, Fr. On cabbage-stalks. Greeshop. April.
1000. Phomatospora, B. and Br. On decaying stems of wallflower. Waterford. May.
1001. Salicella, Fr. On willow. Greeshop. April.
1002. Revelata, B. and Br. On a stick. Brodie. May.
1003. Vepris, De Laert. Sp. rubi, Cur. On bramble-twigs. Greeshop.
1004. Rubicunda, Nies. On a stick at Suspension Bridge. April.
1005. Infectoria, Fckl. On withered grass. Waterford.
1006. Rubella, Pers. On stems of Umbelliferæ, and on cabbage-stalks. Spring.
1007. Herpotricha, Fr. On grass. Greeshop. June.
1008. Nigrans, Desm. On grass. Greeshop. July.
1009. Sabuletorum, B. and Br. On bent. Findhorn.
1010. Coryli, Batsch. On living hazel-leaves. Grantown. Aug.

SORDARIA, Winter.

1011. Merdaria, Awd. On rabbit's dung. Grantown. Aug.
1012. Fimicola, Rob. On dog's dung. Aviemore. Aug.
1013. Microspora, Pl. On cow's dung. Rothiemurchus. Sept. Grev., vol. vi. p. 28, t. 94, f. 3.
1014. Discospora, Awd. Rabbit's dung. Sanquhar. Aug.
1015. Platyspora, Pl. On horse-dung. Aviemore. Grev., vol. vi. p. 28, t. 94, f. 2.
1016. Humana, Awd. Ad merdam humanam. Grantown. Aug.
1017. Fimiseda, Ces. de Not. On cow's dung. Rothiemurchus. Aug.
1018. Coprophila, Ces. de Not. On cow's dung. Alvie, &c., Aug.
1019. Curvula, De By. Forma-conica. On cow's dung. Forres. April.

DILITSCHIA, Awd.

1020. Winteri, Plow. On rabbit's dung in many places. Grev., vol. vi. p. 29, t. 24, f. 5.
1021. Minuta, Fckl. On sheep's dung. Aviemore. Sept.
1022. Bisporula, Hans. On horse-dung. Forres. Grev., vol. vi. p. 28, tab. 94, f. 4.

SPORORMIA, Awd.

1023. Minima, Awd. On grouse-dung. Aviemore. Sept.
1024. Intermedia, Awd. On rabbit's dung. Common.
1025. Megalospora, Awd. On horse-dung. Aviemore. Sept.
1026. Octomera, Awd. On grouse-dung on hill above Craigellachie, Aviemore. Sept. Grev., vol. vi. p. 29, t. 94, f. 6.
1027. Pulchra, Hans. On cow's dung. Aviemore. Sept.

(*To be continued.*)

DESCRIPTIONS OF NEW SCOTTISH LICHENS.

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

Pannaria melantera, sp. nov.—Similis P. dolichoteræ (Nyl.) sed sporis longioribus, .03-.045 × .0045-.005 mm., 1-3-septatis vel simplicibus. Thallus niger effusus profunde et late diffractus vel potius squamosus, squamis crassiusculis minute papillosis infra nigro-cœrulescentibus; apothecia sessilia nigra plana vel convexiuscula margine nigro nitido cincta, parva (latit. .3-.6 mm.); paraphyses articulatæ crassiusculæ (latit. .003-.004 mm.) apicibus clavatis cœrulescentibus; hypothecium fuscescens. Iodo gel. hym. cœrulescens, thecæ fulvescentes. Ad saxa micaceo-schistosa, Ben Lawers.

The thallus is abundantly supplied with gelatinous nodules (as in Nostoc), containing gonimia. These are of various colours, as red, yellow, fulvous, &c. Sirosiphoid filaments are also present. Other gonimia in groups are noticeable, many of which in an active state of development by fission. No true gonidia have been detected. Such a conglomeration of the so-called lower algæ I have seldom or never seen.

A rather puzzling problem for solution is here presented to the believers of the algo-mycological theory of lichens—viz., what relationship subsists between these algæ and the apothecia? Is it necessary to the full development of such apothecia that such a conglomeration and no other should be present as a nidus; or are several merely accidental, and therefore unnecessary? I have examined different parts of the thallus (which is widely extended on the rock), but the same conglomeration occurs throughout.

Lecidea fucata, sp. nov.—Thallus cinereus granulosus, vix ullus visibilis; apothecia nigra rotunda vel oblonga vel nonnihil irregularia convexa et immarginata, intus tota intense *violacea*, iodo vix mutata, K cœruleo-virescentia; sporæ (1-3)næ incolores ellipsoideæ vel oblongo-ellipsoideæ, episporio crasso pellucido, .032-.048 × .015-.022 mm.; hypothecium incolor. K protoplasma sporarum maturarum nigro fulvaceum. Ad lignum decorticatum prope Tyndrum. Forsan affinis L. melinæ.

The paraphyses are rendered distinct by K, and are thickish and somewhat irregular. The intense violaceous colour of a section of the apothecia is a well-marked character.

Lecidea insita, sp. nov.—Parasitica supra thallum Peltigeræ aphthosæ. Apothecia nigra parva (latit. .2-.3 mm.) convexa immarginata sæpius fere sphærica, intus rufescentia; sporæ (12-16) næ incolores simplices sphæroideæ, diam. .005-.0065 mm.; paraphyses distinctæ graciles filiformes in gelatina firma involutæ apicibus rufis vel fere incoloribus; hypothecium rufum vel in lamina crassiuscula visum rufo-nigrum. Iodo gel. hym. intense cœrulescens dein intense vinose rubens. Affinis (forte nimium) L. geophanæ. Apud Craigna-Lochan.

Lecidea mucosa, sp. nov.—Thallus fulvus gelatinosus vel vix ullus; apothecia fusca vel fusco-nigra, planiuscula, convexa aut fere sphærica, parva (latit. circ. .25 mm.), intus fuscescentia ve pallide fuscescentia; sporæ 8næ incolores simplices ellipsoideæ, .0075-.01 × .004-.0055 mm.; paraphyses conglutinatæ indistinctæ apicibus incoloribus non clavatis; hypothecium fuscum. Iodo gel. hym. cœrulescens dein sordida. Ad lignum putridum prope Ben Doran.

Opegrapha mirifica, sp. nov.—Thallus albidus vel albido-cinerascens crassiusculus, minute rimulosus, interdum fere granulosus, nonnihil farinaceus (K — C erythrinosus, sed C seorsum—); apothecia nigra sessilia mediocria (latit. .2-.4 mm.) rotunda vel oblonga, sparsa vel aggregata, epithecio cæsio-pruinoso vel nudo, primum concaviusculo et tunc acute marginato, demum plano, sæpe (vetustate) convexiusculo et immarginato; sporæ 8næ incolores oblongæ vel obtuse fusiformes 3-septatæ, .014-.021 × .0035-.0045 mm.; paraphyses irregulares non discretæ sæpe discontinuæ apicibus nigricantibus clavatis; hypothecium nigrum vel fusco-nigrum crassum. Iodo gel. hym. vinose rubens (præcedente cœrulescentia nulla). Saxicola in Insula Cumbræ.

This puzzling lichen seems rather referable to the Opegraphæ than to the Lecideæ.

CRYPTOGAMIC SOCIETY OF SCOTLAND.

THE Fourth Annual Meeting of the Scottish Cryptogamic Society was held at Edinburgh last October, under the presidency of Professor Balfour, and was successful in every way. Cryptogamic botanists from the other side of the Tweed were well represented; but from one reason or another, several of the

Scottish Fellows of the Society, who should have been present, were conspicuous by their absence. As one chief object that our English friends have in view in coming north is to see and exchange ideas with their Scottish brethren, it seems a pity that some of the latter did not make greater efforts, even at a little personal inconvenience, to attend the conference. Some were, we know, to their own great regret, unavoidably prevented from taking part in the proceedings.

By the kind permission of the President, the business-meeting and show were held in the Royal Botanic Gardens.

The conference was opened on Wednesday, October 9th, by the President delivering his inaugural address, which was chiefly devoted to a review of the life and works of the celebrated Scottish cryptogamic botanist Dr Greville—a very appropriate subject, and one which could not fail to be full of interest, especially as coming from one of Greville's most intimate friends. In illustration of Greville's works, a large number of his original drawings —in the possession of Professor Balfour—were exhibited, and elicited universal admiration from their beauty.

It was unanimously resolved that the next annual conference should be held at Forres, under the presidency of the Rev. James Keith, than whom no one has done more to elucidate the mycology of the north of Scotland. It was also arranged that the conference should take place at an earlier season of the year than the previous ones—probably not later than the middle of September; so that, with the fine scenery and cryptogamic riches of Forres, as well as its accessibility by rail, a good meeting may be expected. Though no public show is to be held, there will probably be a private exhibition.

Amongst others, the following papers were read at the meeting: Professor Balfour exhibited specimens, and gave notes upon certain new and rare fungi that have appeared in his official residence, Inverleith House. The house had been partially burned, and allowed to remain roofless and exposed to the weather for several months, the consequence of which was, that a large crop of fungi—chiefly *Peziza* (including *P. adæ*, Sadl., a beautiful violet-coloured species, named in honour of Miss Ada Balfour, *P. cretea*, Cke, and *P. tectoria*, Cke.) The house was not yet free from fungi; but the species were not of so great scientific interest.

On behalf of Dr Moore, of Glasnevin Botanic Garden, specimens of an *Isöetes*, from Upper Loch Bray, county Wicklow, Ireland, were exhibited. This species, which is remarkable for

its long, slender, setaceous leaves, frequently floating on the surface of the water, was at one time referred to *Isöetes setacea*, Bosc., but has now been described ('Journal of Botany,' December 1878) as a new species, under the name *I. Morei* Moore, in honour of Dr Moore's fellow-worker Mr A. G. More.

Dr M. C. Cooke read a paper upon the species of *Corticium* and *Stereum*, of which he had been examining the minute structure. He described characters which he thought warranted the generic separation of several of the species; and he proposed to establish a new genus—*Peniophora*. It is questionable if the characters pointed out by Dr Cooke are of more than subgeneric value; but of this an opinion can be better formed when the result of his investigations has been published.

Dr I. B. Balfour made some interesting remarks on the light thrown on several genera of the Myxomycetes by his discovery of a new species—*Cribraria Balfouri*, De By.—which unites several genera.

Mr Sadler read a paper on *Agaricus Sadleri;* and Dr B. Carrington described and showed specimens of several new Scottish Hepaticæ.

Dr Buchanan White read a paper on the Altitudes above Sea-level attained by Fungi in Scotland, and gave a brief description of a supposed new fungus he had found upon the leaves of *Erythroxylon coca*—the cuca-leaves of commerce. This he proposed to call *Trichobasis Balfouriana*, in honour of the President of the Society. It may be described thus: "Sori hypophyllous, small, subrotund, rather scattered, but often two or three together, epidermis ruptured; spores often obscurely pedunculate, pyriform, pale brown, epispore finely tuberculate." Specimens and a sketch of the spores were exhibited.

Dr Parsons (of Goole) called attention to a scheme for investigating the geographical distribution of mosses in the British Isles. Botanists desirous of helping may communicate with Dr Parsons (Goole, Yorkshire) or Mr C. P. Hobkirk (Huddersfield).

Mr C. B. Plowright (of King's Lynn) presented a copy of his 'Sphæriacei Britannici' (three centuries) to the Society, and received a hearty vote of thanks for his valuable donation.

In the evening the annual dinner of the Society took place, and on the following day an excursion was made to Penicuik woods, under the guidance of Mr France, forester to Sir George Clerk, who kindly threw his grounds open to the Society. A

great number of fungi were collected and catalogued, though the absence of the larger Hymenomycetes was very noticeable.

On Friday and Saturday, October 11th and 12th, the Society's public show was held in the Royal Botanic Garden, and was visited by large numbers of people. The show chiefly consisted of fungi, though mosses and Hepaticæ were not unrepresented, Dr Parsons superintending the former and Dr Carrington the latter. In the Herbarium Hall the fungi were arranged specially with a view to scenic effect, though many of the specimens were named. This part of the show was very popular with the public; and some of the English botanists, who had previously been sceptical as to the desirability of arranging fungi in this manner, admitted that it had its advantages in attracting the attention of the public. In this hall also was a beautiful collection of named specimens of Myxomycetes, shown by Dr I. B. Balfour.

The other portion of the exhibition was held in the glass structure known as the Winter Garden, and consisted of an extensive array of named and classified specimens, due chiefly to the labours of Messrs Phillips (Shrewsbury), Plowright (King's Lynn), Perceval (Bristol), and Rev. J. Stevenson (Glamis). At our request Mr Stevenson has prepared a report upon this part of the exhibition, which is given below.

The meeting, altogether, was a memorable one, which was due in great measure to the efforts of the President and his son, Dr I. B. Balfour, and to the energy shown by the Local Secretary, Mr John Sadler, who, in his desire to make it successful, unfortunately overworked himself, and, instead of enjoying the sight of the happy termination of his labours, had to retire to bed with a sharp attack of illness. The great hospitality shown to members from a distance by the President and other members of the Local Committee will always be remembered by their guests.

REPORT ON THE SCIENTIFIC PORTION OF THE CRYPTOGAMIC SOCIETY'S EXHIBITION,

At Edinburgh, on October 11, 1878.

By the Rev. J. STEVENSON.

IN addition to the general collection, which was arranged in groups with a view chiefly to artistic effect, separate tables were devoted to a scientific arrangement of species in the sequence of genera; and, considering the brief time which could

be devoted to the subject, a wonderfully representative collection was produced. It contained about 200 different species, chiefly *Hymenomycetes*. It may be interesting to notice a few of the rarer species contained in this collection.

During the excursion at Penicuik, on the day previous to the public exhibition, Mr C. B. Plowright was fortunate in gathering a new species of *Panus*, which has yet to be described. It will be recorded by the Rev. M. J. Berkeley, who determined it, in the forthcoming "Notices of British Fungi" in the 'Annals and Magazine of Natural History.'

In a brief notice of the Society's meeting, contained in the last number of 'Grevillea,' Dr Cooke mentions, as probably new, a species of *Nectria*, which was growing in large patches on the naked ground at Penicuik.

Of species which have not previously been recorded as British, we have to notice *Ag.* (*Crep.*) *calolepis*, Fr., a very pretty little agaric; *Polyporus spongia*, Fr. (*P. Herbergii*, Rost.) and *Craterium Friesii*, Rost. The latter was found by Mr W. Phillips at Hawthornden. It is the same as *Craterium nutans*, Fr. (Syst. Myc., iii. 151), and has been figured in "Myxomycetes" (fig. 105).

The following were of special interest, as new to our Scottish Flora: *Ag. inamœnus*, Fr., *Ag. brevipes*, Bull., *Ag. dryinus*, P., *Ag. alveolus*, Lasch., growing on oak-bark; *Ag. Phillipsii*, B. and Br., a very delicate little species, growing on dead grass, which was identified by the discoverer, Mr W. Phillips; *Ag. inunctus*, Fr., *Cortinarius decoloratus*, Fr., *Russula Queletii*, Fr., *Hygrophorus russo-coriaceus*, B. and Br., a species which may be easily mistaken, but which is readily recognised by its distinctive odour of Russian leather; *Cynophallus caninus*, Fr., frequent in some parts of England; *Peziza theleboloides*, A. and S., a remarkably pretty yellow species, growing in clusters on leaf-mould; *Nectria Rousseliana*, Mont., an inconspicuous species on dead leaves of Box; and *Nectria Albertini*, B. and Br., remarkable for its tomentose subiculum, but not new to Scotland. The latter species was gathered by Mr Plowright in Hawthornden.

Some other species of particular interest remain to be mentioned: notably three which were sent for exhibition by the Rev. M. J. Berkeley,—a new and very pretty species of *Hygrophorus* from Coed Coch, which was exhibited also at the Hereford meeting, and which he has named *H. Wynniæ; Hygrophorus turundus*, Fr., var. *mollis;* and *Hygrophorus lacmus*, Fr., a variety of *H. subradiatus*, Schum. *H. turundus*, which Mr

Berkeley found at Coed Coch in 1869, and in subsequent years, has been gathered in several localities in Scotland. In 1874 I found it at Glamis. In 1877 I gathered the typical form on Farragon, in Perthshire, growing on peat soil at an elevation of 2000 feet; and in September last I found the variety at Loch Maree in Ross-shire. It has also been gathered by Dr Buchanan White in the neighbourhood of Perth. *H. lacmus* I gathered also at Loch Maree in September. The stem is remarkable for its yellow base.

The Rev. M. L. Anderson exhibited *Peziza ammophila*, D. R. and Lev., a striking stipitate species, and *Morchella deliciosa*, Fr., both species having been discovered by him at St Andrews as new to Britain, the latter in May 1878. A curious circumstance connected with *Peziza ammophila* is worthy of notice. *Agaricus ammophilus*, Mont. and Dur., and *Peziza ammophila*, D. R. and Lev., have both been discovered by Mr Anderson at St Andrews, growing together in sand on the sea-shore. Previously they were known only in Algeria, and there also they were found growing together.

Two species, which I discovered some time ago as new to Britain, may also be mentioned, as they have not yet been detected elsewhere than at Glamis: *Ag. scobinaceus*, Fr., resembling in some respects the rare *Ag. caput-Medusæ*, Fr., which I found also at Glamis during two successive seasons, and which was exhibited at South Kensington and at Perth; and *Polyporus roseus*, Fr., remarkable in the earlier stages of its growth for the delicacy of its rose-coloured bloom. I have already, in a previous article,[1] referred to *Ag. scobinaceus* in describing a plant which was exactly intermediate between *Ag. caput-Medusæ* and *Ag. scobinaceus.* The specimens shown at Edinburgh were scarcely of the typical form of *Ag. scobinaceus*, but were much nearer to it than the plant referred to.

Hydnum imbricatum, L., and *Hydnum fragile*, Fr., were forwarded by the Rev. J. Keith from Morayshire. These are worthy of note as not having been met with farther south than Rannoch in Perthshire, where they have been gathered by Dr Buchanan White, the former abundant and very large. The old pine-forests of the North seem to be peculiarly the Scottish homes of the larger *Hydna*.

In the general collection I observed some fine specimens of *Nidularia;* but on inquiry, I have been informed by Mr J.

[1] Scot. Nat., vol. iv. p. 20.

Anderson-Henry of Woodend, that they appeared in the soil of a wardian-case which he had from New Zealand; so that, though interesting, they cannot be regarded as native.

The following may be mentioned as hitherto less commonly found in Scotland. Several of them may be regarded as frequent, but local:—

Ag. (*Amanita*) *pantherinus*, D. C., *Ag.* (*Lepiota*) *rachodes*, Vitt., *Ag.* (*Armillaria*) *mucidus*, Schrad., very infrequent during most seasons, though abundant in some localities during 1878; *Ag.* (*Tricholoma*) *equestris*, Linn., *resplendens*, Fr., first found in Britain at Forres by Mr Keith, but since gathered in several localities in England and in Wales; *Columbetta*, Fr., *sulphureus*, Bull., *nudus*, Bull. (*Lepista nuda*, Sm.), *Ag.* (*Clitocybe*) *nebularis*, Batsch., *Ag.* (*Collybia*) *stipitarius*, Fr., *Ag.* (*Mycena*) *galopus*, Pers., *Ag.* (*Entoloma*) *jubatus*, Fr., *Ag.* (*Pholiota*) *caperatus*, Fr., fine specimens; *Ag.* (*Flammula*) *conissans*, Fr., *Ag.* (*Naucoria*) *cucumis*, Pers., *Cortinarius glaucopus*, Schæff., *cærulescens*, Fr., *castaneus*, Bull., *Hygrophorus calyptræformis*, B. and Br., a pure white variety of which also was gathered at Penicuik; *Fistulina hepatica*, Huds., *Polyporus Schweinitzii*, Fr., *intybaceus*, Fr., *sulphureus*, Bull., *chioneus*, Fr., *lacteus*, Fr., *fragilis*, Fr., *applanatus*, Pers., *fomentarius*, L., *Dædalea quercina*, L., *Merulius pallens*, Berk., *Sparassis crispa*, Wulf., *Clavaria amethystina*, Pers., very large fine clusters; *fumosa*, Pers., *Typhula erythropus*, Bolt., *Tremella epigæa*, B. and Br., *Lycoperdon giganteum*, Batsch., a very large specimen; *Craterium minutum*, Fr., *Puccinia chrysosplenii*, Grev., *Urocystis pompholygodes*, Schl., *Anthina flammea*, Fr., *Helvella crispa*, Fr., *lacunosa*, Afz., unusually large specimens; *Mitrula cucullata*, Fr., found previously in Scotland only by Greville, and recorded in his 'Flora Edinensis;' *Peziza cerea*, Sow., *Helotium claro-flavum*, Berk., *pallescens*, Fr., *Hypomyces rosellus*, Tul., *Xylaria polymorpha*, Grev., *Sphæria ostruthii*, Fr.

ZOOLOGY.

THE LEPIDOPTERA OF MONCREIFFE HILL.

By Sir THOMAS MONCREIFFE, Bart.

(*Continued from Vol. IV. p.* 340.)

Tineina.

Exapate congelatella.—Not a common insect here. [Very plentiful in the young Scots-fir plantations with heather undergrowth, on the Logiealmond range of hills to the west of Dunkeld.]

Chimabacche phryganella.—A common autumn insect at Moncreiffe. Does not appear to vary.

C. fagella.—Very plentiful in March and April. Especially attached to beech here. I have taken one male, the wings of which are yellowish-white, and quite destitute of markings; the body, head, and thorax yellow.

Semioscopis avellanella.—Common in March and April among birch. I have taken this insect on the wing freely at night with the lantern.

Diplodoma marginepunctella.—I have rarely met with this insect. As there are plenty of fungi, it is probably more common than is supposed.

Ochsenheimeria birdella.—The only specimens of this insect I have taken were crawling up the grass-stems on a rough bank near the river. I have never seen it on the wing. It appears in July.

O. bisontella.—Common, particularly on an open flat at an elevation of 500 feet.

Tinea rusticella.—This insect must feed on other things than cloth, as although I take it in the house and in the outhouses, I also take it freely in my garden of an evening, and on Moncreiffe Hill up to 700 feet. Those I take at a high elevation are

much darker, stronger made, and more strongly marked insects, than those I take about the house. They probably feed on skins, feathers, &c.

T. tapetzella.—A pest in a harness-room or farm-stable, if the horse-collars, saddles, &c., are not properly attended to.

T. granella.—Not uncommon, but not such a common insect as

T. cloacella, which is abundant everywhere.

T. misella.—Common, and generally distributed. All the insects belonging to this family which we have here may be netted on the wing in the evening twilight, and most of them come to light.

T. fuscipunctella.—I have only one specimen of this insect, taken in an outhouse here, in July; but I may have overlooked it.

T. pellionella.—Common, and generally distributed.

T. lapella.—Also a common summer insect.

T. biselliella.—Thank goodness, I have scarcely been able to procure a set of this insect here, as it is one of the most destructive to furniture that we have.

T. semifulvella.—This pretty insect is common along the woodsides here. Mr Stainton does not mention upon what the larvæ feed; probably rotten wood.

T. bistrigella.—This pretty little insect, which always strikes me as being unlike its congeners, is not very common here. I have beaten it off birch in June.

Lampronia rubiella. — Locally common among raspberry-bushes. Is very noticeable where it occurs, flying about the food-plant in the evenings early in June.

Incurvaria masculella.—Common among birch.

I. pectinea.—Not so common as the last, and appears somewhat earlier in April and May in the same locality.

Nemophora swammerdamella, and *N. Schwarziella.*—Both these insects occur here commonly in the month of May.

Adela fibulella.—Plentiful wherever I have observed it; particularly so amongst a large bed of Hypericum, the flowers of which appear to have a great attraction for it. May and June.

A. viridella.—Plentiful among Vaccinium myrtillus under scattered birches in the month of May.

Micropteryx calthella.—Plentiful in May among meadow-hay near my house, and otherwise distributed.

M. seppella.—Plentiful in the same locality.

M. allionella.—Plentiful on heather and Vaccinium among scattered birches at an altitude of 600 feet. I have observed the heather-blossoms perforated by some small larvæ in that neighbourhood, but have failed to trace them.

M. purpurella, *M. semipurpurella*, *M. unimaculella*, and *M. sparmanella*, may all be beaten off birch at all altitudes in April and early in May.

M. subpurpurella.—Plentiful on oak. In windy weather I have seen the grass below the oak-trees alive with specimens.

Swammerdamia apicella.—Not uncommon in June. From the localities in which I find this insect, I presume it feeds on blackthorn as well as on plum.

S. cæsiella.—Not uncommon near old thorn-trees and hedges.

S. griseocapitella.—Common among birch through the summer months.

Hyponomenta padellus (*variabilis*).—One of my sons beat a specimen of this insect off an apple-tree in my orchard in August 1876. No other specimen has been observed here before or since.

H. padi (*euonymella*).—This insect occurs in one locality here, where I have beaten it off bird-cherry, and taken it on ragwort-blossom.

Prays curtisellus.—Plentiful among the ash-trees. I have never heard of the dark variety being taken here.

Plutella cruciferarum. — Plentiful everywhere. Varies considerably in size and in the colour of the dorsal streak. Those I take at the higher altitudes among the heather are larger and more richly marked—*i.e.*, more rosy—than those that frequent the fields below, which usually have white or yellowish dorsal markings. It appears in May, and is flying still in numbers, Oct. 19, 1878.

P. porrectella.—Plentiful among a large bed of Hesperis matronalis, which grows on and under the rocks on Moncreiffe Hill. Flies in May and on through the summer.

P. dalella.—Common and generally distributed. I presume this insect hybernates, as I have taken it at sallow-blossom in the month of April.

Cerostoma vittella.—Common.

C. radiatella (*variella*).—This common insect may well be called *variella*, as it varies here from black to white, brown and yellow, and the markings are just as variable as the ground colour.

C. costella.—Frequent but local. May be beaten off birch at the higher altitudes in July. It varies considerably in the size and brilliancy of the costal streak.

C. xylostella (*harpella*).—Not uncommon. May be easily bred from honeysuckle in spring. Does not vary.

Depressaria costosa.—Common, particularly at the higher altitudes, where the furze is most abundant. August, &c.

D. liturella.—Locally common. The larva may be taken full fed in the rolled-up leaves of Centaurea nigra at the end of May and beginning of June, and the imago on the flowers in the evening and after dark with a lantern in August.

D. umbellana.—Common in the same localities as *costosa*, in August, &c.

D. assimilella.—Common among broom in the month of June.

D. arenella.—Common in autumn among thistles and knapweed.

D. angelicella.—To be taken also in several localities in August.

D. ciniflonella.—Mr. Herd has taken this insect on Moncreiffe Hill. I have never met with it.

D. applana.—Abundant everywhere. I have taken this insect, as also *costosa* and *umbellana*, in February and March, frequenting the Cupressi in the evenings.

D. ciliella.—I have beaten this insect from thatch in winter.

D. pulcherrimella.—I have only one specimen, captured in August in front of my house. As, however, the food-plant is common, I presume I have overlooked it, although I have failed to notice the larvæ at work.

D. nervosa.—The larvæ are common in the stems of Œnanthe crocata, and emerge in August in the imago state.

D. heracliana.—The same as *D. nervosa*, except that the food-plant is Heraclium sphondylium.

THE NATURAL HISTORY OF THE GALL-MAKING CYNIPIDÆ.

ABOUT a year and a half ago, we briefly noticed (Sc. Nat., IV. p. 117) the curious and interesting discovery of an alternation of generations in the gall-making Cynipidæ made by Dr Adler of Schleswig. Mr Peter Cameron subsequently published a paper (Sc. Nat., IV. p. 152) entitled "Does Alternation

of Generations or Dimorphism occur in European Cynipidæ?" in which he argued theoretically against the existence of such an alternation of generations; but since then he has admitted that he "attached too much importance to mere negative observations;" and is "very glad to say that I have this spring made some observations on *Neuroterus lenticularis* which confirm those of Dr Adler" (Entom. Month. Mag., XV. p. 13, June 1878).

In 'The Canadian Entomologist' for May 1878 (Vol. X. p. 85), Dr H. Hagen has reviewed the whole subject; and as the magazine in which his paper appears is probably not seen by a majority of our readers, we will reprint most of the article. We may mention that several other entomologists have been successful in repeating Dr Adler's experiments.

Dr Hagen writes as follows:—

"The natural history of the interesting gall-insects is still somewhat mysterious. A large number of observations have been made here and in Europe by prominent entomologists; nevertheless, a careful study of the most detailed papers always gives the impression that something is still wanting to explain the various facts related by the authors. Among the Hymenopterous gall-insects important progress was made in the discovery, by the late B. Walsh, of the dimorphism of *C. q. spongifica* and *C. q. aciculata*, the latter one a parthenogenetic species. But even here new observations are wanted to fill some gaps in the history of those species. Mr W. F. Basset, of Waterbury, Conn., draws my attention to the fact that in a letter in the Proc. Entom. Soc. Lond., April 1873, p. xv, he 'did state most emphatically his belief that all one-gendered gall-flies were the alternate of a two-gendered brood from galls of a different form.'

"Two papers by Dr Adler, from Schleswig—'Contributions to the Natural History of the Cynipidæ,' and 'On the Ovipositor and on Oviposition of Cynipidæ,' in 'Berlin Entom. Zeitschr.,' vol. xxi., 1877, Dec.—which have just arrived here, are prominently remarkable. I believe the way so long sought for is found, to understand the complicated relations not only of the Hymenopterous gall-insects, but probably of all other gall-insects, and perhaps, also, of some other insects not gall-producing. These papers are equally remarkable both by the manner of the experiments, the judicious conclusions drawn from them, and the clear and plain description of what he has observed. Dr Adler has raised the species through several years. In Cynipidæ the raising is less difficult, as the eggs are

mature the moment the insect has passed its last transformation: the females are usually disposed to lay the eggs directly, and are, at least many of them, not disturbed by observation; therefore the experiments with them followed through several years become more reliable.

"The parthenogenesis of *Rhodites rosae* was proved by direct raising through three years. The fact is, indeed, more remarkable as males exist in a very small number, about one to a hundred females: but a copulation was never observed. The females carefully separated after their transformation, laid the eggs in confinement. Moreover, a number of females were dissected and showed always the receptaculum seminis empty, therefore proving that the eggs were not impregnated.

"Other series of observations lead to the interesting discovery of alternating generation by a number of species, which were considered to belong to different genera, but are now proved to be the winter form and the summer form of the same insect.

"*Neuroterus fumipennis* was raised from the galls, the imagines placed on oak-buds, the oviposition observed, and the plants isolated. The galls originating from them were entirely different from those galls out of which *N. fumipennis* was raised. By further growth they proved to be the well-known galls of *Spathegaster albipes*, which species was raised from them in due time. These two Cynips belong to two different genera, and differ in size. *Neuroterus*, the winter form, is agamous, only females known, and the receptaculum seminis was always empty; the eggs are laid deep in the buds. *Spathegaster*, the summer form, is bisexual, males and females in regular proportion and copulating; the receptaculum seminis of the egg-laying females being always filled with spermatozoa. The eggs are laid on the leaves. To complete the cycles, *Spathegaster* galls carefully confined were raised, and gave in due time *Neuroterus*. The experiment was made repeatedly on a large scale and with excellent precautions, so that no doubt is possible. Now, as the fact is known, it is rather remarkable that it was not sooner discovered, as it is entirely impossible for *Spathegaster* and for *Neuroterus* to produce the galls out of which they are always raised. *Spathegaster* possesses a short and somewhat degraded ovipositor, just fit to injure the superficies of a leaf and to lay the egg; *Neuroterus* possesses a long, bent and complicated ovipositor, able to perform the rather difficult act of entering the bud and laying the eggs in the basis of the bud, but would be scarcely able to injure

the superficies of a leaf in the same manner as *Spathegaster*. I think this admirable discovery is of the greatest importance for further observations. If we find again a species with an ovipositor not fit to make the galls of the species, we are justified in presuming a similar alternating generation with some other species.

"The difficult question how the eggs of Cynips are able to pass through the comparatively small ovipositor, is described with much detail and acumen. The observation was only possible by the ingenious device of chloroforming the insects in the act of oviposition, and making an anatomical investigation of the parts. By repeating the observation many times in different stages of the act, a full series of observations, one completing the other, gave a clear and satisfactory result, and at the same time the place was ascertained in which the egg was laid. A large number of other interesting details concerning the formation, structure, and the growth of the galls, are given, which must be studied in the original paper. I may only add the surprising fact of the continuous rotation of the embryo in the egg, till it is hatched. The rotation is not made as in molluscs, by vibrating cells, but by the alternate contraction of long spindle-shaped cells, which are attached to the hypodermis.

"Similar experiments with similar results followed also through the whole cycles, proved that *Neuroterus lenticularis* is the winter form of *Spathegaster baccarum*, and *N. numismatis* the winter form of *Sp. vesicatrix*. Dr Adler adds that experiments with all three species are not very difficult, and he believes that every student will be able to repeat them.

"It seemed to the author more than probable that such alternating generation would not exist alone in *Neuroterus*. Similar observations and experiments followed through all the cycles proved that *Dryophanta scutellaris* is the winter form of *Trigonaspis crustalis*, and *Dryophanta longiventris* the winter form of *Spathegaster Taschenbergi;* but for the last species only half the cycles was till now ascertained.

"Direct observations proved that the egg of *Dryophanta* is laid with the egg-body downwards and the stem of the egg upwards. The situation is just reversed in *Neuroterus;* and as the egg is always hatched through the hind portion, the larva of *Dryophanta* is obliged to make its galls downwards in the cambium, and the larva of *Neuroterus* upwards on the leaves.

"Another agamous genus, *Aphilothrix*, possesses an ovipositor similar to *Neuroterus*, and it seemed impossible that the large

galls out of which it develops could be made by such an ovipositor. Similar observations gave the result that *Aphilothrix radicis* is the alternating generation of *Andricus noduli*, and *Aphilothrix Sieboldii* of *Andricus testaceipes*. Neither *Aphilothrix* nor *Andricus* develop in the same year; each of those genera needs two years for its development; therefore the whole cycle runs here through four years, and till now only half the cycle of *Andricus* bred from *Aphilothrix* galls has been ascertained by observation.

"I think there can be no doubt that the agamous *C. q. aciculata* is the winter form of the bisexual *C. q. spongifica*, just as *Neuroterus* and *Dryophanta;* but here both species have the same kind of gall, and both species are less different than those above quoted.

"The remarkable success of Dr Adler's experiments with the Hymenopterous galls induced me to compare the rather large collection of Dipterous galls from Europe and America belonging to the Museum. I found directly some forms entirely similar and corresponding to the alternating galls of Cynips; but the collection is rather poor in bred specimens of the insects. Just in the presence of the judicious and sober observations of Dr Adler, it would not be proper to say more than that it is not difficult to point out galls of *Cecidomyia* similar to both forms of the alternating *Cynips* galls. It is to be presumed that in *Cecidomyia*, as well as in *Cynips*, the form of the ovipositor will be different; but such investigations can scarcely be successful with dry specimens.

"I may add one observation, made by myself, by which it is at least probable that bisexual species of *Cecidomyia* may also propagate by parthenogenesis. Some twenty years ago, occupied with the study of insects obnoxious to agriculture in Prussia, I had stalks with cocoons of *Cecidomyia destructor* in corked glass tubes. In one of them I raised a single female, and was sure that no other cocoon was present. The female laid a number of eggs on the glass, which, after a few days, began to develop so far that the embryo and the segmentations of it were clearly visible. By some mischance the glass tube was left in sunlight and the development stopped. Though I have not been able since to repeat the observation, I am sure that I was not mistaken. I think it is justifiable to presume a possible parthenogenesis for *Cecidomyia*, which, if proved, may lead to successful results concerning the destruction of this dangerous pest.

"After having studied Dr Adler's papers, I remembered directly some similar facts given by Mr Lichtenstein in Stettin. Entom. Zeit, 1877, on the Hemipterous genus *Phylloxera;* the alternation is here very remarkable. The bisexual form originates from pupæ, which are produced by larger-winged forms, which possess no external sexual organs, and can therefore not copulate. Mr Lichtenstein calls this form of propagation anthogenesis. A certain similiarity with *Cynips* consists in the fact that the different forms of *Phylloxera* emigrate in spring and return in the fall. So the well-known *Ph. vastatrix* emigrates from the leaves to the root of the same plant, and needs therefore no special winged forms for the purpose of emigration. But *Ph. quercus* changes to another tree, and needs therefore two winged forms, which are different one from the other. One parthenogenetic form brings the summer colonies from *Ilex* to *Robur*, and another anthogenetic fall form brings them back from *Robur* to *Ilex*. The fact that some species possess two different winged forms will probably reduce the number of the described winged species. Till now it is only known that *Ph. Lichtensteinii* is the anthogenetic form of *Ph. quercus*, and *Ph. Signoretii* probably the same form of *Ph. florentina*. Mr Lichtenstein presumes that many *Pemphigus* and *Adelges* will possess similar forms, and observations made by myself on one species in the last year seem to favour his opinion.

"Such alternations stated without doubt for Hymenoptera and some Hemiptera, and probable by analogy for some Diptera, will certainly not fail to occur in other orders, and are probable in some Lepidoptera heterocera.

"A paper by Mr P. Cameron, in the 'Scottish Naturalist' for October 1877, the substance of which is incorporated and fully approved in the President's Address to the Entomological Society of London, arrives at conclusions entirely unfavourable to Dr Adler's memoir. To corroborate my views about the memoir I wish to give a few statements.

"Dr Adler gives the facts upon the discovery 'of the Parthenogenesis of *Rhodites rosae*' on ten pages, about two-thirds of the first part of his memoir.

"In May 1872, *Rh. rosae* in large numbers was observed; some few males appeared, which were put, together with several females, in the breeding cabinet; but no copulation was observed. For further experiment were chosen females appearing later, of which, by careful observation, it was certain that none of them

had been with any male. Those females were put on bushes of *Rosa canina:* on May 10th, 12 wasps;[1] May 13th, 16 wasps; May 26th, 10 wasps; June 2d, 6 wasps,—together, 44 wasps. Of those 26 wasps were observed in the act of oviposition, and the twigs were marked with a thread around each. The first formation of a gall was observed June 5th, and in all only nine twigs formed galls; giving the positive result that unimpregnated eggs had developed. The experiment was tried again for the purpose of having surer results by repetition, and to investigate why the first experiment was without result in so many cases. In 1874 there were put, June 22d, on rose-bushes 8 wasps, 4 of which were observed in oviposition, none producing galls; June 23d, of 10 wasps, 4 observed in oviposition, 2 producing galls; June 27th, of 12 wasps, 5 were observed in oviposition, producing 3 galls.

"Of the 13 wasps observed in the act of oviposition, 4 were dissected, and the receptaculum seminis stated to be entirely empty (without spermatozoa). Every one of the wasps spoken of was carefully observed and not lost sight of till the wasp had begun the oviposition, in which act some persevered for more than 24 hours. Of course observation was not followed through this whole time, but every few hours it was again observed that the wasp was continuing the oviposition. The five produced galls were in November preserved for the experiment of the following year. In the spring of 1875 there were raised from them 35 wasps, all females, and a large number of parasites. These wasps were put again on rose-bushes as soon as they appeared on May 26th, June 2d, 5th, 7th, and oviposition observed on 11 twigs. After 11 days some of the eggs were examined, and the embryo found in different stages of development (more details are given). Of the 11 twigs 6 produced galls, out of which were raised in spring, 1876, 28 wasps, all females. Those wasps were put on rose-bushes June 26th, July 2d, July 4th, and oviposition observed on 13 twigs, which produced 8 galls. Therefore, through three years parthenogenetic propagation was observed. The objection that in experiments thus made in the open air oviposition could have been made on the same twigs by other wasps, cannot be refuted directly; but if it has been noticed so many times that only galls were produced in the observed and marked places, I believe it is allowable to conclude that none except the observed oviposition had been made.

[1] "Wasp" is used here to designate the perfect gall-insect or fly, and is not restricted to a species of *Vespa* as is usual amongst us.—Ed. 'Sc. Nat.'

"The other question, if the unimpregnated eggs are regularly developed, was answered in the affirmative by repeated experiments, which are very simple and very easy to be repeated. I put female wasps, raised by myself, which had not been with a male, on shoots of rose put in a jar in water. As soon as the wasps began oviposition the shoot was placed in a breeding cabinet. After oviposition had ended, the wasp was examined anatomically, and the vesicula seminalis found to be empty. The eggs were examined after 12 hours, and the peripherical layer of cells around the dark yolk was seen; in the following days the development advanced in the regular manner.

"Dr Adler gives on five pages more the most interesting details upon the formation and growth of the gall. As *Rh. rosæ* is common here, this part of the memoir is of great value for American students. If we look in Mr P. Cameron's paper, we find about this matter on p. 156, as follows:—

"'With the bisexual Cynipidæ the males are in some species nearly as common as the other sex; in others, as in *Rhodites*, they are very rare.' That is all!

"On the alternation of generations in Cynipidæ the first part of Dr Adler's memoir contains only (6 p.) the beginning of the experiments with *Neuroterus fumipennis*. The second part (24 p.) was published three months later than Mr Cameron's paper, which contains, nevertheless, some of the names of the species (5 out of 7) treated in the second part, probably out of a provisionally published notice, unknown to me.

"Dr Adler having raised in 1874 out of all *Neuroterus fumipennis* galls nothing but *Spathegaster albipes*, decided to observe them more exactly. The experiments with *Neuroterus fumipennis* were made in 1875 in the following manner:—

"The galls were collected in the autumn before. When the wasps began to appear, they were put on a small oak-tree in a tub in a cool room. When a wasp began oviposition, each twig was enclosed in a glass tube, after the bud had been marked with a thread. There were marked March 14th, 12 buds; March 19th, 10 buds; March 24th, 8 buds; March 26th, 6 buds—in all, 36 buds. Besides those, other wasps were put on cut oak-twigs placed in damp earth or sand (in which manner the twigs keep well three weeks and longer as good material for observing the eggs), and after oviposition was observed, the isolated twig was covered with a glass bell. The wasps were examined after the oviposition, and the receptaculum seminis found

to be empty. The receptaculum is in the agamous species always somewhat atrophied; in the bisexual species the external membrane is pigmented, and even if empty, forms a ball.

"Besides those experiments, others were made at the same time in the open air. The oviposition was observed March 31st on 5 buds, April 1st on 7 buds, April 2d on 12 buds, April 7th on 12 buds, April 10th on 40 buds, April 12th on 38 buds; altogether on 114 buds. A curious fact is related, that in 42 buds the ovipositor of the wasp was found left in the bud.

"The results of the different experiments were as follows: The small oak-tree in the tub was kept in the room, and began to bud in the beginning of May, and the leaves were developed enough, May 14th, to see if galls were forming. Of the 36 marked buds, 13 had no galls produced; on the others, in all 36 galls were counted. It is to be remembered that here oviposition was made and observed in the room, the twigs carefully isolated by glass tubes, and kept in the room till the tree began to bud. Therefore it is impossible that eggs could have been laid by other wasps. The galls were those of *Spath. albipes*. Concerning the experiments in the open air, the leaves of the tree were, May 20th, so far developed that the formation of galls could be observed, and again the galls were those of *Spath. albipes*. Out of the 144 buds marked, galls were found on 68, with about 300 galls. The oak chosen was a small shrub four to five feet high, easy to be examined, and showed nowhere any other galls.

"Out of the collected galls a large number of *Spath. albipes* was raised in the first half of June, and were put in a breeding cabinet with a small oak-tree. As no copulation nor oviposition was observed, Dr Adler decided to try observation in the open air. He succeeded, June 3d, in finding several females of *Spath. albipes* in the act of oviposition, and secured six wasps, several leaves, and marked four leaves on which he had observed oviposition with a thread. The lens showed that an egg was deposited. The secured wasps were put on the small oak in the breeding cabinet, and now the wasps were observed ovipositing on two leaves. The next day the wasps were examined, and showed the receptaculum seminis full of spermatozoa. On June 5th and 6th several more wasps in the act of oviposition were observed, and six leaves marked. In the first fortnight no change in the leaves was seen; in the third week the substance of the leaf where the egg was deposited was visibly thickened—the larva had left the egg, and the formation of the gall began.

Then the progress was very slow; after four to five weeks, in the beginning of July only a very small hairy disk was seen, and only in the end of July the galls could be recognised with certainty as those of *Neuroterus fumipennis*. On all ten leaves such galls were produced.

"I have given here the substance of Dr Adler's experiments only for one pair of individuals, but in the same manner the memoir contains them for seven pairs."

Occurrence of Deiopeia pulchella in Scotland.—Mr W. J. Kerr has sent me a specimen of the rare and beautiful moth, *Deiopeia pulchella*, which has not, I think, been previously recorded as a native of Scotland. Mr Kerr writes: "When fishing on the Teviot between Kelso and Rutherford, I took *Deiopeia pulchella*, either in August or September 1876. The insect was sitting upon a blade of grass; and though I searched carefully, I could only find the one specimen."—Thos. Moncreiffe, Moncreiffe House, Bridge of Earn, Nov. 20, 1878.

Capture of Larvæ of Acherontia atropos.—I had three caterpillars of the Death's-head Hawk-moth brought to me lately. The first was found in a field of potatoes on the 28th ult., and the other two were found in a heap of stones about the beginning of this month. They were not found at the same place, the first mentioned being found some two miles from the other two.—Thomas Marshall, Stanley, Perthshire, Sept. 17, 1878.

Esquimaux Curlew.—A fine specimen of the Esquimaux Curlew (*Numenius borealis*) was shot by Mr W. Ramsay on the estate of Slains, on Saturday, 28th September last. The bird, which proved a male, was in good condition. The stomach was crammed with crow-berries (Knouperts), amongst which were several flies and one caterpillar. Extent of wings, 25¾ inches, length from point of beak to end of tail, 13½ inches; length of beak, measured over ridge, 2 inches; tarsus, 1¾ inch; wing, from carpel joint, 7⅞ inches; weight, 8 ounces. This is the second of this species on record for Scotland, the first having been shot on the estate of Durris, Kincardineshire, on the 6th September 1855. The one now obtained answers well with the description of the first as given in 'The Naturalist,' vol. v. p. 265; as also with Swainson's description of the species. Wilson, in his 'American Ornithology,' describes a bird as *N. borealis*, of proportions so different from the testimony of all other authors with which I am acquainted, that it is evident he has made a mistake in the bird's identity, or the others have.—George Sim, Aberdeen.

Stock-dove (Columba anas) breeding in Scotland.—I have much pleasure in recording the fact of a pair of Stock-doves (*C. anas*) having bred this season on a rocky hill at the back of this house—this being, so far as I am aware, the first recorded instance of their having nested in Scotland. I first discovered the nest after some difficulty on the 28th June, and it then contained two young birds nearly hatched. The old birds were very shy, and although I spent many hours watching for them, could rarely catch them

coming to their nest. They appeared to feed the young chiefly early in the morning, or very late in the evening, just before dark. I had several opportunities of identifying them satisfactorily, as they sat on the rocks a couple of hundred yards off, and I might frequently have shot them. When the young were fully fledged, I took one, and kept him in a cage for a week, but he eventually escaped; and I have since seen him, or some of his relations, more than once flying about the hill. The nest was built in a hole in a cleft of the rocks, and the entrance to it entirely concealed by overhanging heather. In the last number of the 'Ibis,' p. 382, there is a note of three specimens having been shot in Scotland early in the summer. There is no doubt these birds would have bred if they had been left alone.—A. B. Brooke, Cardney, Dunkeld.

REVIEWS.

Transactions of the Natural History Society of Aberdeen, 1878. 8vo, pp. 98.—The Natural History Society of Aberdeen (the third of that name) was instituted in 1863; but though its meetings have been regular, and its life apparently altogether healthy, this is the first volume of Transactions that it has published. Not, however, the first of its publications, as from time to time several excellent papers, which had been read at the meetings, were printed and circulated.

The present volume, after a brief sketch of the work of the existing Society and its predecessors, commences with a paper on the "Progress of Zoology in Aberdeen and its Neighbourhood," from the pen of Professor J. W. H. Trail. Zoology, it seems, has been much less a field-study in Aberdeenshire than Botany. Consequently it has been thought desirable to devote the greater part of the first volume of Transactions to that department of Natural History, with the view especially of showing what is the present state of knowledge regarding the local fauna, and of pointing out what remains to be done in the future.

The four following papers are also by Dr Trail, and include "Introductory remarks on the Entomology of 'Dee,'" and lists of the Insects, of the Spiders, and of the Galls and their Makers that have been found in the district.

The zoological province or district "Dee," as defined in this Magazine, is adopted by Dr Trail, and divided into seven sub-districts, which he describes and illustrates by a map. Then follows a pretty extensive list of the Lepidoptera (to the end of the Tortrices), with their sub-district destribution as far as known. This list contains the names of 455 species. Of some of the other orders of Insects, short lists are given; but, as in most parts of the country, comparatively little attention has yet been paid in Dee to the "neglected orders."

The list of the Araneidæ or Spiders is more fully worked out, and is rather extensive. All the species were collected by Dr Trail himself who gives some excellent hints on the best methods of collecting spiders.

The article that follows is the longest in the volume, and is also by Professor Trail. The subject is, "Galls and their Makers in 'Dee,'" and is treated at great length. Dr Trail, as our readers know, interests himself very much on the subject of galls, and has contributed many notes thereon to our columns. These notes he has rearranged into systematic form, and now republishes with considerable additions.

After giving a sketch of the classification of galls, proposed by Frauenfeld and expanded by Schenck, Dr Trail gives a list of the galls of Dee, according to the plants on which they occur, with description of each gall and name of its maker. He next gives a list of the insects that make the galls, with the plants galled by them, and concludes with an analysis or summary of the galls and the gall-makers. Up to the present time he has found 27 natural orders and 96 species of plants bearing galls of 155 kinds in "Dee." By far the greater number are made by the gall-midges (Cecidomyidæ). The article will altogether be found to be very valuable and interesting.

Mr George Sim follows with a list of the Crustacea of the north-east coast of Scotland, and, in connection with the late Dr Dyce, with a catalogue of the "Fish found in the Vicinity of Aberdeen." In this list the scientific, "English," and local names are given. Of the latter, some are very curious.

The volume concludes with remarks on, and a Synopsis of the British species of, the genus *Sphagnum* (bog-mosses), by Mr John Sim.

Proceedings of the Natural History Society of Glasgow, Vol. III. Part III. Pp. 221-360. 1878.—As usual, these "Proceedings" contain many valuable papers treating of all departments of Natural History, and for the most part relating to the Fauna and Flora of the west of Scotland. Space will not permit us to notice this part at greater length—at least just now. We have also received from the same Society "A Catalogue of the British Tenthredinidæ," by Mr P. Cameron, which, like all the other publications of the Society, is well got up, and likely to prove valuable.

We have been asked to call attention to the "Postal Microscopical Society," which exists for "the circulation, study, and discussion of microscopic objects, and for the general advancement of microscopy and the natural sciences amongst its members." This is acomplished by the circulation by post of microscopic slides, with notes, &c., amongst the members, and appears to work well. It is now proposed to add to the objects studied by the Society "a special series of Histo- and Patho-logical slides," to circulate almost exclusively amongst the medical members. Persons desirous of further information regarding this Society may get it from the Secretary, Mr Alfred Allen, 1 Cambridge Place, Bath.

INSECTA SCOTICA.

THE LEPIDOPTERA OF SCOTLAND.

(*Continued from Vol. IV. p.* 321.)

EDITED BY F. BUCHANAN WHITE, M.D., F.L.S.

DURING the seven years that have elapsed since this list was commenced, the study of the geographical distribution of the Scottish Lepidoptera has received a considerable impulse. Many new workers have arisen, and, as a natural consequence, our knowledge of the distribution in Scotland of species already known as Scottish has not only been very much increased, but several species — some of them very unexpected — have been added to our list. It is chiefly in the south of Scotland that this good work has been done, as it is in that part of the country that most of the new workers have appeared. Regarding the Lepidoptera of the north and of the north-west, a great deal remains to be learnt.

In the following series of papers I purpose giving—1stly, The additions (some of which require corroboration) to the list of species; 2dly, The additions to the district distribution; and 3dly, A summary of the chief features of the distribution of the Scottish Macro-lepidoptera.

I. Additional species :—

RHOPALOCERA.

NYMPHALIDÆ.

VANESSA Fab.

POLYCHLOROS L. Very rare.

DISTRIBUTION—EAST. Tweed Forth [Tay] Dee o o o o

WEST. o o o o o

LAT. 56°-57°. RANGE IN EUROPE. Nearly throughout. TYPE. European. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. July, August-May. LARVA. June, July. FOOD-PLANT. Elm.

As only one or two specimens have been taken or seen in each of the districts indicated, it is possible that this species is not really established in Scotland.

PIERIDÆ.

Rhodocera Rhamni L. A single specimen taken in Forth (Fife) by Dr Power (Scot. Nat. II. 20).

LYCÆNIDÆ.

LYCÆNA Fab.

ASTRARCHE Bgstr. (1779); *agestis* Hh. (1793.) Local. Pascual.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o
LAT. 55°. RANGE IN EUROPE. Nearly throughout. TYPE. Territorial. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. June-August. LARVA. July-May. FOOD-PLANT. *Erodium cicutarium.*

Mr Robert Service, to whom I am indebted for information regarding most of the additions in the Solway district, writes that this species is or was common at Mabie, in the neighbourhood of Dumfries, but that the var. *Artaxerxes* is very local in the district. Mr Service has kindly sent for my inspection a specimen of each form. The Dumfries *Astrarche* (to judge from the specimen) is nearly half-way between the south English insect and the usual Scottish one (*Artaxerxes*); and the specimen sent as *Artaxerxes* agrees very well with the description of the north English form, *Salmacis* Stph.

Though now considered to be but varieties of one species, *Astrarche*, *Salmacis*, and *Artaxerxes* were thought, not very long ago, to be all good species, but if a number of specimens from various localities between the south of Europe and central Scotland are examined, a series can easily be selected showing the gradations between the southern *Astrarche* and the northern *Artaxerxes.*

HETEROCERA.

LIPARIDIDÆ.

Orgyia pudibunda L. has been taken once in Solway (by Mr Service), and possibly in Tay (by Sir T. Moncreiffe), but is probably only an accidental introduction.

ARCTIIDÆ.

DEIOPEIA Steph.

PULCHELLA L. Very rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o
LAT. 55° 40′. RANGE IN EUROPE. South; sporadic in central. TYPE. Meridional. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. July-October. LARVA. July. FOOD-PLANT. Myosotis, &c.

A single specimen taken near Kelso by Mr W. J. Kerr (Scot. Nat., v. 36) has been seen by me.

LITHOSIIDÆ.

LITHOSIA Fab.

COMPLANA L. Not common.

DISTRIBUTION—EAST. o o o o [Moray] o o o
WEST. Solway o o o o

LAT. 55°. RANGE IN EUROPE. Nearly throughout. TYPE. European. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. July. LARVA. May, June. FOOD-PLANT. Lichens.

CYMATOPHORIDÆ.

Asphalia diluta F. Admitted to the list as a doubtful native; seems really indigenous in Solway, and is also reported from Clyde.

ACRONYCTIDÆ.

ACRONYCTA Ochs.

TRIDENS Schiff. Not common, or overlooked.

DISTRIBUTION—EAST. Tweed ♀♀ ♀♀ o o o o o
WEST. Solway ♀♀ o o o

LAT. 55°-56°. RANGE IN EUROPE. Central and northern. TYPE. Centro-septentrional. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. June. LARVA. August, September. FOOD-PLANT. Plum, &c.

ORTHOSIIDÆ.

Tæniocampa munda Esp. Doubtfully admitted hitherto; is indigenous in Solway.

HADENIDÆ.

HADENA Tr.

TRIFOLII Rott. (1776); *chenopodii* F. (1787).

DISTRIBUTION—EAST. o [Forth] o Dee o o o o
WEST. o [Clyde] o o o

LAT. 56°-57°. RANGE IN EUROPE. Throughout. TYPE. Territorial. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. June, July. LARVA. July, August, FOOD-PLANT. *Chenopodium*.

Professor J. W. H. Trail tells me that this species has really been taken in Dee, but whether it is indigenous is doubtful.

The ab. *lunebergensis* Frr. of *Epunda lutulenta* has occurred in Argyle (Cooke), and Dee (Trail).

CATOCALIDÆ.

CATOCALA Schrk.

FRAXINI L. Very rare.

DISTRIBUTION—EAST. Tweed o o o o o o o o
WEST. o o o o o

LAT. 55° 50′. RANGE IN EUROPE. Central (to S. Finland). TYPE. Central. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. August-October. LARVA. June, July. FOOD-PLANT. Ash, poplar, and aspen.

For the discovery of this and the following species we are indebted to Mr W. Shaw (Scot. Nat., vol. iv. p. 12).

NUPTA L. Very rare.

DISTRIBUTION—EAST. Tweed o o o o o
WEST. o o o o o

LAT. 55° 50′. RANGE IN EUROPE. Central (to South Sweden). TYPE. Central. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. July, August. LARVA. May, June. FOOD-PLANT. Willow and poplar.

HYPENIDÆ.

HYPENODES Gn.

COSTÆSTRIGALIS Stph. Rare.

DISTRIBUTION—EAST. o o o o o o o o o
WEST. o Clyde o o o

LAT. 56°. RANGE IN EUROPE. West central. TYPE. Occidento-central. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. July. LARVA. . FOOD-PLANT. .

On the authority of Mr T. Chapman.

AMPHIDASIDÆ.

AMPHIDASIS Tr.

STRATARIUS Hufn. (1769); *prodromaria* Schiff. (1776). Rare. Nemoral.

DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

LAT. 55°. RANGE IN EUROPE. Central. TYPE. Central. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. March, April. LARVA. June-August. FOOD-PLANT. Oak and birch.

Taken by Dr Sharp and Mr Service.

EUGONIIDÆ.

EUGONIA Hh.

FUSCANTARIA Hw. Not common. Nemoral.

DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o

LAT. 55°-56°. RANGE IN EUROPE. West central. TYPE. Occidental. TYPE IN BRITAIN. English.

TIME OF APPEARANCE.—IMAGO. August, September. LARVA. June, July. FOOD-PLANT. Ash.

I have seen a specimen taken by Mr Service.

EURYMENE Dup.

DOLABRARIA L. Rare. Nemoral.

DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

LAT. 55°. RANGE IN EUROPE. Central and northern. TYPE. Centro-septentrional. TYPE IN BRITAIN. English.

TIME OF APPEARANCE.—IMAGO. June. LARVA. August, September. FOOD-PLANT. Beech and oak.

GEOMETRIDÆ.

NEMORIA Hh.

VIRIDATA L. Rare. Nemoral.

DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

LAT. 55°. RANGE IN EUROPE. Nearly throughout. TYPE. European. TYPE IN BRITAIN. English.

TIME OF APPEARANCE.—IMAGO. May, June. LARVA. August, September. FOOD-PLANT. Bramble and hawthorn.

FIDONIIDÆ.

ASPILATES Tr.

OCHREARIA Rossi (1794); *citraria* Hh. (after 1797). Not common.

DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o

LAT. 55°. RANGE IN EUROPE. South and west-central. TYPE. Meridional. TYPE IN BRITAIN. English.

TIME OF APPEARANCE—IMAGO. May, June. LARVA. July, August. FOOD-PLANT. Low plants.

Taken by Messrs Service (who has kindly let me see a specimen) and Len-

non near Dumfries. It has also been reported from Skye, where so southern an insect is scarcely likely to occur. In England *ochrearia* has not, I think, been recorded as occurring north of Suffolk and South Wales. Hence its occurrence in Scotland is of much interest.

BOARMIIDÆ.

BOARMIA Tr.

ROBORARIA Schiff. Rare. Nemoral.

DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

LAT. 55°. RANGE IN EUROPE. Central (to Finland . TYPE. Central. TYPE IN BRITAIN. English.

TIME OF APPEARANCE.—IMAGO. June, July. LARVA. August-May. FOOD-PLANT. Oak.

Hemerophila abruptaria Thnb. has been taken in Dee (Trail), but was probably an accidental introduction.

LARENTIIDÆ.

ASTHENA Hubn.

SYLVATA Hh. Rare. Nemoral.

DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

LAT. 55°. RANGE IN EUROPE. Central (to Finland). TYPE. Central. TYPE IN BRITAIN. English.

TIME OF APPEARANCE.—IMAGO. June, July. LARVA. August. FOOD-PLANT. Alder.

Eupithecia pimpinellata Hh. is recorded—with some doubt—from Solway (Service).

THE COLEOPTERA OF SCOTLAND.

(*Continued from Vol. IV., p.* 364.)

EDITED BY D. SHARP, M.B.

MELANDRYADÆ.

TETRATOMA Har.

FUNGORUM Fab. Rare.

DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

ANCORA F. Scarce. About Scots fir.

DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray o o o
WEST. Solway Clyde o o o

ORCHESIA Har.

MINOR Walk. Rare. On flowers of mountain-ash.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

HALLOMENUS Har.

HUMERALIS Panz. Rare. In *Trametes pini*, &c.
DISTRIBUTION—EAST. o o Tay Dee o o o o o
WEST. o o o o o

ABDERA Har.

TRIGUTTATA Gyll. Rare.
DISTRIBUTION—EAST. o o o Dee Moray o o o
WEST. o o o o o

FLEXUOSA Payk. Rare. In *Polyporus radiatus* on alder.
DISTRIBUTION—EAST. o o Tay o Moray o o o
WEST. Solway o o o o

ZILORA Har.

FERRUGINEA Payk. Very local. In *Polyporus abietinus* on dead Scots fir.
DISTRIBUTION—EAST. o o o Dee Moray o o o
WEST. o o o o o

XYLITA Har.

LÆVIGATA Hell. Rare. Highland.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o o
WEST. o o o o o

LAGRIIDÆ.

LAGRIA Th.

HIRTA L. Very local.
DISTRIBUTION—EAST. oo o o o Moray o o o
WEST. oo o o o o

ANTHICIDÆ.

NOTOXUS Th.

MONOCEROS L. Local. Maritime.
DISTRIBUTION—EAST. Tweed Forth oo o o o o o
WEST. oo oo o o o

ANTHICUS Th.

FLORALIS L. In rubbish-heaps.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. ♀ ♀ o o o

SCOTICUS Rye. Very local.
DISTRIBUTION—EAST. o Forth o Dee o o o o
WEST. ♀ Clyde o o o

PYROCHROIDÆ.

PYROCHROA Th.

PECTINICORNIS L. Local. Highland. In birch stumps.
DISTRIBUTION—EAST. o o o Dee Moray o o o
WEST. o o o o o

MORDELLIDÆ.

ANASPIS Th.

FRONTALIS L. Common in flowers.
DISTRIBUTION—EAST. Tweed Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

RUFILABRIS Gyll. Common. In flowers.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o o
WEST. Solway ♀ o o o

FASCIATA Forst. Not common. In flowers.
DISTRIBUTION—EAST. Tweed Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

RUFICOLLIS Fab. Occasional.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. Solway ♀ o o o

THORACICA L. Rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

MELANOPA Forst. Common. In flowers.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

RHIPIDOPHORIDÆ.

METŒCUS Redt.

PARADOXUS L. Parasitic in wasps' nests. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o Clyde o o o

CANTHARIDÆ.

MELOE Th.

PROSCARABŒUS L. Not common. Lowland. Highland.
DISTRIBUTION—EAST. ♀ Forth Tay Dee Moray o o o
WEST. Solway Clyde o o o

VIOLACEUS Marsh. Rare.
DISTRIBUTION—EAST. o o o Dee o o o o
WEST. o o Argyle o o o

CURCULIONIDÆ.

OTIORHYNCHUS Th.

TENEBRICOSUS Hbst. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o o
WEST. Solway o o o o

I have never seen a specimen found in Scotland of this species, and record it on the authority of Murray's Catalogue.

EBENINUS Schön.
DISTRIBUTION—Unknown.

"A few specimens taken in the West of Scotland. Mr R. K. Greville." Murray Cat.

ATROAPTERUS de G. Local. On sandy coasts.
DISTRIBUTION—EAST. Tweed Forth ♀ Dee Moray o o
Shetland
WEST. ♀ ♀ o o o

LIGNEUS Ol. Not common. In sandy places.
DISTRIBUTION—EAST. ♀ ♀ o o o o o o
WEST. Solway Clyde o o o

SEPTENTRIONIS Hbst. Highland. Local.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

MAURUS Gyll. Sub-alpine. Scarce.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o Shetland
WEST. Solway Clyde o o o

BLANDUS Schön. Sub-alpine. Common.
DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray Sutherland o Shetland
WEST. ♀ ♀ ♀ ♀ o

PICIPES Fab. Very abundant.
DISTRIBUTION—EAST. ♀ Forth Tay Dee Moray ♀ o o
WEST. Solway ♀ ♀ o o

SULCATUS Fab. Rare.
DISTRIBUTION—EAST. ♀ Forth Tay o o o o o
WEST. ♀ o o o

RUGIFRONS Gyll. Not common.
DISTRIBUTION—EAST. ♀ ♀ Tay ♀ ♀ o o o
WEST. Solway ♀ o o o

AMBIGUUS Schön. (fide Rye).
DISTRIBUTION—EAST. o o Tay o o o o o
WEST. o o o o o

OVATUS L. Common.
DISTRIBUTION—EAST. ♀ Forth Tay ♀ ♀ o o o
WEST. Solway Clyde o o o

MUSCORUM Bris. Not rare.
DISTRIBUTION—EAST. ♀ Forth ♀ Dee o o o o
WEST. Solway ♀ o o o

O. scabrosus Marsh. is recorded in Murray's Catalogue from "Dollar, Berwickshire, East Lothian, &c.;" but I have never seen a specimen found in Scotland, and conclude the record must be erroneous.

OMIAS Seid.

MOLLINUS Boh. Rare.
DISTRIBUTION—EAST. Tweed o Tay o o o o o
WEST. ♀ o o o o

(*To be continued.*)

ZOOLOGY.

BIRDS'-NESTING.

By ALLEN HARKER.

AS the time of year again comes round when the nesting operations of birds begin, it may not be unseasonable to make to our readers some plea on behalf of our native birds, and to indicate to all who may have influence to exert, or authority to exercise, on the question of birds'-nesting, methods by which alike the study of Ornithology and the interests of our bird population may be best served, and their preservation insured.

Surely of all God's creatures which delight us, those which give us the purest, most unalloyed pleasure, are the

"Feather'd songsters of the grove"!

How much of the charm of English or Scottish landscape, of deep wooded lane and open breezy heath and common, is due to the presence of ever active, ever musical bird-life, may be best appreciated by a visit to countries where the birds are songless, or where, as in many parts of the continent, for great stretches of country, scarce a bird is to be seen. Such a visit could not fail to impress the lover of nature with a sense of his duty to use his endeavours to preserve from the dull monotony of a birdless country, the melodious fields and hedgerows of rural England.

It is not solely on behalf of the birds themselves, and their nests and eggs, that it seems desirable to awaken greater interest and action, but also in favour of a more systematic and accurate study of the subject, combined with a true scientific use of the knowledge thus obtained—knowledge which is now in a purposeless manner allowed to become lost.

The building of a bird's nest, the choice of site, the selection and gathering of materials, the deft skill that carries on and perfects the work; the number, size, and colour of the eggs, their variations, the period of incubation, the sex of the incubator, the

condition of the new-born young, their growth and first essays at independent flight—these are events in the natural history of the bird, no less interesting or important to the ornithologist than its anatomy, its distribution, or any other of the chapters in its life-history. But in addition to their interest to the ornithologist, these events have ever possessed a special charm and interest for the young of all ranks of life. The beauty of the nest, and the beauty of form and colour of the egg, accompanied, too, by the novelty of finding such a treasure, combine to present a temptation to the finder too strong for any schoolboy to resist. The desire of possessing coloured and shining objects, which he possesses in common with the savage, whose adult condition of mind he represents, leads to the destruction by him of a vast number of eggs and nests; for the youth, having taken the prize, speedily tires of his acquisition, and the eggs are soon broken, and new "sensations" sought for.

Most people will agree that such wanton destruction is to be deplored; but for ages birds'-nesting has been the schoolboy's licence, and while most parents disapprove of it, few go the length of absolutely prohibiting it—still fewer use it as a means of imparting that pleasing knowledge of the natural history of birds which would soonest cure the propensity, and teach the youth at once humanity and zoology. That some efficient protection should be given to eggs and nests is the unanimous feeling of naturalists.

At present, the parent birds themselves are protected during the season of nesting by a somewhat imperfect—but still, as far as it goes, a very beneficent—Act of Parliament; but it need hardly be pointed out that if a female bird is not allowed to rear any young, the chances against it (personally or by its offspring) surviving the winter, or, if it is a migratory bird, of returning in the following spring, are increased by as many times more as the number of young it might be supposed to rear; and in this way persistent and injudicious birds'-nesting may soon diminish the number of birds in a given area. And that birds'-nesting has this effect will not be doubted by any one whose study of the subject has led him to remark the diminution of small and rare birds in particular districts, or by one who has had opportunities of knowing what immense numbers of birds' eggs are annually destroyed by marauding youths.

There are always at work enough of causes—some natural, some artificial—which are not preventible, tending to diminish

the numbers of our birds, more especially of our smaller song birds, either by cutting off their food supplies or by destroying their nesting grounds. Every field, marsh, or swamp that is drained, lessens the supply of insect life on which a great majority of small birds live; every piece of land that is reclaimed from waste, robs the ground or low bush nesting birds of their *habitat.* Every wood that is cut down, every gorse-patch that is burned—in short, every advance of cultivation—drives before it some species of birds.

It was my fortune to revisit, after a lapse of ten years, a part of the country where some of my earliest birds'-nesting exploits had been carried out. "High-farming" had taken the place of a more primitive agriculture; the thick high hedges where red-backed shrikes, bullfinches, linnets, and long-tailed tits were wont to nest, were supplanted by neat trim-cut hedges three feet high, and not thick enough to offer cover for the smallest of birds. The deep ditches with high grass-grown banks, once the haunt of wood-wren, lesser whitethroat, or whinchat, had disappeared, and patches of gorse and heather, where redpole and linnet once dwelt, had been burnt and stubbed out long ago. These causes, which for the birds' sake we may deplore, we cannot nor should we wish to prevent; and even consolation is to be found in that while one species of bird may be driven out, another suited to the new condition may follow and take its place. The richest arable lands are especially the resort of the lark, who dispels the monotony with his "sweet jargoning." It is rather with preventible causes that we have to deal; and to the indiscriminate and utterly wanton birds'-nesting, for no intelligent or intellectual aim or object, which goes on in every parish in the country, a check must be applied. Here it is that the authority of parents and schoolmasters should come into force. It is in most cases due as much to *ignorance* as to wantonness or destructiveness, that the youthful birds'-nester takes eggs for which he has no use—no idea of use, in fact; they serve to gratify his instinct for finding and possessing pretty objects, and then are strung on a string as an ornament, or made cock-shies of as an amusing pastime. Had he been taught anything of the importance of the nest and eggs to the continuance of the parent birds; or had any facts of their history, as of how birds differ from other animals, or how in a sense a nest and eggs are as much a part of the mother as the embryos of viviparous animals,—his nesting for pure wanton

destruction of his spoil would at least be checked; or if he proved not amenable to such reasoning, should be forcibly prevented and heavily punished. But a remedy for checking birds'-nesting in the intelligent boy who wishes to avoid wantonness, but at the same time claims a right to make his collection of eggs as much as another collector has one to make his of butterflies or birds, must be sought in another direction, and is worth the consideration of lovers both of birds and of intelligent and inquiring schoolboys.

In passing it must be remarked that schoolboys alone are not to be blamed for purposeless birds'-nesting, and it would be unfair to pass over as great a culprit—the amateur adult collector, whose condemnation should be as much greater as is his opportunity of knowing better. It has been well remarked that few, if any, advances have been made by human beings in their history but have been accompanied by a concomitant development of special vices, originating in a perverted application or use of the benefits gained by the advance. The form which this aberration assumes in connection with the rise and progress of Biological science is as a mania for amassing large collections of animal structures, whether shells or birds' eggs, or the animals themselves, without any reference whatever to their structure or history, or to the educational purpose they might serve, when this latter exists at all. When you see in the drawers of a collector of birds' eggs a long series of the eggs of the kingfisher or a wild duck, not one egg in each series differing in any way from another, the inane purposelessness of the thing—not to use any stronger term—is evident. No clearer proof could be given that the great majority of egg-collecting—that is, by others than schoolboys—arises from a barbarous desire of possession alone, than that it is seldom if ever accompanied by the collecting of birds' *nests*, from which probably much more is to be learned of bird history than from the eggs. I need only refer to the learned observations of Pouchet on the changes which he remarked in the building of the nests of species of *Hirundo*, to instance the interesting and important results which a study of nests might lead us to.

Compare the nest of a chaffinch with those of its congeners the greenfinch or the bullfinch, or that of a sedge warbler with that of the wood-wren: how totally different they are, one feels inclined to say,—comparing incomparables, more different than the birds themselves. Or to go further, compare one chaffinch's

nest with another, and note the variety in material, and even in construction, adapted to some peculiarity of situation or surroundings. Here is a field for observation and comparison by means of which the philosophical student may hope to catch some glimpses of the working of the laws which have taught birds, as they must in time have been taught, to build nests in endless variety of form and material. Little, if anything, has been written beyond mere speculation on this subject, which presents so much scope for investigation. In spite, too, of all the vast collections of birds' eggs which have been made, we are still almost entirely in the dark as to any theory, even, of the causes which have tended to produce such infinite variety of form and colour for what is really but for one and the same end.

The method of at one and the same time limiting the tendency to purposeless egg-collecting, and systematically extending our knowledge of the whole subject, which it is the purpose of this paper to suggest, is the formation in connection with local museums, or, where these do not exist, with larger schools, of complete educational collections of birds' nests and eggs. Under the judicious guidance of the head-master, this might be done with but a minimum of wrong to the parent birds in at most three years, and the eggs and nests which would be required to complete such a collection would be many times fewer than what are annually destroyed in the same area, and would, by being carefully housed and attended to, obviate, as I shall endeavour to show, the necessity for repeated nesting in time to come.

Many years ago I assisted at the formation of such a collection for a small country museum, and our method of preserving and displaying it to the best advantage being devised chiefly with a view to economy of space and material, it may be useful to briefly describe it. We took our nests generally before any eggs, or but the first, had been laid, and binding them carefully with tape or cord we saturated them or sprinkled them with some preservative liquid (methylated spirits and corrosive sublimate solution is best), to kill any vermin and keep away moths in the future, and then dried them and packed them in drawers or boxes. The eggs we got when we could. Our collection being nearly complete, we had a wall case about 5 feet high and 12 inches wide made, with shelves sloping at an angle of 45°.

On the bottom shelf we placed the large nests, such as those of the crow, rook, jackdaw, magpie, &c., putting into each nest

the number of eggs usually laid, not necessarily, and indeed seldom, taken from that particular nest.

On the second shelf, such nests as consist of little more than a few reeds or grasses or a mere hollow scraped in earth were contained in round card-board boxes to hold the materials together. These included the nests of the curlew, sandpiper, gulls, coot, water-hen, ducks, grebes, &c. Smaller boxes held the collection of bones on which the kingfisher lays its eggs, the few grasses that the skylark lines a hole in the soil with, and so on.

Upper shelves held the smaller nests; and when they had been built in holes of trees we cut away the branch, where possible. In time we had not only a very complete collection, but an additional case of such eggs as vary from a common type, and our little museum was the favourite resort of all the schoolboys in the district; and it is certain that much less bird-nesting for mere nesting's sake was one outcome of our efforts. Sometimes we had brought us varieties which were not found in our cases,—a result which was most desirable and pleasing, as it evidenced an intelligent appreciation of the uses of a collection. A schoolmaster who will but inaugurate such a collection, will certainly be conferring a lasting benefit on his pupils, and sparing many a nest from careless destruction. Certain it is, too, that if every country town and village had its small, well-ordered, local museum, where the common objects of animal and plant life, which ever will possess an absorbing interest for the young, were displayed in such a manner as to convey some intelligent ideas of their life-history, and relation to each other, among the innumerable benefits which would accrue, one of not the least would be that there would be created a sympathy between the animals and their keen-eyed observers, and the wanton destruction of myriads of them would be diminished.

One of the most pleasant recollections of a short residence in a French country town is associated with its admirable museum, and the character of its visitors on Sunday afternoons. On week-days the students from an *école de medecine* shared with me the examination of its well-arranged cases; but on Sunday afternoons troops of peasants and their families took the place of the systematic student,—the husband in his clean blouse, the wife in clean starched cap of marvellous and stupendous proportions, and the children in clean Sunday best. The shouts of the youngsters at the wonders of strange foreign *bêtes* were only sur-

passed by their delight at the discovery of old friends like *M. Crapaud* or *les petites papillons bleus;* while older schoolboys conferred together over cases of beetles or bottles of reptiles, or related, in audible whispers, exploits with beast and bird which the preserved specimens recalled to mind. For two or three hours the rooms were filled with these happy-faced students of zoology; and the remembrance of Sunday afternoons nearer home, spent by British peasants in less creditable ways, rose, not unnaturally, in the mind, with the reflection that "they manage these things better in France."

In forming such a collection of birds' eggs and nests as I have described, with the desire, at the same time, to collect with such discrimination and judgment as to limit to a minimum, if not to avoid entirely, cruelty or injury to the birds, there are certain broad maxims which must be held in mind; and it is these which it is my object to strongly impress. It is well established by experience that many birds will go on laying eggs in the same nest after the loss of their first eggs; and, physiologically, there exists the most ample provision in the mother bird for such a contingency. Others will build new nests again and again after the destruction of their first efforts; but manifestly there is a limit, if only in point of time and season, to these persistent efforts at propagating their kind. No egg collector should, therefore, ever take eggs or nests after a certain date—say, first of June—except in the case of very late migrants. This limiting date should, of course, vary with different species of birds, and in different parts of the country, but should be fixed and rigidly adhered to.

A second maxim should be, that no collector should ever take partially-incubated eggs, or disturb the nest in such case; and lastly, that he should never take any egg or nest at all that is not intended to form part of some new public collection, or to supply a blank in such already-established one. The common possession of a perfect collection, which might thus be speedily formed, would not only have the influences which experience has proved similar ones to have on schoolboys, but with "schoolboys of a larger growth" birds and their nests and eggs would become more familiar and interesting objects, and the ranks of ornithologists be swelled by new and devoted students. Furthermore, with such opportunities of comparing observations and discovering variations in habits of nesting, or in the phenomena connected with birds' eggs, the study of birds' nests and eggs

might in time be raised to the dignity, which it scarcely at present occupies, of a science. Vast as is the number of facts which we are in possession of regarding the subject, the time scarcely seems to have arrived when these may be formulated, and a theory of birds' eggs be established. The interesting researches of Mr Sorby into the nature and composition of the colouring matter of birds eggs belong rather to the sciences of chemistry and spectroscopy than to those of oology or animal physiology. What has been done towards an elucidation of the subject may form matter for future consideration. If this appeal should induce one lover of birds to take any steps to form a permanent and accessible record of their habits of nidification, it will have more than served its object.

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.

1. Aquila chrysaëtos, Briss. (Golden Eagle.)

Notwithstanding the almost total extermination of most of our birds of prey, the Golden Eagle, we are happy to say, may still be seen soaring over the shoulders of Ben Aldar on Loch Ericht, as well as some of the higher peaks in Athole and Breadalbane; and were the good examples of some noble proprietors, who allow it to breed unmolested in their deer-forests, a little more followed by others, this fine species might still long be preserved to be an ornament to our mountain sides, and to enhance the interest of our Highland scenery.

2. Haliaëtus albicilla, Cuvier. (Earne or Sea Eagle.)

Though more generally an inhabitant of our sea coasts, this species has for long been known as a resident in the neighbourhood of the larger lochs in the district; but I fear, with the exception of a straggler or two from the Continent, and those in the immature plumage, the bird is now scarcely ever seen. Mr James Stewart, who has had long experience as head-keeper on the Earl of Mansfield's grouse-shootings, informs me that some years ago, when in charge of his lordship's shootings in Rannoch, a pair of Sea Eagles, called by the people there the Water Eagle, had their nest for several years in an old fir-tree in a corner

of the Black Wood by the loch side, and that an old keeper of Struan's told him that he had often seen these water eagles dart down from a great height, and catch the trout in the loch. From the minute description Mr Stewart gives me, I am well satisfied that these birds were no other than the true Sea Eagle, and not the Osprey. He further tells me that one year there was a pair of what he describes as "light blue eagles, just as near the colour of the Wood Pigeon as can be," which had a nest in an old poplar-tree on an island in Loch Lydon, and that when the eaglets were nearly fledged, they were taken and pegged down in a solitary part of Rannoch Moor, where they were fed by the parents. The old birds were afterwards trapped, but most unfortunately were not preserved. When the young eagles were ready for an eagle-house they were both sent to Scone Palace. One of these birds, which lived for many years there, and was afterwards accidentally poisoned, I had frequent opportunities of examining; this was doubtless a true *Haliaëtus albicilla*, but the whole plumage was of a whitish colour, and it was evidently an albino. Many birds, from certain constitutional causes, attain a bluish, whitish, or even pure white plumage; but I am not aware that there is any record of this in the Sea Eagle. What may be considered singular in this instance, is not that the young birds were each of a light colour, but that the parent birds should have been exactly of the same bluish ash or dove-coloured plumage. The Common Buzzard is the only one of our raptorial species in which, as far as I am aware, there are any great variations of colour in the plumage other than that of the regular changes according to age, and which thus exhibit variations subject to no fixed law.

3. Pandion haliaëtus, Cuv. (Osprey.)

The Osprey, once, no doubt, a denizen of all our larger lochs and streams, may now, from its wanton destruction, be looked upon as only an occasional visitant. It is said to have bred regularly in former times on Loch Rannoch, and probably had its eyrie also on Loch Lydon. Mr Malloch, bird-stuffer, Perth, tells me that a fine specimen of this species has been killed lately on Loch Tay.

4. Buteo vulgaris, Bechst. (Common Buzzard.)

This bird, formerly so abundant in many of our Highland districts, is now, like most of our beautiful raptores, thanks to strychnine and pole-traps, become so rare, that were it not for the

few which find their way over from the Continent every year on their way south, it might almost be looked upon as nearly extinct. Up to the years 1832-33 they were numerous in many parts; and at that time, within the Dunkeld grounds, where they bred regularly, I have noticed them sitting for hours on some exposed branch of a tree.

5. Archibuteo lagopus, Gray. (Rough-legged Buzzard.)

Though not nearly so abundant a bird in former times as the above, the Rough-legged Buzzard was always a regular visitant in the Highlands, frequenting for the most part the open moors; and not further back than the year 1856, numerous individuals were trapped every spring on the Ballyouchan shootings near Pitlochry; but of late years, I understand, both there and elsewhere, they have all but disappeared.

6. Pernis apivorus, Cuv. (Honey-Buzzard.)

Several instances occur of the Honey-Buzzard having been captured from time to time in various parts of the district, chiefly birds in the chocolate-coloured plumage of the first year, but no notice has come across me of its nesting with us, though it does so frequently in many parts of England. These birds, therefore, may possibly be only passing stragglers from the Continent.

7. Accipiter nisus, Pall. (Sparrow-Hawk.)

Notwithstanding the great persecution the Sparrow-Hawk undergoes (for should he escape trap or poison, he is ruthlessly shot at whenever a chance occurs), he has, with all this, held his own in the district, perhaps better (with the exception of the Kestrel) than any of his congeners. Many of these, however, may be foreigners, or birds from a distance not bred in the district.

8. Falco peregrinus, Gmel. (Peregrine Falcon.)

The Peregrine Falcon was once well represented throughout the whole district, for there was not a rock or cliff suitable for the purpose of nesting or rearing its young where a pair of Falcons did not take up their quarters, and would still do so were they allowed. Thus, Craig-y-barns at Dunkeld, Kinnoull and Moncreiffe cliffs, and many other places, each had their occupants; but though these are all now tenantless, it is satisfactory to know that there are still in some of the remoter and less frequented parts of the district a few breeding places yet re-

maining, otherwise this noble bird would be lost to us, like many others, from the mania of over game-preserving and over-stocking.

9. Falco æsalon, Gmel. (Merlin.)

Not uncommon throughout the district, but more frequently seen in the autumn months, and then chiefly in the plumage of the first year.

10. Tinnunculus alaudarius, Viell. (Kestrel.)

Like the Sparrow-Hawk, the Kestrel has held its own perhaps better than most of the tribe, but no thanks to gamekeepers, who, failing the deadly pole-trap (that most iniquitous of all inventions, as no perching bird of sufficient weight is safe from it), shoot down every Kestrel they see. Had keepers a little more knowledge of ornithology and a little more observation, they might more likely be able to distinguish friend from foe. The Kestrel is almost exclusively a mouse-feeder,[1] but to impress such a fact on most keepers would be a difficult matter, for were he told that not only do some hawks feed on mice, but some on frogs, some on beetles, and some even on the larvæ of bees and wasps, he would simply look upon you as fairly demented, and possibly make the same reply as that which has more than once been made to the writer, "All I ken is, a hăăk's a hăăk, an' ăŭ hăăks are vērmin, an' ăŭ vērmin must be killed!" And this, I fear, is the fate of all our owls as well as hawks; for though the former are mostly mouse, rat, and weasel catchers, they come under the same category in the eyes of the keeper, without a moment's thought or observation. Even the White or Barn Owl, I am quite aware, has the character of taking young rabbits; but this bird being essentially a night-feeder, if young rabbits choose to be out after hours, along with rats and mice, they must just take the consequences, and no blame to the owl.

11. Milvus regalis, Kaup. (Kite.)

The Salmon-tailed Glead, as this beautiful bird was familiarly called when once common in all our glens and hill-sides, but which is now all but exterminated, has still, I am glad to say, a few breeding spots in some of the remoter parts of the Highlands

[1] See note on the Nesting of the Kestrel at Murthly Asylum, by W. C. M'Intosh, M.D., 'Scot. Nat.,' April 1877, p. 56.

where they can rear their young undisturbed; otherwise it, like the falcon, would ere this have been entirely lost to us.

12. Circus æruginosus, Sav. (Marsh Harrier.)

An occasional visitant in the district, and, before the extensive drainage throughout the country, was probably not unfrequent. It may still possibly be found in some of the wilder parts of Rannoch Moor, the very home for such a bird, but even there the inevitable pole-trap would make short work of it. A very fine specimen, in full adult plumage, which was shot recently in the district, was shown to me in the flesh by Mr Malloch, bird-stuffer, Perth.

13. Circus cyaneus, Boie. (Hen Harrier.)

In the days before keepers vied with each other in making the largest collections of hăăks, hoolets, and huddie crăws, and nailing them to their kennel doors, the Hen Harrier was far from being an uncommon bird, either on the hill-side or the low grounds; and I have often in the Carse of Gowrie sat down and watched a pair hunting a field, and a most beautiful sight it was to see them working and quartering their ground like a brace of thoroughbred pointers. But since about the year 1832 or 1833 they have got scarcer and scarcer till they have almost totally disappeared, at least in the Lowlands. The female and young were known as the Ring-tailed Hawk, and to the uninitiated passed for a different species.

14. Strix flammea Linn. (White or Barn Owl.)

This beautiful and intelligent bird, so useful in the destruction of mice, insects, and reptiles, more than counterbalances, as Mr Gould very aptly remarks, any slight damage it may do by the good it effects in the destruction of obnoxious animals. Though strictly a nocturnal species, it has in common with many others one great enemy, "the keepers' pole-trap," by which means, within the last very few years, it has been, "shame to say," all but exterminated. As a mouser, the wonderful quickness and dexterity it displays cannot be excelled even by the cat, to which I can well testify, as many years ago, when quartered on the island of Vido, in the Ionian Islands, a young white owl was brought to me from the nest. It was fed daily on mice, and was never kept in confinement; and when fully fledged, used to take up its position on the back of a chair, or on the top bar at the

back of the bedstead, where it sat motionless all day, occasionally giving vent to its curious snoring note. In the course of a few weeks it became perfectly tame and familiar, and readily responded to call, and every evening at feeding-time was all life and excitement. On liberating a live mouse from the trap, let it attempt to escape ever so nimbly, either under chair or table, even at the further end of the room, "owl" was after him in a moment, and never failed silently but surely to seize his prey, and in a few seconds to return to his favourite stance, when mousey was at once devoured. It may be that his supply of food was not considered sufficient, for shortly he took to hunting for himself, generally disappearing from the room immediately after dusk, and never failing to return about ten o'clock, or after an absence of three or four hours, when a slight tap would be heard at the window, which, on being opened, in would fly owl, and go straight to his perch, give two or three loud snores, and then remain quiet for the night. A small silver plate, with name and regiment engraved on it, was attached by a ring to the leg above the tarsal joint: this never seemed to incommode him. Many months passed, when, having to leave the islands, owl was consigned to the care of a friend who remained behind. Whether not approving of the change of masters, or that he betook to the rearing of a family of his own, is not recorded; but the fact remains that, becoming more irregular and longer in his returns, he eventually stayed away altogether, and the last that was heard of poor owl was that, some three years afterwards, he was shot by a sergeant of artillery in mistake for a wild one, the silver plate being still attached. I will now only ask, Can nothing be done to obviate the wholesale slaughter of all our most interesting birds? If the hawks must go, at least save our owls.

15. Syrnium aluco, Cuv. (Tawny or Brown Owl.)

Of all our Owls, perhaps the Brown is the most common, and its lively hoot may be heard more or less in all our woods. He bears, however, and I fear with some justice, rather a bad character, as it must be admitted that he has frequently been found guilty of treating his young brood now and then not only to young rabbits, but to young partridges and pheasants, and, strange to say, has even been detected occasionally capturing a trout or two from some neighbouring stream. But the damage he may inflict by his poaching habits is much more than compensated by the number of brown rats and weasels he will

destroy in a season, which, had they been permitted to live, would have been far more destructive to the young game than the owl. Therefore let the sportsman save his shot, and desist from firing at some poor owl which, half-asleep and stupid, is suddenly driven out of some thick tree during cover-shooting, affording an easy and unfailing shot even to the tyro,—a practice which I fear is far too common.

16. Bubo maximus, Sibb. (Eagle Owl.)

One shot near Pitlochry was a bird escaped from confinement. See 'Scottish Naturalist,' ii. 58, and iii. 359.

17. Otus vulgaris, Flem. (Long-Eared Owl.)

The Long-Eared Owl, though found at most seasons in our woods, is far more abundant in the autumn months, when large accessions to its numbers reach us from the Continent; and a very striking instance of this was mentioned to me by Admiral Maitland Dougal, who, when shooting some covers near Scots Craig on the borders of the lower part of the Tay, in the month of October two or three years ago, in company with some other guns, fell in with a large flock of birds, numbering, as far as he could judge, about seventy, which suddenly rose off the trees some little distance before them. Some shots were fired at them by the party, supposing them to be woodcock. Several of them fell, which, on being picked up, proved to their great surprise to be Long-Eared Owls. This occurring close to the coast, they had no doubt but recently arrived, and had not had sufficient time to disperse.

18. Brachyotus palustris, Bechst. (Short-Eared Owl.)

The Short-Eared Owl, which is more diurnal in its habits, frequents the more open ground on moors and marshy places, and never in woods, like the Long-Eared. It is rather a scarce bird in the district, but every now and again it is met with, though, as far as I can learn, only in the autumn, when on its passage. It is not at all unlikely, however, that it breeds on some of the more retired parts of the moors, as it is known to do in several places, both in England and Scotland.

(*To be continued.*)

THE ACULEATE HYMENOPTERA OF THE DISTRICT SURROUNDING DUMFRIES.

By ROBERT SERVICE.

SO few local lists of Hymenoptera have been published, that the following list of the Aculeates taken in this locality may not be without interest. It must not be regarded as being complete, as my opportunities of day-collecting have hitherto been rather limited, and I anticipate a number of additions to the list when I can manage to go over a wider district. The species enumerated have all been taken by myself, and the great majority within a radius of six or seven miles from Dumfries.

The nomenclature and arrangement is that given by Mr Frederick Smith in the 'Catalogue of British Fossorial Hymenoptera, Formicidae, and Vespidæ,' 1858, and 'Catalogue of British Bees,' 2d edition, 1876.

I cannot refrain from here expressing my great obligations to Mr E. Saunders of Holmesdale, Tooting, for much assistance on my commencing the study of this deeply interesting Order; and I am sure Mr Saunders will be well pleased to extend to others, becoming collectors of Bees, the same generous assistance.

Formica cunicularia.—Occurs at several localities, but is not so common as the following two species.

F. fusca.—Very abundant on the hill-sides and dry hedge-banks and fields.

F. nigra.—Very common; it is also frequently found in hot-houses.

Myrmica ruginodis.—As yet I have only found this species at three places in the district—Goldielea, Burnside, and Woodhead—and there it is abundant on flowers in the evenings.

M. scabrinodis.—Swarms everywhere, being the commonest Ant of the district.

M. lævinodis.—Also very common.

M. (*Leptothorax*) *acervorum.*—Single specimens have been met with in various localities, but I have not yet found its nest.

Tiphia minuta.—I took one ♀ specimen on the flowers of Goutweed (*Ægopodium podagraria*) at Mabie last August.

Pompilus plumbeus.—Seems to be scarce. I saw a few of it near Lochaber in July last, at the foot of a steep thorny bank, and within a few feet of me. I managed to capture one, but

the others refused to come within reach of my short-handled net, and eventually they dispersed amongst the surrounding brambles.

P. (*Priocnemus*) *sepicola.*—Was not uncommon at Burnside in June 1876, but I have not seen it since.

Gorytes mystaceus.—Common. I have taken it several times with the green larva of the "cuckoo spit" (or "gowk spittle" as it is termed here), and once noticed it pulling out the larva, and, after settling on a neighbouring twig, set to work and clean off the adhering frothy substance with its anterior legs.

Mellinus arvensis.—Common everywhere. The sides of Potato furrows seem to be favourite situations for its burrows.

M. sabulosus.—One taken on Goutweed flowers.

Crabro dimidiatus.—I took a *Crabro* in August 1878, which, on being referred to Mr E. Saunders, was returned as a "curious variety" of this species. It is a ♀ and differs from the type in being wholly black, with the exception of a thin line on the basal segment of the abdomen and a spot on each side of the third segment, which are yellow. All the tarsi and a short line on the underside of the tibiæ are also yellow. The specimen is also more slender in its proportions.

C. pallidipalpus.—Very common; wherever there is a clump of tangled briars it may be found running on, and flying about the leaves, busily engaged catching small Diptera.

C. cribrarius.—Very abundant in August on the flowers of Goutweed.

C. patellatus.—Not unfrequent in company with the preceding.

C. palmipes.—While capturing *C. pallidipalpus* in June, I found what at the time I thought was a pair of that species *in coitu.* However Mr E. Saunders states that the ♂ of the pair in question is *C. palmipes.*

C. chrysostomus.—A ♀ specimen at Burnside in July 1878 on Goutweed.

Mimesa bicolor.—Found at same time and place as last, and also on the flowers of Goutweed.

Odynerus parietum.—Very common, especially in thick old copsewoods.

Vespa vulgaris.—Common.

V. germanica.—Common.

V. rufa.—Also common. The past year wasps of these three species were in most unusual numbers, doing great damage to ripe fruit. In several places here the crop of grapes in the

vineries was made almost useless before any serious damage was suspected. The males also were very numerous on the flowers of Eupatorium and Goutweed, and so lethargic as scarcely to move when touched.

V. sylvestris.—I have met with this species several times.

V. norvegica.—Last spring (1878) a nest of this species was found hanging to one of the lower branches of a dwarf rhododendron. I intended taking the nest and contents one day at the beginning of August, but on going to it I found only two males in it, although a day or two previous the nest seemed to have a strong population. I have found the nest occasionally in similar situations, but never noticed that the inmates died off so early in these cases.

Colletes succincta.—I have two specimens taken on heath in Lochar Moss last August.

Colletes fodiens.—Only once met with, in September 1876, on ragwort bloom.

Sphecodes gibbus.—Common. I have found it at its burrows and on ragwort flowers. These burrows were on a hard garden-walk; and as bearing somewhat on the supposed parasitism of the genus, I may add that, so far as I could find, no other species of bees were burrowing anywhere near the place.

S. rufiventris.—Several found last July on dandelion.

S. ephippius.—Common on ragwort.

Andrena albicans.—Very common. Mr Smith says (Brit. Bees, 2d edit., p. 37), "It is commonly found on the dandelion." I have seldom seen it on that flower, but always find the ♂s numerously at the flowers of *Mahonia aquifolium* in shrubberies, and the ♀s seem specially fond of chickweed flowers.

A. gwynana.—Very common; frequenting crocuses, sallows, and dandelions. In April 1878 I one day had captured a number of this species, placing them in separate pill-boxes. After a while I had a bee in each box, and captured a ♂, which I also wished to keep, and placed him in a box containing a ♀. On opening the box when I arrived home, I was surprised to find the pair *in coitu.* I relate the incident for the purpose of suggesting that in some cases this plan might be tried for finding out the species to which the very similarly coloured ♂s of the genus *Andrena* belong.

A. bicolor.—Not unfrequent at flowers of bluebell and hawkweed.

A. nigro-ænea.—Once found on dandelion at Lochar Moss.

A. trimmerana.—Common on dandelion at Lochar Moss and Dalscairth. Most of the ♂s captured have the pubescence on the face black. Mr Smith describes specimens from Loch Rannoch as also having this peculiarity.

A. lapponica ?—In June 1877 I captured two specimens on ragwort—one at Mabie, the other at Corberry Hill, localities five miles apart—which Mr E. Saunders thinks are this species; and as *A. lapponica* was first discovered by the Rev. Mr Little at Moffat, not far from Dumfries, this is very probably the correct name.

A. nigriceps.—Found at Dowie Vale in a "sod dyke."

A. denticulata.—Not uncommon, and is generally distributed over this locality. Frequents the dandelion and ragwort in August.

A. albicrus.—There is a colony of this species at the Craig's Quarries, but I have not met with it elsewhere.

A. coitana.—Very abundant. Mostly found on hawkweed and ragwort.

A. parvula.—Very common. In April and May almost every dandelion flower has one or sometimes more of this little bee upon it.

A. minutula.—I have taken about a dozen of both sexes of this species, but was quite unable to distinguish it from *A. parvula* until Mr Saunders did so for me. All were, however, taken in August, when the latter had long disappeared.

A. nana.—I captured a few of this species in July last at Dalscairth by sweeping the heather flowers.

A. convexiuscula.—The only one I have taken of this—a ♀ from dandelion in May 1878 at Dalscairth—was stylopised.

A. xanthura.—Several were captured in Lochar Moss in 1877, but I did not find it last year. It frequented ragwort flowers.

Halictus rubicundus.—The season of 1877, which brought forth the wasps and humble-bees in such unusual swarms, must have had a deterrent effect upon this species. All summer I did not see more than half-a-dozen of it, although in 1876 and 1877 it was extremely abundant.

H. cylindricus.—Very common; perhaps the most abundant bee of the district. Wherever there is a dry and firmly-trodden footpath, there its colonies are sure to be found.

H. albipes.—Mr Saunders separated this species from amongst a number of *H. cylindricus* which I sent for examination. I confess I am quite unable to see any specific distinctions. Both are apparently equally common here.

H. lævigatus.—I found this species on 26th September 1877 at Dalscairth. I had filled all my pill-boxes with insects except one, when, on passing a small clump of ragwort, I was surprised to see quite a swarm of the ♂s settled on the flowers. I put eleven into the remaining pill-box, and was preparing to throw out the less choice specimens out of others, but before this was done, the rest of the bees had taken alarm at my proceedings, and refused to settle again. There could not have been less than seven or eight dozen of them. Last year, although often at the same spot, I did not see more of it.

H. villosulus.—Very common. Although to be found on many other flowers, it seems most partial to those of the marjoram.

H. subfasciatus.—I find three ♀s amongst the small *Halicti* collected last April, which, Mr Saunders states, are this species.

H. morio.—Very common in rough, dry, weedy places.

H. leucopus.—I have taken four ♂s of this bright little species on wallflower.

H. minutus.—Common. On ragwort flowers in August and September.

Nomada roberjeottiana.—I have taken three specimens of this —one on ragwort and the others on goutweed—at Burnside of Mabie.

N. solidaginis.—Not uncommon on ragwort in autumn at Dalscairth and Cargen.

N. alternata.—Common at Dalscairth and Lochar Moss.

Cælioxys elongata.—Generally distributed in the district, but not abundant. I have taken it on thyme and sage flowers.

Anthidium manicatum.—As a very little boy this was almost the first insect that attracted my attention. At beds of sage in bloom, the rapid dart with which the male pounced on the female and carried her off (to be eaten as I then supposed !) was a matter of wonder to me. With no less interest I used to watch these bees scraping off the tomentum from a species of Gnaphalium, and fly with the little bundles to their nests, which were usually placed in the angles of old garden-frames close at hand. Of late years, although the sage-beds and frames are still there, this interesting species has become scarce, and last year I could only find two or three specimens.

Megachile centuncularis.—Found occasionally on various garden flowers, preferring the order *Compositæ*. The ♀ stings severely, and when holding her in the fingers one can scarcely

prevent this, as she has the power of protruding her sting, and turning and twisting it in all directions, almost without moving the abdomen.

M. willughbiella.—I have taken only a few of this species; but the absence of large willow-trees probably accounts for its scarcity.

Anthophora furcata.—Near Threave Castle last July I took a ♀ at the flowers of dead nettle.

Bombus muscorum.—Very common, and extremely variable in size and colouring. All the varieties described in 'British Bees' occur here, with the exception of the black var.

B. elegans.—Scarce. In June 1877 the ♀s were numerous at the rhododendron flowers; last year there were very few.

B. derhamellus.—Very common. The nests are easily found in the hedge-banks by looking out for the groups of seven or eight workers which, on hot days in August, seem to be continually buzzing above the nests.

B. pratorum.—Not common in this district, but seems to be more plentiful round Castle-Douglas.

B. lapidarius.—Very common. The large females are, when in good condition, really beautiful insects, and look most conspicuous as they visit the rhododendron flowers.

B. lucorum.—Perhaps the most abundant species of Bombus in the district, and the first met with in spring. I caught one flying briskly last year on 17th February, but then the weather was remarkably mild and in striking contrast to what we have experienced this year. The males are remarkably variable—the var. B. of 'British Bees' is often met with.

B. virginalis.—Frequently met with, though not by any means so common as the preceding.

B. hortorum.—The females are abundant at the rhododendrons, but as yet I have seen very few of the males and workers.

B. latreillellus.—I have taken numerous females at the flowers of plants of the Brassica tribe, but have not found males or workers yet.

Apathus barbutellus.—Very common.

A. campestris.—Also common. Both species are usually very sluggish and easily caught with the fingers. Last autumn the numbers of both species frequenting the flowers of *Scabiosa succisa* were very remarkable.

Corberry Hill, Maxwelltown,
February 1879.

THE LEPIDOPTERA OF MONCREIFFE HILL.

By Sir THOMAS MONCREIFFE, Bart.

(*Continued from page* 27.)

Gelechia cinerella.—Common, and generally distributed. July and August. Among every variety of herbage by day, and on ragweed blossom at night.

G. ericitella.—Common on dry rocky tops—usually where heather grows scantily. Appears in May.

G. mulinella.—Not common. Have taken a few specimens among rough herbage, and on a dry rocky top in August.

G. longicornis.—Common on the dry rocky tops, on the short herbage. Appears in April or May, according to the season; and I have obtained it in good condition late in July.

G. terrella.—Abundant among old pasture and rough herbage in June. I have also taken this species on rhododendron blossom at night with a lantern.

G. politella.—This is apparently a local insect here. I have taken it in June among short dry herbage in one place on the face of Moncreiffe Hill, but have not noticed it elsewhere in this locality.

G. acuminatella.—Common on the lower levels among rough herbage, from the foot of Moncreiffe Hill to the banks of the Earn, in May and June.

G. artemesiella.—I took one specimen on Moncreiffe Hill in June 1874, but unfortunately did not keep a note of the locality, and have never fallen in with it since.

G. senectella.—To be met with in August on one dry rocky top on Moncreiffe Hill.

G. affinis.—In the same locality in July and August.

G. confinis.—Same time and place as the preceding.

G. rhombella.—I have only one specimen, which I took in my garden in June 1875.

G. proximella.—Common among birch in June on the top of Moncreiffe Hill.

G. notatella.—I have taken this insect occasionally along the foot of Moncreiffe Hill; but as I am usually absent in August and September, it may be more plentiful than I suppose.

G. humeralis (*lyellella ?*) is a common insect at Moncreiffe at all elevations. It is on the wing from October till May. I have

beat it off various trees, and have netted it in the dusk of the evening in March flying about the *cupressi* in my garden. Numbers of them hybernate in the reed-thatch of an old summer-house which stands under oak-trees in my garden. There is no doubt the oak is the food-plant of the larvæ in this country; and it is to be hoped that before long we may have an interesting article from Mr Stainton on this subject.

G. fugitivella.—By no means common, but frequently to be met with in July and August at all elevations.

G. sequax.—One specimen in 1878 among rock-rose (*Helianthemum vulgare*) in August 1878—probably not uncommon, but easily overlooked.

G. dodecella.—I have beaten this insect out of Scots fir in July, and have no doubt it is fairly common among its food-plant, but I have neglected to look for it of late years at the proper season.

G. tenebrella.—Common in July among natural grasses near Moncreiffe House.

G. tenebrosella.—Less frequent than the preceding species, but may be taken in July among rough herbage near the river-side.

Chelaria hubnerella.—A common insect at all elevations, and may be beaten off any forest-tree at the end of July and in August.

Pleurota bicostella.—Common on the dry rocky tops in June and July.

Œcophora subaquilea.—The specimens I have taken of this insect have been invariably on old Scots fir trunks at an elevation of upwards of 500 feet in June—one on old sugar.

Œ. fuscescens.—Common near Moncreiffe House in July and August; and also on an old wall on the top of Moncreiffe Hill. On what does this insect feed?

Œ. pseudospretella.—A common insect wherever the destructive larvæ can find food. I once took a large number of this moth out of a jar of preserved rose-leaves, which was also full of empty chrysalis cases.[1]

Endrosis fenestrella.—Common everywhere. It is curious where insects secrete themselves. Early last spring I beat a specimen of this insect out of a mummified carcass of a rabbit,

[1] Messrs Dandie, Newby, & Dandie, druggists in Perth, once gave me a number of the larvæ of this insect feeding upon "horse-ball," in the composition of which aloes forms a large part—not a very palatable food, one would think.—Ed. 'Sc. Nat.'

which had been hung up on a tree some months before and forgotten.

Pancalia latreillella.—Common in May on the dry tops and faces on Moncreiffe Hill. Like its congener,

G. leuwenhockella, it is quick in its movements, and easily lost sight of, although it makes but short flights. If disturbed more than once, it crawls under the small stones or short herbage on which it delights to sun itself, and may with a little practice be easily boxed.

Glyphipteryx equitella.—Of this pretty little insect I have only one specimen, captured on an afternoon in August at rest on blossoms of the wild thyme. The food-plant, *Sedum acre*, grows on the rocky face where I met with my specimen.

G. fischeriella.—Following up Mr Stainton's advice when describing the habits of this insect in his 'History of the Tineina,' I fell in with a large colony of the imago disporting themselves on the sunny side of a rough hedge at the base of Moncreiffe Hill in the end of May 1878.

Heliozela sericiella.—Plentiful in May flying in the sunshine in certain localities. I on one occasion found the imago flying in clouds about a young *Abies Douglasii* which was growing under oak-trees on the face of Moncreiffe Hill.

Argyresthia ephippella.—Not uncommon in my garden or on the hill-face, where the wild cherry grows in August.

A. nitidella.—Curiously enough, I have not found this a very common insect here, although there is plenty of hawthorn. I have a few specimens named by Mr Stainton, which I have taken by rather promiscuous beating in July.

A. semitestacella.—Common in August beaten off beech-trees; seems very partial to copper-beech.

A. spiniella.—I have one or two specimens in my cabinet named as this insect, but I see very little difference between them and the above species. They were also beaten off beech.

A. albistria.—I have not noticed this insect commonly, but have taken it in the garden here.

A. conjugella.—Local, according to the presence of the mountain-ash; but plentiful where it occurs in the month of June.

A. retinella.—I find it commonly among the apple-trees in my garden in the month of June.

A. dilectella.—I met with one specimen on the last day of July 1877 flying about a *cupressus* or *juniperus*, whichever it may be (but I have so many varieties mixed up together in my grounds,

that I have never met with any one who could pronounce a decided opinion upon them). Juniper, according to Mr Stainton, is the food-plant; but I have failed to discover this insect where the common juniper grows here. I hunted diligently last year, but could not find the imago or trace the larva.

A. curvella.—Frequents my apple-orchard in June.

A. sorbiella.—I have disturbed this insect both from mountain-ash and service-tree, and am inclined to think the larva feeds on both these plants. Flies in June.

A. pygmæella.—Local on sallow—principally on the willows and sallows growing at the higher altitudes—in July.

A. gœdartella and

A. brockeella are common everywhere on birch. The golden variety without white markings occurs of both species.

Cedestis farinatella and

C. gysselinella both occur here. They abound on a *Pinus austriaca* in my shrubbery. The latter is usually the earliest to appear in the end of July or beginning of August. The larva differ very decidedly. The larva of *C. farinatella* is green, with a yellow head, with a shining and polished appearance; no spots, and, to my eye, shorter and stouter than that of *C. gysselinella*, which is green, with three spots on each segment (on the first two segments the spots are linear; on the others, triangular). I take these descriptions from a short note I made some years ago, and believe them to be correct.

Ocnerostoma piniariella.—Common among young Scots firs on the hill-top. I have taken them in cop. in May.

Zelleria hepariella.—The genus *Zelleria* is a puzzle which will never be cleared up until they are plentifully bred in confinement. The present species is plentiful here among the yew-bushes in my shrubbery. The next species—

Z. insignipenella, I have seldom met with here; but we have another which Mr Stainton has provisionally named—

Z. fusca—and which is far from uncommon in my shrubbery, and has been met with elsewhere on the property. I have formed an opinion that the three species are quite distinct, which I know is not at all the universal opinion. My belief is that the males of *insignipenella* are smaller than the females, and at times are somewhat like specimens of *hepariella*, with which they have been confounded. The wings of males which I have found in company with *insignipenella*, appear to me to be longer and more narrow than those of the true *hepariella*.

Gracilaria sweederella.—Common everywhere among oak-trees in June.

G. stramineella.—Rare. The specimen I have I beat off sycamore early in May.

G. populetorum.—I have only taken two specimens of this insect here.

G. elongella.—Common. The ground colour varies from pale lemon to light chocolate brown.

G. tringipennella.—Locally frequent during the summer.

G. syringella.—Abundant everywhere; last year the foliage of many of the ash-trees was entirely shrivelled up by the larvæ.

G. auroguttella.—Locally plentiful in a bed of Hypericum near Moncreiffe House in July. It is a pretty sight to see them flitting about in the afternoon sunshine.

Coriscium cuculipennellum.—Either uncommon or has been overlooked. I took one specimen last May in my garden, hybernated.

C. sulphurellum.—Not uncommon, but local. I have taken it both in autumn and spring. I am not aware that this insect has been commonly observed on this side of the Border.

Ornix betulæ.—To be beaten out of birch in June at all altitudes, most frequently at and above 500 feet. Common where it occurs but not plentiful.

O. loganella.—To be taken at the same time and in the same localities as the last.

Coleophora limosipennella and *C. lutipennella.*—Not common, or overlooked.

C. fuscedinella.—I have beaten this insect off dog-wood in July, with no elm or alder near.

C. gryphipennella.—Not common, or overlooked.

C. alcyonipennella.—Plentiful among natural grass in June near Moncreiffe House.

C. albicosta.—Common in May among or near the food-plant (Ulex).

C. annulatella.—Frequent in May, especially near the river-side.

C. murinipennella.—Abundant in the same place and at the same season as *C. alcyonipennella.*

C. cæspititiella.—I have taken this little moth in my shrubbery. It must have travelled some distance, as there are no rushes within half a mile that I know of. It is nowhere very plentiful here even amongst the food-plant.

Batrachedra præangusta. — Plentiful on the trunks of old willows in August.

Chauliodus chærophyllellus.—Not common here. The specimens I have taken appear to be darker than those obtained in the south.

Laverna hellerella (*atra*).—I have one specimen, beaten off hawthorn in August.

Elachista apicipunctella.—Not uncommon among birch in May and June. On what does the larva feed? I have always taken the imago either on or under birch.

E. albifrontella.—Very local, but where it does occur, it swarms, in June.

E. luticomella.—I have one specimen, taken in July outside my hall-door, but have failed to find its headquarters.

E. nigrella.—Not uncommon in May.

E. obscurella.—Common. The difference in the markings and general appearance of the sexes make it difficult to arrive at the conclusion that they are the same insect.

E. rufocinerea.—I have as yet obtained this little insect sparingly.

E. cygnipennella.—Not plentiful, and appears to be confined here to the lower elevations.

Tischeria complanella.—Was very plentiful on Moncreiffe Hill in June 1875, but I have not noticed it in any quantity before or since.

Of the *Lithocolletidæ*—

Lithocolletis cramerella,
L. heegeriella,
L. ulmifoliella,
L. pomifoliella,
L. faginella,
L. vacciniella,
L. quercifoliella,
L. messaniella,
L. klemanella,

are to be found, more or less, commonly, with the exception of *vacciniella*, of which I have obtained only one specimen. It was taken among Vaccinium myrtillus, and as no V. vitis idæa grows here, the former is probably also a food-plant of the larva.

Lyonetia clerckella.—Very plentiful.

Cemiostoma spartifoliella. — Occurs sparingly in the actual locality of which I treat, as the food-plant is now scarce.

Bucculatrix aurimaculella is plentiful in June among the natural grass near my house, where the food-plant is much too abundant.

B. ulmella.—I reared one specimen in 1876, from a cocoon, spun on moss, growing on an oak-trunk.

B. demariella.—Not uncommon among birch at the higher altitudes in June.

Nepticula betulicola and *N. tityrella.*—Both occur here.

Trifurcula immundella.—I have taken this insect among honeysuckle in my garden.

Platyptilus dichrodactylus (*ochrodactylus H. S. ?*).—This insect is plentiful among the tansy which grows near the river-side. I have seen them swarming about the blossoms when out at night with my lantern, and on one occasion observed a female ovipositing in a flower-head. I marked the plant, but the autumn floods destroyed it.

P. gonodactylus.—This insect comes to light: I have taken it at night in my study in September.

P. acanthodactylus.—Common everywhere.

P. cosmodactylus.—One specimen on ragweed blossom in September.

Pterophorus fuscus.—Common.

Alucita polydactyla.—Common wherever the food-plant occurs, and in outhouses.

440. Exapate congelatella.
441. Chimabacche phryganella.
442. ,, fagella.
443. Semioscopis avellanella.
444. Diplodoma marginepunctella.
445. Ochsenheimeria birdella.
446. ,, bisontella.
447. Tinea rusticella.
448. ,, tapetzella.
449. ,, granella.
450. ,, cloacella.
451. ,, misella.
452. ,, fuscipunctella.
453. ,, pellionella.
454. ,, lapella.
455. ,, biselliella.
456. ,, semifulvella.
457. ,, bistrigella.
458. Lampronia rubiella.
459. Incurvaria masculella.
460. ,, pectinea.
461. Nemophora swammerdamella.
462. ,, schwarziella.
463. Adela fibulella.
464. ,, viridella.
465. Micropteryx calthella.
466. ,, seppella.
467. ,, allionella.
468. ,, purpurella.
469. ,, semipurpurella.
470. ,, unimaculella.
471. ,, sparmanella.
472. ,, subpurpurella.
473. Swammerdamia apicella.
474. ,, cæsiella.
475. ,, griseocapitella.
476. Hyponomeuta padellus.
477. ,, padi.

478. Prays curtisellus.
479. Plutella cruciferarum.
480. ,, porrectella.
481. ,, dalella.
482. Cerostoma vittella.
483. ,, radiatella.
484. ,, costella.
485. ,, xylostella.
486. Depressaria costosa.
487. ,, liturella.
488. ,, umbellana.
489. ,, assimilella.
490. ,, arenella.
491. ,, angelicella.
492. ,, ciniflonella.
493. ,, applana.
494. ,, ciliella.
495. ,, pulcherrimella.
496. ,, nervosa.
497. ,, heracliana.
498. Gelechia cinerella.
499. ,, ericitella.
500. ,, mulinella.
501. ,, longicornis.
502. ,, terrella.
503. ,, politella.
504. ,, acuminatella.
505. ,, artemesiella.
506. ,, senectella.
507. ,, affinis.
508. ,, confinis.
509. ,, rhombella.
510. ,, proximella.
511. ,, notatella.
512. ,, humeralis (lyellella).
513. ,, fugitivella.
514. ,, sequax.
515. ,, dodecella.
516. ,, tenebrella.
517. ,, tenebrosella.
518. Chelaria hubnerella.
519. Pleurota bicostella.
520. Œcophora subaquilea.
521. ,, fuscescens.
522. ,, pseudospretella.
523. Endrosis fenestrella.
524. Pancalia latreillella.
525. ,, leuwenhoekella.
526. Glyphipteryx equitella.
527. ,, fischeriella.
528. Heliozela sericiella.
529. Argyresthia ephippella.
530. ,, nitidella.
531. ,, semitestacella.
532. ,, spiniella.
533. ,, albistria.
534. ,, conjugella.
535. ,, retinella.
536. ,, dilectella.
537. ,, curvella.
538. ,, sorbiella.
539. ,, pygmæella.
540. ,, gædartella.
541. ,, brockeella.
542. Cedestis farinatella.
543. ,, gysselinella.
544. Ocnerostoma piniariella.
545. Zelleria hepariella.
546. ,, insignipennella.
547. ,, fusca.
548. Gracilaria sweederella.
549. ,, stramineella.
550. ,, populetorum.
551. ,, elongella.
552. ,, tringipennella.
553. ,, syringella.
554. ,, auroguttella.
555. Coriscium cuculipennellum.
556. ,, sulphurellum.
557. Ornix betulæ.
558. ,, loganella.
559. Coleophora limosipennella.
560. ,, lutipennella.
561. ,, fuscedinella.

562. Coleophora gryphipennella.
563. ,, alcyonipenella.
564. ,, albicosta.
565. ,, annulatella.
566. ,, murinipenella.
567. ,, cæspititiella.
568. Batrachedra præangusta.
569. Chauliodus chærophyllelus.
570. Laverna hellerella (atra).
571. Elachista apicipunctella.
572. ,, albifrontella.
573. ,, luticomella.
574. ,, nigrella.
575. ,, obscurella.
576. ,, rufocinerea.
577. ,, cygnipennella.
578. Tischeria complanella.
579. Lithocolletis cramerella.
580. ,, heegeriella.
581. ,, ulmifoliella.
582. Lithocolletis pomifoliella.
583. ,, faginella.
584. ,, vacciniella.
585. ,, quercifoliella.
586. ,, messaniella.
587. ,, klemanella.
588. Lyonetia clerckella.
589. Cemiostoma spartifoliella.
590. Bucculatrix aurimaculella.
591. ,, ulmella.
592. ,, demariella.
593. Nepticula betulicola.
594. ,, tityrella.
595. Trifurcula immundella.
596. Platyptilus dichrodactylus.
597. ,, gonodactylus.
598. ,, acanthodactylus.
599. ,, cosmodactylus.
600. Pterophorus fuscus.
601. Alucita polydactyla.

ADDENDA.

602. Ennomos tiliaria.
603. Simaëthes pariana.

The total number of Lepidoptera recorded in these papers, as having been captured in the space of a square mile at Moncreiffe, is therefore 603. It will be observed that I have, as yet, paid little attention, comparatively speaking, to breeding by collecting the larva. There is, therefore, no doubt that many species among the microlepidoptera will still be added to the list. To all but one or two I can speak from my own personal knowledge, as having taken them myself since January 1872; and the few which I cannot personally speak to have been vouched for by Dr B. White and Mr Herd, both reliable authorities. There are probably few places in Scotland where so varied and interesting a collection could be made within the same space. However this may be, it has given me much pleasure to search out their habitats, and to watch their manners and customs, as also to endeavour to support those who have given their time and labour towards carrying on 'The Scottish Naturalist,' by adding my mite to its contributions. I trust that, in this respect, my example may be followed by others of my countrymen.

MONCREIFFE, *February* 1879.

First occurrence of White's Thrush (*Turdus varius*, Pallas = *T. Whitei*, Eyton) **in Scotland.**—In the last week of December 1878 a specimen of this very rare and beautiful Thrush was shot by Mr Forbes Burn at Hardacres, in Berwickshire. Not being aware of its rarity, unfortunately only a portion of the bird was saved—the head and wings unskinned, with part of the skin of the breast and back—and forwarded to me on January 22, 1879, to preserve as an ornament for a lady's hat. I immediately took the necessary steps to try and secure what was left of it for the ornithological collection of the Kelso Museum, which were successful, the owner very promptly and kindly presenting it to that institution. The relative lengths of the primaries may be interesting, as they differ from Yarrell's measurements of the original British specimen, which was shot by Lord Malmesbury in Hampshire, January 24, 1828, and named after White of Selborne by Mr Eyton, who was not aware that it had been previously named *T. varius*, and described by Pallas as an inhabitant of Siberia. Length of wing from carpal joint 6⅜ inches; first feather very short, 1¼ inch; the second feather in the right wing is ¼ inch (probably not being full grown); and in the left about ⅛ inch shorter than the fourth. (The second and fourth in Lord Malmesbury's specimen were equal.) The third is the longest in the wing, being about ⅛ inch longer than the fourth. Length of bill from gape, one inch four lines. The marking on the head is also different. Yarrell says: "The feathers on the upper part of the head and neck, yellow-brown, tipped with black." In this specimen these feathers are black (becoming lighter on the basal half as they go backwards), with a yellow-brown spot about one-sixteenth of an inch from the tip. In other respects it agrees with his description so far as can be seen.

I believe another bird of the same kind was seen on January 19th by Mr A. Steel. It was feeding on a bare sandy spot, under some large willow-trees, at the south end of Kelso bridge. He had an excellent view of it before it took flight; and after seeing the remains of the Hardacres specimen, he is convinced that it belonged to the same species. Both birds were solitary.

In Yarrell's lifetime there appears to have been great confusion between the true *T. varius* and other allied species. Professor Newton, who has seen and examined this specimen, has very kindly communicated a large amount of interesting information concerning these birds, especially to those who have not seen his edition of Yarrell's 'British Birds' (1872). I therefore give the following extracts from his letters: "At least nine examples of this bird have been before now killed in Britain. They are—

1. Christchurch, Hants, 24th January 1828.
2. Bandon, Cork, December 1842.
3. Welford, Warwickshire, 26th January 1859.
4. Ballymahon, Longford, 1867.
5. Hestercombe, Somerset, January 1870.
6. Langsford, Somerset, 6th January 1871.
7. Hickling, Norfolk, 10th October 1871.
8. Castle Eden, Durham, 31st January 1872.
9. Probus, Cornwall, early in January 1874."

After mentioning the example said to have been killed in the New Forest, and another example recorded as having been killed near Huddersfield, which, he thinks, wants confirmation, Professor Newton says: "I have heard also of three others having been seen—one in Kent, one in Yorkshire, and

one in Durham." So this is the tenth authentic instance of White's Thrush having been killed in Britain.

"On comparison with a specimen that has been long mounted, the fresh beauty of the colours in yours is very decidedly marked, yet I fear that nothing can be done to preserve its tints, and that when as many years have elapsed their richness will have disappeared. I have wholly failed to find any indication that would enable me to determine the sex or age of your bird. There is no question about its being the true *Turdus varius* of Pallas, though the tail is wanting—an unfortunate thing, as therein lies one of the most curious characters of this species—one that is possessed, so far as I know, by only one other species of Thrush—the presence of fourteen instead of twelve *rectrices*. . . .

"The real White's Thrush, *T. varius*, Pallas, was first described as an inhabitant of Siberia, to which country, and to the N.E. of Asia (*i.e.*, China and Japan), it is now known to be a regular summer visitant. Owing to causes which I cannot attempt to explain, a small number of examples seem yearly to migrate *westward* in autumn, and to come into Europe, where they occur as stragglers; but the majority, no doubt, retire more or less due southward, for they have been obtained in winter in the Philippine Islands, and suchlike places.

"In Java there is a Thrush to all appearance extremely like the true *T. varius*, even to the curious character of having fourteen tail-feathers. This Javan bird was described by Horsfield under the name of *T. varius*, he being ignorant (it would seem) that Pallas had previously applied the same specific name to another species. But the Javan species appears to be a resident in that island, or at any rate not to possess the migratory habits of the East Asiatic species, and accordingly the Javan species has a comparatively short and rounded wing, in which the second primary is considerably shorter than the sixth, and all the quill-feathers are much broader. This Javan bird is now usually known as *Turdus* (or *Oreocinda*) *horsfieldi*. In India, Ceylon, and Australia are other species with much the same colouring as that of *T. varius* and *T. horsfieldi*, but they have all only twelve tail-feathers, while the two above mentioned have fourteen. There are, however, other characters by which they may be distinguished, though these require some knowledge of the subject to detect them; and I am sorry to say that, both in this country and on the Continent, persons have been found unscrupulous enough to try and pass off examples of the Indian and Australian species for those of the true *T. varius*. Over and over again have I seen in collections the Australian bird personating the true *T. varius*. No one who knows the difference can fail to detect the difference directly; but there is a large number of persons who are deceived, and it is clear that Mr Yarrell himself was one of them, for his description of the specimen shown to him, and said to have been killed in the New Forest, proves to have belonged to the Australian bird; and indeed, I have since been told by Mr Gould, who perfectly recollects the circumstance, that it was stuffed with Australian wool!"—ANDREW BROTHERSTON, Shedden Park Road, Kelso.

THINGS TO BE OBSERVED IN 1879.

CONSIDERING the most unusual character of the winter which we have just endured, it seems extremely desirable that observations should be made (and recorded) of many natural phenomena. Such observations are not only interesting in themselves and beneficial to the observer, but have a much greater value in assisting to throw light on the causes of some facts in the geographical distribution of species.

We may point out a few of the things to be observed.

The Ornithologist will have of course been very much concerned about the hardships that his favourites have undergone, and the havoc that the scarcity of food has made in their ranks. At the same time he will have been on the look-out for any unusual visitors, as well as observant of any temporary changes of habits or forced migrations on the part of the non-migratory birds. The coming spring and summer will show what species have suffered most, and it will then be interesting to observe how the numbers are recruited, and what effect, if any, the severe weather has had upon the arrival and departure of the spring migrant, the times of nesting, &c.

Observations of a similar character should be made on the mammalia, amphibia, reptiles, and fishes.

To the Entomologist a wide field of observation is open. The effect of the long-continued cold upon the vitality of the species, and the state of development in which such species are —*i.e.*, whether the egg, larva, pupa, or perfect insect is best fitted to resist the cold; the abundance of individuals of those species (*e.g.*, Vanessæ amongst the butterflies) which hibernate in the perfect state; the times of appearances, more especially of the spring insects, in comparison with the dates of former years; and especially, the degree of colour-variation in different species, and whether this variation, if it exists, tends to melanochroism or leucochroism (more intense or more dilute coloration).

Observations should also be made on the effect of the severe winter upon terrestrial and aquatic mollusca, &c.

Many things may be observed by the Botanist: the dates of the flowering of plants and of the leafing of the deciduous trees; the effects of the cold upon indigenous and introduced plants, &c.

If any of our readers will favour us with notes, few or many, on these or similar observations, we will be happy to give them place.

Notes on the Effects of the Past Winter in the South-east of Scotland.—The extreme severity and the long duration of the winter of 1878-79 will be long remembered, and notes of its effects in different localities will be interesting. Judging from newspaper and other reports of the numbers of birds that have died from starvation in various parts of the country, this district, so far as my experience goes, has suffered comparatively little. Although the frost was not so severe, or the snow so deep, as in some localities, still it was very hard, the thermometer, in the vicinity of Kelso, falling on two nights to 3° below zero. The effect on different species and genera of birds has been very different. The great majority of those that I have dissected have been in excellent condition: "pined" birds are the exception. Indeed, I have had more very fat birds, with fewer "pined" birds in proportion, during the past winter, than any previous one that I can remember. The fat appears to be a provision of nature to protect them from the cold.

Fieldfares and Redwings felt it most: they suffered severely in the early part of the storm; but very few of them died while they remained with us, which was not long after the storm commenced.[1] I believe they would either go farther south or take up their quarters on the coast, where there would be something turning up for them after every tide. Wood-pigeons, for the most part, fared badly; but some were to be had in good condition throughout the whole winter. In the second week of February I saw numerous Cole-Tits (no Blue Tits: most probably they had migrated southwards) flying and searching about for insects or their larva on the trees and hedges, in their usual active manner. Chaffinches, Bramblings, Sparrows, and other hard-billed birds, have, to all appearance at present, come through the ordeal with very little loss. About the usual numbers are to be seen in their regular haunts, which, to the farmer and gardener, is rather unfortunate. What with the destruction of birds of prey, protective laws, &c., the great increase in the number of the hard-billed birds in many parts of this district has become a perfect pest.

The following notes are from birds dissected during the winter:—Hawks (Sparrow and Kestrel) were very fat; Owls also, especially the Tawny Owl, exceedingly fat. The only substances found in their stomachs were the remains of mice and a few rats. The Creeper and the Skylark were in fair condition in the middle of February. In the beginning of the same month, a pair of Siskins, which had been feeding on the seeds of the alder, were in excellent condition. Rooks generally are in fair condition. Some of them commenced nesting at Ednam, Edenhall, and other places in this neighbourhood, in the end of February—the usual time—which, if they had been hard up, would not have been the case until later in the season. Kingfishers, of which I had four during the storm, were all fat. They were obtained on the smaller burns and streams that were not frozen over. The cold does not seem to have any bad effect upon them, unless, as sometimes happens, they get frozen to their perch. Grouse—both black and red—in February, though not fat, were in fair condition; one, a grey hen, was obtained in the beginning of the month on Tweedside, a few miles below Kelso—a long way from its natural haunts (the Lammermoors, on the north—or the Cheviots, to the south). It seemed to have eaten any green thing that came in its way. The crop was distended with a large quantity of newly-swallowed leaves and

[1] Some of them have now returned (March 10).—A. B.

buds, mostly *geum*, with a little grass and a few veronica leaves intermixed. So far as I can learn from shepherds and others, they had seen no dead birds on the moors as yet. But it is probable that some of the weaker birds, as the spring advances, will pine and die. No Lapwings were seen throughout the winter; but some of them are now (March 10th) returned from the sea-coast. Common Snipe and Woodcock, in the end of last and beginning of this year, were both plentiful and fat—Jack Snipes rare. Dunlins, Ringed Plovers, &c., from the coast, were very fat; and a Curlew, in the end of February, also from the coast, was exceedingly fat, having a thick layer both externally and internally. None of our birds appear to thrive better than the Heron during frost. I had several, both adult and immature; all were fat. Trout and parr were their chief feeding: one had, in addition, the remains of a large frog in its stomach; in that of another there was nothing except a number of parasitical nematoid worms, about three inches in length. I suppose it had been shot before getting breakfast. Coots apparently do not fare so well as the Water-hen, some of the latter being very fat. In the early part of February I had two Brent-Geese—both fat; their stomachs were full of grass-wrack (*Zostera marina*, var. *angustifolia*). They had probably been feeding on the "slakes" between Fenham and Holy Island, where this plant occurs in great abundance. All the *Anatidæ*, especially the diving sorts—Golden-eye, Tufted Duck, &c.—have had abundance of food—larva of aquatic insects and shells, chiefly *Physa fontinalis;* no appearance of fish of any sort. A Mallard from near Gordon had in its stomach, besides the roots and leaves of aquatic plants, and a large number of the shells of *Pisidium pusillum*, a quantity of *Sedum acre*—a plant which I had not before found in any bird. Its fresh green colour would look tempting on the tops of the "dry stane dykes," and other bare spots, from which the snow had drifted. Owing to the severity of the frost, the lochs and ponds were all frozen over; consequently the Ducks have not been so numerous in this district as usual this winter. Most of them have been obtained on the open parts of the Tweed and its tributaries. Goosanders, on the contrary, have been more numerous (they are common every winter and spring), and excessively fat. Nearly every one that I have dissected has been gorged with trout and parr, in various stages of digestion, and from three or four inches in length up to nine and a half. One of them had been feeding on eels. They must devour large quantities of fish, as the digestive process goes on very rapidly. Often the head of the fish is decomposed, while the tail is quite fresh. They are invariably swallowed head first. The Little Grebes were in good condition; one, in addition to the remains of aquatic insects and their larva, had a quantity of salmon-roe in its stomach.[1]

Some of the Grebes have the curious habit of eating feathers. One, a male of the Great Crested Grebe—shot on the Bowmont near Paston (a very short distance "over the border"), Nov. 18, 1878—had a large quantity of feathers in the stomach, intermixed with the elytra of a few beetles. The feathers, which appeared to be mainly from the breast of the bird, were dyed green, as if it had been eating some vegetable matter. An Eared Grebe, which was shot in a pond near Kelso, Aug. 13, 1877, had also, when opened,

[1] I should have mentioned that the feet of many water-birds were frost-bitten—especially Ducks and Grebes—having lost part of the web and the toes. One, a Tufted Duck, was found frozen to the ice.—A. B.

a number of feathers in its stomach. I may here mention, that on the same day that the Great Crested Grebe was shot, I received a beautiful adult male Glaucous Gull in full winter plumage, which was shot on the Magdalene Fields, Berwick. Three Little Auks were captured during the winter; all were very much emaciated, being little more than skin and bone—one of them was found fully fifteen miles from the sea. The various species of Gulls were very fat. Several of them, in the very depth of the winter, were fatter than any birds that I had previously seen. Judging from the contents of their stomachs, it is difficult to say what they had been feeding upon—a few small fish; but chiefly, I think, the carcases of animals and dead fish which have floated down the river. Any Squirrels that I have had were also fat. The Squirrel by some is supposed to lie dormant during frost, but I am convinced that such is not always the case, as I have seen them when it was very hard. The Rabbits, especially in the upland districts, suffered very severely; whilst in some parts, where they had access to the turnips—which were a splendid crop—they fared better. Much damage has been done by them in young plantations by barking the trees. The Field Vole (*Arvicola agrestis*) has also been very destructive (on one estate, at least, that I have seen); but their work is not so apparent, as their operations were confined to barking the young trees just above the surface, where it is hidden by the withered grass and other herbage.

From the above notes it will be seen that there are many birds which, instead of having been starved with cold and hunger, were the opposite. Their natural instinct came to the aid of those which felt it most, taking them either to the sea-shore or to warmer climates, where suitable food and shelter would be more easily obtained. Now that the winter is past, the small birds, instead of being all but annihilated, as many writers prophesied, are still to be seen in about their usual numbers.

It is impossible as yet to judge, with any degree of certainty, the effects of the winter on plants; but, so far as I can see, it will not be so destructive as that of 1860-61, when most of the Laurels (both Portugal and Bay) in this district were either killed to the ground or so seriously damaged that they had to be cut over. The little damage they have sustained is chiefly confined to gross young shoots—the result of severe pruning—or to half smothered plants, from which sufficient light and air is excluded. The previous summer and autumn have much to do with the manner in which such plants stand the succeeding winter. If the young growth is well ripened, they can resist a much greater degree of frost than when they make a late ill-ripened growth. If last winter had followed the summer and autumn of 1877, there would have been a different tale to tell. I may mention the effects on a few well-known plants. *Araucarias* are for the most part unhurt, but some are very brown. The leaves of many Hollies, especially the variegated varieties, are seriously damaged. Rhododendrons (*R. ponticum*) and Aucubas are unscathed.[1] Laurestinus is much cut up, the flowers all destroyed. *Garrya elliptica*, which usually stands the winter well, is very much damaged. I may say the same of *Cotoneaster microphylla*. Pentstemons, Antirrhinums, Wallflower, &c.: many killed. Spring flowers are late. I have seen only one Daisy. Snow-drops, Winter Aconites, Christmas Roses, Hepaticas, and *Bulbocodium vernum*, are

[1] I have since seen some plants of Aucuba which were transplanted late in the spring that are much cut up.—A. B.

now in flower ; but Crocuses are not yet out, though pushing up rapidly for a week past.—ANDW. BROTHERSTON, Shedden Park Road, Kelso.

The Effect of the late Storm on our Wild Animals in the North-east of Scotland.—Considering the length and severity of the storm we have just passed through—a storm the like of which has not been known, I believe, within the memory of any one living—doubtless a few notes as to its effect on our wild animals may not be out of place in the columns of the 'Scottish Naturalist.' Truly, the marks left by the storm upon these creatures are such as must continue to be seen for some time to come. Partridges in this part of the country have been almost annihilated, hundreds of them being found dead or dying ; and even in this famished condition they have been sent to the various game-dealers in town. Many of the birds I have seen, and it may be safely said that most of them had not an ounce of flesh on the whole body. Many gamekeepers also, to whom I have spoken on the subject, say that there is but little chance of partridge-shooting for next season at least ; and on some estates they already speak of giving the birds a season or two's rest.

Grouse, in the more exposed districts, have also perished in considerable numbers ; as have also Pheasants on estates where these birds were not regularly fed.

Wood-pigeons have been seen in some districts lying dead in dozens in the turnip-fields, evidently unable to pick from the frozen bulbs, where such might chance to be exposed, a morsel sufficient to sustain life. One gentleman tells me he saw on his estate some of this species feeding on a dead companion.

Woodcock have also suffered considerably, some I have seen being mere skeletons ;—whilst many of our song and other small birds—such as Thrush, Blackbird, Redwing, Lark, Greenfinch, Linnet, &c.—in some instances boldly forced their way among the poultry at the farmyards, endeavouring to share in what might be given there, but too often failing to obtain even there a picking, were driven to seek rest on the house-tops or some neighbouring tree, ultimately to succumb to the pangs of hunger, dropping lifeless on the snow beneath ; and over the breadth of the country they have perished in thousands.

Deer have also been in great straits. On many estates efforts have been made to relieve the poor animals by supplies of hay, straw, and turnips being carried to their haunts. Beans and oats have also been laid out for their benefit ; but in such forests where this has not been done, hunger has compelled them to break through the fences and wander over the country, often to fall a prize to some sportsman on whose land they are not seen in ordinary seasons.

Hares and rabbits, too, have also suffered sorely ; the latter being so thin that for a considerable time I saw one game-dealer offering them at twopence each, the usual price being, when skinned, 1s. 2d. to 1s. 4d. each. As to rarities among the feathered tribes, they have been conspicuous by their entire absence. Not one have I seen or heard of all the winter, and every one to whom I have spoken on the subject has given a similar answer. Truly, the severity of the past winter has been such upon every creature, from man downwards, that few will wish to see a repetition of it for many a year to come.—GEORGE SIM, Aberdeen.

PHYTOLOGY.

GLEN TILT: ITS FAUNA AND FLORA.

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

(*Continued from vol. iv. page* 304.)

THE CRYPTOGAMIC FLORA.

TO compile a tolerably perfect list of the flowering plants of a district, a few well-planned visits of not more than four or five days each is all that is absolutely necessary, but it is far otherwise with the cryptogamic flora. To become acquainted with the mosses and liverworts, the fungi and lichens, the desmids and diatoms, the botanist must spend summer and winter, spring and autumn, in continued search. Nor will one year be sufficient for his purpose: a lifetime is scarcely enough. Year after year may be spent in examining a single copse or plantation; each square foot of ground may have been repeatedly gone over; and when the patient searcher has almost made up his mind that there is nothing left for him to discover, lo! some fine morning he beholds the well-known ground covered with a beautiful agaric that has never gladdened his eyes before, and which may not be seen again till after the lapse of a human generation. And so it may happen with the other groups. Not that they are so uncertain in their times of appearances as the fungi, but many are so minute and so restricted in their localities, as well as variable in quantity, that species may elude observation year after year. Therefore, until that happy time, when Glen Tilt possesses resident botanists qualified to reveal its hidden treasures, the cryptogamic flora must remain comparatively, though, thanks to various explorers, not absolutely unknown.

MOSSES.

Of all the cryptogams—that is to say, all except the ferns and their allies which have already been discussed—the mosses of the glen and its vicinity are the best known, thanks to the labours of Miss M'Inroy of Lude.

One of the first mosses recorded from Glen Tilt was *Dicranum Grevilleanum*, which was found "upon the ground in an old neglected road at the foot of Ben-y-Gloe" by Messrs Greville, Arnott, and Hooker, in 1823, and which was not found again for many years. Miss M'Inroy rediscovered it in Glen Tilt, and it has also been found elsewhere.

Another very interesting moss discovered by the same lady is the little *Seligeria tristicha*. Two other species of the genus, *S. pusilla* and *S. recurvata*, both scarce species, also occur, as does the still rarer allied species, *Anodus Donianus*.

In our visits to Glen Tilt, I have not been able to pay very much attention to the mosses. Amongst the species I have noticed are *Encalypta streptocarpa*, not an uncommon moss in many districts, but very rarely fruiting. On an old wall near Blair Castle I have never failed to find capsules, and this is the only locality where I have found them. *Tortula princeps* grows on rocks a little further up the Tilt; and on Craig Mhor *Anacalypta latifolia* was found rather abundantly by Mr Roy and myself. Professor Barker has also found the same moss in Glen More, one of the valleys running into Glen Tilt.

In damp crevices of rocks on Ben Chat, *Œdipodium Griffithianum*, a curious moss, almost or quite confined to Britain, is not uncommon; and in woods near Blair Castle the beautiful *Hypnum crista-castrensis* may be found. On Ben Ghlo probably many of the alpine species occur. It is one of the oldest localities for *Catoscopium nigritum*. In a deep rocky hole amongst the heather, high up on that hill, I was surprised to find the pretty *Hookeria lucens*, a moss I never have seen elsewhere in so alpine a situation. *Weissia verticillata* is very abundant on the dripping limestone rock opposite the Falls of Fender.

Amongst the rarer mosses found by Miss M'Inroy in Glen Tilt or its neighbourhood are: *Dicranum falcatum, Anacalypta lanceolata, Tortula rigida, Encalypta rhabdocarpa, Grimmia Donniana, Orthotrichum tenellum, O. Bruchii, Leptobryum pyriforme, Bryum Zierii, Amblyodon dealbatus, Pterogonium filiforme, Hypnum Sommerfeldtii, H. sylvaticum*, &c., &c.

Altogether, about two hundred species of mosses are known from Glen Tilt, and careful searching would probably result in considerable additions to the number.

LICHENS.

Of these I personally know very little, and therefore cannot say much regarding the Glen Tilt species. The Rev. J. M. Crombie has devoted a good deal of attention to the lichens of Blair Athole, and though most of his "finds" in that district are from localities beyond our bounds, yet there are enough to show that it is not poor in rare and interesting species. The following may be noted: *Calicium citrinum*, on walls in Glen Fender; *Alectoria nigricans*, plentiful on Ben Ghlo; *A. lanata*, and its variety *parmelioides*, near the summit of Ben Ghlo; *Placodium callopismum*, var. *plicatum*, on a wall near the village; *Lecidea leucophæa*, var. *conglobata*, near the summit of Cairn Gowar; *L. epanora*, Glen Fender; *L. lucida*, Glen Fender; *L. turgidula*, var. *pityophila*, Glen Fender; *L. metamorphea*, very rare in Glen Fender; *L. sublatypea*, Glen Fender; *L. limosa*, near the summit of Cairn Gowar; *L. silacea*, Glen Fender; *L. plana*, Glen Fender; *L. sarcogyniza*, near the summit of Cairn Gowar; *L. subfurva*, Glen Fender; *L. nigro-glomerata*, *L. Gevrensis*, and *L. deparcula*, near the summit of Cairn Gowar; *L. lugubris*, Glen Fender; *L. atrobadia*, Cairn Gowar; *Lithographa tesserata*, Cairn Gowar, extremely rare. The above are extracted from a paper by Mr Crombie, "On the Rarer Lichens of Blair Athole," in 'Grevillea,' vol. i., p. 170. In concluding the paper, Mr Crombie says: "My attention was directed chiefly to those localities in which primary limestone is associated with mica, slate, and quartz—a geological combination which always yields the lichenist everywhere throughout the Grampians a rich and rare harvest—*e.g.*, Ben Lawers, Morrone, Craig Guie, &c. Many other interesting species were met with; and many which might have been expected to occur, such as Parmelias and Stictas, were but few in number. To those interested in the geographical distribution of our British lichens, I may state that there is a marked contrast in many respects between the lichen-flora of the central Grampians in Blair Athole, and that of the south-west Grampians in Breadalbane, as also between it and the north Grampians in Braemar."

Other species discovered since then by Mr Crombie are:

Lecidea deludens, summit of Cairn Gowar, 1871; and *Pyrenopsis phylliscella*, Ben Ghlo, 1870.

In concluding this notice of the lichens, I may mention that *Peltigera canina* is used in Glen Tilt as a remedy for distemper in dogs. It was probably on account of this real or supposed medicinal property that Linné gave it its specific name. Some other lichens are used in the glen as dyes.

ALGÆ.

All that I can say about these is that Mr Roy, during a few days' exploration of the district, found upwards of eighty-four species of Desmids, a list of which will be found at page 68 of the fourth volume of this magazine, and which need not be repeated here. Though the district did not turn out so rich as Mr Roy expected, still a more extensive search at a different season of the year would probably add considerably to the list. It is wonderful how many species may be found in a favourable locality and season. I once collected over eighty species in less than half an hour on the Sidlaw Hills, not far from Perth.

FUNGI.

In Glen Tilt there is much—very much—ground that no mycologist would expect to be very productive, and which, in fact, is not productive, of fungi. So many of these plants are dependent on the conditions afforded by the shelter of woods, so many grow on or near dead and decaying timber, that a wide extent of grassy meadows—rich though such be in certain species—and of heather-clad hills—the least productive of any ground—cannot be expected to produce a great variety. Moreover, it is not every kind of wood that provides the most favourable conditions for the growth of fungi. Birch woods, for example, are proverbially unproductive, while, on the contrary, woods of Scots fir or of spruce—more especially if the trees stand so thickly as to prevent or limit the growth of phanerogamous plants on the ground beneath them—afford a rich harvest to the mycophilous botanist. And it is in such woods of natural growth that Glen Tilt is deficient. Here is no such grand assemblage of native firs as that of the Black Wood of Rannoch, with its grand masses of *Hydnum imbricatum*—beautiful in its expanse of rich, brown scaliness—and *H. lævigatum;* its *Trametes pini* and *Polyporus Schweinitzii;* its groups of many species of *Boletus*, including the

rare *B. flavidus*, not to mention its myriad Agarics. Instead of this mycological paradise we have a large extent of birch-wood, not indeed altogether barren, but still not very productive; and though there are plenty of coniferous plantations in the lower part of the glen—for the most part remaining unexplored—they cannot be expected to be very rich.

Notwithstanding these drawbacks, I think the list which I give below will show that Glen Tilt is by no means destitute of both rare and interesting species; and that when its mycology has been more fully investigated, the catalogue of its species will not be a short one.

Up to the present moment very little has been done to reveal the riches of the glen. In studying its entomology and its flowering plants, I of course did not altogether neglect to notice the fungi, but they only occupied a very small portion of my attention. In fact, a single day only has been properly devoted to the mycology of Glen Tilt; and though on that occasion I had the great advantage of Mr Stevenson's companionship, and though the day was a good long one—we worked straight on from 5 A.M. to 5 P.M.—we can scarcely be said to have got further than the title-page of the catalogue of the fungi.

In noticing the species observed in the Glen, I shall begin with those that attain the higher altitudes, and thence gradually descend to the lower part of the district.

The only Agaric that is at all widely distributed on the hills is *Agaricus umbelliferus*, which ascends above 3000 feet, and is very variable in colour. Of a more truly alpine character is *Peziza axillaris*, which occurs at about 3000 feet on Ben Ghlo, the only place in the district where I have noticed it. In Rannoch it descends to 900 feet.

Between 3000 and 2000 feet a number of species occur, some common, others more or less local. Amongst these I have noticed in Glen Tilt, chiefly on the hill to the north-west of Forest Lodge, *Agaricus semiglobatus*, *Ag. tener*, *Ag. dryophilus*, *Ag. gracillimus* (amongst *Vaccinium myrtillus* and *V. uliginosum*), *Russula emetica*, *Coprinus radiatus*, *C. niveus*, *Marasmius androsaceus*, *Phragmidium obtusum*, *Puccinia compositarum*, *P. variabilis*, *Æcidium compositarum*, *Uredo vacciniorum* (on *Vaccinium uliginosum*), and *Pilobolus crystallinus*. At about the same altitude on Ben Chat a *Puccinia*, which seems to be *pulverulenta*, grows on *Epilobium alpinum*, var. *anagallidifolium;* and *Lecythea salicetí*, or an allied species, upon *Salix herbacea*. *Rhytisma*

empetri grows here and there on *Empetrum nigrum.* On An Scarsgach, above 2000 feet, *Vibrissea margarita* occurred sparingly on dead heather sticks in a spring. It has also been found in Glen Tilt a few miles below Forest Lodge, and is probably not uncommon in springs and small streams.

Below 2000 feet, but above 1500, the above species are joined by others, including *Agaricus rimosus*, *Ag. infundibuliformis*, *Ag. æthiops*, *Hygrophorus conicus*, *Boletus scaber* (amongst the heather near Falar), *Puccinia Andersoni*, *P. violarum*, *Uromyces appendiculata* (on *Lathyrus macrorhizus* = *Uredo orobi* DC.), *U. apiculosa* (on *Trifolium repens* = *Uredo trifolii* DC.), *Ustilago urceolorum* (on various *Carices*), *Coleosporium pingue*, and *C. tussilaginis.* Most of these occur on the hill above Forest Lodge, where also I have found *Æcidium orobi* on *Lathyrus macrorhizus*, *Æc. trifolii repentis* Kl. on *Trifolium repens*, *Ustilago utriculosa* on *Polygonum viviparum*, and *Dactylium spirale* on the leaves of the same plant. Near Loch Tilt *Venturia atramentaria* may be found on dying leaves of *Vaccinium uliginosum*; *Puccinia bistortæ* is common on leaves of *Polygonum viviparum* in many parts of the Glen. *Puccinia luzulæ* has been gathered very sparingly on leaves of *Luzula multiflora* in one of the ravines of Ben Ghlo, and *Isothea rhytismoides* occurs on leaves of *Dryas* on Craig Mhor.

From the level of Forest Lodge downwards, fungi increase in numbers. Underneath the shade of the fir-trees that grow near the Lodge, *Agaricus vaginatus* is not uncommon, and *Ag. rubescens* (a good esculent species) is not rare. The common mushroom (*Ag. campestris*) also grows near the Lodge. On the banks of the Tilt the Mountain Sorrel, *Oxyria reniformis*, is not a scarce plant; and on various tufts of it beween the Lodge and Dal-an-Eas Bridge, the very local and rare *Ustilago vinosa* abounds. Whether it is always to be found there I cannot say, but I have found it two years in succession. On *Galium verum*, near the river, I have found *Æcidium galii* in small quantity. Here and there *Dactylium modestum* is by no means unfrequent on *Alchemilla alpina.*

On a peaty bank near the kennels *Agaricus mutilus*, a rare and beautiful species, grows in small quantity; and near the same place various other fungi, including *Sphærotheca pannosa*, *Ustilago antherarum* (on *Stellaria graminea*), *Peziza granulata*, *Uredo bifrons*, *Agaricus campanulatus*, *Coprinus plicatilis*, *Cortinarius violaceus*, *Boletus chrysenteron*, *Triphragmium ulmariæ*,

Agaricus solstitialis, *Ag. jubatus*, &c., grow at about 1000 feet above sea-level.

In marshy places *Æcidium pedicularis* is parasitic upon *Pedicularis palustris*, and *Puccinia calthæ* upon *Caltha palustris*. Though the *Caltha*, in its form *minor*, ascends to a high altitude on the mountains, the *Puccinia* does not, so far as I have seen, ascend with it.

On the grassy slopes the usual fungi that like the "open" may be found, such as *Hygrophorus pratensis*, *H. puniceus*, *Clavaria fragilis*, *Agaricus lampropus*, *Lycoperdon gemmatum*, and other species already mentioned; and no great change in the character of the mycological flora is perceptible till we reach the birch woods. Then these pasture fungi begin to give way to the sylvan kinds, which find their special habitats either below the shelter of the trees or upon the dead or dying wood. On the latter we find the large tough white masses of *Polyporus betulinus*, which, when dried, may be cut into razor-strops. The entomologist will find bits of this fungus useful for the same purposes as elder or Jerusalem artichoke pith are often used. Also on the dead birches, but in Glen Tilt much rarer than *P. betulinus*, the black hoof-shaped *P. nigrinus* grows, and on the stumps the pretty and variable *P. versicolor*.

Near a stump I found a large Agaric, which I thought might be a form of the common *Ag. melleus*, but which Mr Berkeley was inclined to consider as probably a new species. Consequently I had a search for more specimens a week or two after finding the original ones, but could not discover any more. This fungus, therefore, remains "a thing to be looked for."

The brilliant orange-coloured Chantarelle (*Cantharellus cibarius*) decorates the ground here and there. This fungus, which has an agreeable apricot scent, is not likely to be mistaken for anything but the False Chantarelle (*C. aurantiacus*), and a very little experience suffices to enable one to distinguish the two. Next to the common mushroom, the Chantarelle is perhaps the fungus that is most eaten in this country. It is said to be improved if soaked in milk for several hours before it is cooked.

Amongst other fungi in or near the birch woods were the handsome yellow variety of *Agaricus vaginatus*, *Ag. purus*, *Ag. fasciculatis*, *Ag. melleus*, *Hygrophorus chlorophanus*, *H. nitratus*, *Russula rubra*, *R. cyanoxantha*, *R. fœtens*, *Lactarius blennius*, *L. subdulcis*, *Paxillus involutus*, *Boletus scaber*, &c.; and amongst the smaller fungi *Lecythea lini*, *L. saliceti*, *Melampsora tremulæ*,

M. betulina, *Æthalium septicum*, *Sepedonium chrysospermum*, *Dothidea geranii*, *Trichoderma viride*, *Septoria stachydis*, *S. scabiosæcola*, *Trichobasis suaveolens*, *Epichloë typhina*, &c. On a bridge crossing a ravine *Cystopteris fragilis* is abundant, and almost every frond was covered with the rather local *Uredo filicum*. On *Vaccinium vitis-idæa* the curious *Exobasidium vaccinii* was not uncommon; and on leaves of *Viola sylvatica* and *Geum rivale*, respectively, occurred *Septoria violæ* and *S. gei*. The dark-coloured *Agaricus chalybæus* was also found near the woods.

Still further down the glen, where the woods become of a varied character, there is another change in the fungi; and if these woods were examined at the proper season there is little doubt but that they would be found very prolific. On an oak a magnificent example of the beautiful *Polyporus sulphureus* flourished for some time; and under the shade of the trees various species of *Boletus* were not uncommon, including *B. pachypus*, *B. laricinus*, *B. piperatus*, and *B. subtomentosus*. On the mountain-ash leaves *Rœstelia cornuta* was frequent, and amongst other fungi noticed were *Hygrophorus psittacinus*, *Gomphidius glutinosus*, *Russula integra*, *Agaricus laccatus*, *Lactarius volemen*, *Marasmius oreades*, *Asteroma veronicæ* (on *Veronica officinalis*), *Sphærella rumicis*, *Dichæna strobilina*, *Septoria ulmi*, *Coleosporium campanulæ* (on *Campanula rotundifolia*), *Phragmidium mucronatum*, *Dothidea podagrariæ*, *Dacrymyces deliquescens*, *Asteroma rosæ*, *Erysiphe communis*, &c. A few specimens of a pale variety of *Peziza cochleata* were picked up near the York Cascade, and on the hymenium of one of them was a parasitic fungus, *Bactridium acutum*. Passing the Castle, a little time was spent in examining a small wood of spruce and other trees near the highroad. Amongst other finds in this plantation was *Phelonitis strobilina* on old cones of spruce, *Polyporus annosus* on fir stumps, *Stemonitis fusca* and *Lycogala epidendron*, also on stumps; and amongst the larger fungi *Lycoperdon cælatum*, *Agaricus deglubens*, *Lactarius deliciosus*, *Phallus impudicus*, *Boletus edulis*, *Spumaria alba*, &c.

In addition to the fungi I have enumerated, some others have been found in Glen Tilt, such as *Agaricus ostreatus*, which was found by Mr Keith some years ago. I have also omitted to notice in their proper places a few that we found. Amongst these are *Paxillus leptopus*, considered by some authors to be a variety of *P. involutus*, *Septonema elongatispora*, parasitic on *Geranium pratense* and *G. sylvaticum*, *Agaricus nigrellus* P., *Ag.*

hiulcus, *Ag. scaber*, *Bolbitius titubans*, *Cortinarius torvus*, *Agaricus fimiputris*, *Ascobolus furfuraceus*, *Ustilago longissima*, *Peronospora obliqua*, *Leptothyrium fragariæ*, *Æcidium crassum*, var. *lonicerœ*, *Uredo confluens*, *Puccinia chrysospenii*, *P. galiorum*.

This is all that is at present known regarding the fungi of Glen Tilt, but it is enough, I think, to show that if the glen was examined more thoroughly, and at the proper season, the list might be easily quadrupled.

SUPPLEMENTARY LIST OF FUNGI FOUND WITHIN THE PROVINCE OF MORAY.

By the Rev. JAMES KEITH, A.M.

(*Continued from page* 15.)

SPHÆRELLA, De Not.

1028. Pteridis, Desm. On dead fronds of Pteris. Altyre. June.
1029. Brachytheca, Cke. On blistered spots on leaves of Vaccinium vitis-idæa. Aug. Common. Grev. vol. vii. p. 88.

VENTURIA, De Not.

1030. Chætomium, De Not. On dead leaves of Carex pendula in Greeshop wood. April.
1031. Ilicifolia, Cooke. On holly-leaves. Sluie. June.

PYRENOPHORA, Fr.

1032. Phæocomes, Fr. On dead Holcus-leaves. Common.

CERATOSTOMA, Fr.

1033. Chioneum, Fr. On fir-leaves in damp places. Grantown. Aug.
1034. Vervecinum (Desm.) On whin-stumps. Clunyhill. Nov.

ISOTHEA, Fr.

1035. Pustula, Berk. On fallen oak-leaves. Common.

CAPNODIUM, Mont.

1036. Footii, Berk. and Desm. On laurel and holly leaves. Common.
1037. Sphæricum, Cooke. On leaves of Veronica officinalis. Forres. Jan.

Omitted in proper place.

1038. Stereum rufum, Fr. On ash. Sanquhar, Altyre, and Dunphail. Winter.
1039. Typhula erythropus, Fr. On petioles. Greeshop. Oct.
1400. Stemonitis ovata, Pers. On sticks. Greeshop. Oct.

(*Concluded.*)

Snowdrops and the Frost.—It is interesting to study the tendency of all things in nature to follow out their instincts, if I may so call it. Every one knows that this has been a very severe winter, and yet, as the year rolls on, in spite of climatic influences, the very plants which are due in early spring are not to be prevented by the snow and frost, when the routine of life urges them to add their mite to the embellishment of this our earthly paradise, from forcing their way through the icebound crust. Here, at Moncreiffe, after the partial thaw which commenced about the 4th of February, the Snowdrops were to be seen rearing their snow-white blossoms some inches above the surface of the earth. On the 8th of that month, bunches of well-formed flowers were to be gathered in the garden and in the woods. At that time it required a pickaxe to penetrate to the depth of 16 inches in my garden; and Colonel Drummond-Hay tells me that about the same time his children gathered Snowdrops beneath where a few days before they had amused themselves by forming a slide upon the ice-covered surface. No doubt, had the absence of snow permitted it, we should have seen them at an earlier date, but they are not so very far behind the usual time of their appearance: in 1870, February 3d; in 1872 they were about the same stage on January 25th; in 1877, on January 9th; in 1874, on January 3d; and this year, 1879, February 8th. I have no other dates at hand; but considering the continued snow and frost, and the depth to which the latter had penetrated, it strikes one as a wonderful natural power in so fragile a stem as that of the Snowdrop being able to force its way through so hard a surface, and, at the same time, to blossom in the face of such intense cold.—THOS. MONCREIFFE, February 1879.

NEW BOOKS.

Report for 1877 of the Recorder of the "Botanical Locality Record Club," and **A Summary of Comital Plant-Distribution, additional to that detailed in Topographical Botany: being an enumeration of the new County Records**, published by the Botanical Record Club, 1873-1878. To which are added those appearing in the 'Botanical Exchange Club Reports,' 1867-1877. Compiled by F. Arnold Lees, F.L.S., Recorder to the Botanical Locality Record Club.

With the Report for 1877 the Botanical Locality Record Club completes its first volume, which contains the Reports for the five years that it has existed. The Recorder, in his prefatory remarks, briefly notices what has been done by the Club, and what remains to be done. (We notice, *inter alia*, that manuscript lists of species, personally vouched for from recent observation, are yet lacking for Wigtonshire, Peebles, and West Ross.) Then follow "New County Records," "General Locality List," "Extinctions and Re-appearances," "Aliens, Casuals, and Escapes," and "County Catalogues," &c. In the latter division Professor Babington communicates an article on the Dis-

tribution of the Species of Chara, as shown by specimens in his herbarium. The Report concludes with a "Quinquennial Appendix," which includes the "Summary of Comital Plant-Distribution," mentioned above. This portion, which all possessors of 'Topographical Botany' would do well to obtain, may be had (price 2s. 6d.) from the Treasurer of the Club, Mr T. B. Blow, Welwyn, Hertfordshire.

When the Record Club was instituted, we must confess that we did not anticipate that any great benefits to topographical botany would result from the labours of the members. It is therefore with the more pleasure that we acknowledge the good work that has been accomplished. It is, perhaps, a pity that in the "Summary" the rule that no plant should be entered unless vouched for by an actual specimen has not been more rigidly adhered to, even for the commonest plants. At the same time, probably no great, if any, harm has been done. Still, we would recommend for the future an adherence to the safer plan of excluding every plant not vouched for by specimen.

The Rev. W. A. Leighton informs us that he has nearly completed the printing of a third edition of his **Lichen Flora of Great Britain, Ireland, and the Channel Islands.** (By the way, why will botanists unite the Flora of the Channel Islands—which is entirely French—with that of Great Britain? zoologists do not so treat the Fauna.) The number of Lichens will, in this new edition, be increased from 1156 to 1706, which shows that the British Lichen Flora is quite on a level with that of any other European country. The additions are chiefly due to the author's own researches in Wales, to those of Mr Larbalestier in the West of Ireland, and of Dr Stirton and Mr Crombie in Scotland. The Irish discoveries are especially remarkable.

Mycologists may be interested to learn that M. C. Roumeguère (Rue Riquet 37, Toulouse) has started a new quarterly magazine, entitled the **Revue Mycologique**, of which we have received the first number, dated January 1. The subscription is 12 francs a-year.

Kirby's **European Butterflies and Moths** (Cassell & Co.) has now reached its 12th part, and retains the favourable opinion we expressed regarding it when we noticed it before. Mr Kirby's instructions for collecting and preserving will be found very useful.

A few copies of Mr Blackburn's **Outline Description of British Beetles**, which appeared some time ago in this magazine, have been published in a separate form, and may be had, price 2s. 6d., from Mr Young, C.E., Tay Street, Perth.

Students of British, and especially of Scottish, fresh-water algæ, may like to know that Messrs Wittrock (of Stockholm) and Nordstedt (of Lund) have published six fasciculi of dried specimens of algæ under the title **Algæ aquæ dulcis exsiccatæ præcipue Scandinavicæ, adjectis algis marinis chlorophyllaceis et phycochromaceis.** A few copies of these still remain, "intended exclusively for botanical museums," and may be had for 17s. each fasciculus of 50 species.

The Transactions and Journal of the Proceedings of the Dumfriesshire and Galloway Scientific, Antiquarian, and Natural History Society. Sessions 1876-77 and 1877-78. Dumfries: 1879. 8vo, pp. 84.

We are glad to find so much energy and activity amongst the south-western naturalists as is evidenced by the contents of this, the first part of the "Transactions" of the Society whose headquarters are in that warm little city, "The Queen of the South." The Society was instituted in November 1876, and by October 1878 had a membership of 100, and the very good (we speak with knowledge) average attendance at the ordinary meetings of 27 members.

This first part of Transactions contains—1st, An Account of the institution, and the Rules, of the Society; 2d, The Journal of the Proceedings; 3d, Report of the Field-meetings of 1877 and 1878; and 4th, Eight Selected "Papers" that were read at the Ordinary Meetings, six of these relating to the biology and geology of the Dumfries district. We hope from this that the Society is quite aware what its own peculiar work ought to be—namely, the investigation of its own district.

We do not ourselves much care for the combination of natural science and archæology that most provincial societies "go in" for; but we daresay that it would be difficult to keep an association restricted to one or other of these studies going. But why separate "science" and "natural history," as the title of the Dumfries Society implies? To our mind a better title would have been "Scientific and Antiquarian," or "Antiquarian and Natural History" Society. This, however, is not of much moment. Of greater importance is the use of the recognised scientific names of animals and plants. In several cases we notice that the so-called English names are alone used, and in more than one instance we confess our ignorance of what species is meant. Here we may also notice that the spelling of a few of the scientific names, chiefly of coleoptera, is defective.

May we be allowed to suggest a work that seems peculiarly appropriate for the Society to undertake—namely, the compiling and publishing of lists of the fauna and flora of the district. By the district we mean that to which we have applied the name of "Solway" in the catalogue of Scottish insects, at present being published in this magazine, and which includes all the country drained by rivers between the Borders and Girvan or Maybole. This district may be divided into a number of sub-districts, and the animals and plants of each carefully catalogued as opportunity offers. With the number of good working naturalists that the Society possesses, no difficulty should be experienced in obtaining at least preliminary lists, which would form a foundation hereafter for a more ambitious fauna and flora of the district. One word of advice in compiling such lists. Let not the "common" animals and plants be neglected. These are of as much, or perhaps more, importance in throwing light upon the real nature of the fauna and flora as the rarer, and what are often considered more interesting, species. Another important point is, not to enter in the lists any species unless it is absolutely known to occur in the district. In conclusion, we heartily wish that the Dumfriesshire Society may go on and prosper.

ZOOLOGY.

THE MOUNTAIN LEPIDOPTERA OF BRITAIN: THEIR DISTRIBUTION AND ITS CAUSES.

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

THE distribution of species, either of plants or of animals, is of a twofold character,—firstly, as regards space, and secondly, as regards time, the former of these being again capable of subdivision into latitudinal and longitudinal distribution, and altitudinal distribution; but between the latitudinal and altitudinal distributions a close relationship exists.

In ascending a high mountain and observing the various degrees of temperature and climate, with the accompanying vegetation, that are successively experienced as we pass from the base to the summit—the olive-trees and vines, myrtles and oleanders, that occupy the lowest parts; the chestnuts and oaks that perhaps come next, followed in succession by fir-trees, open pastures, moss and lichen covered soil; and, finally, at the summit, by eternal snow—it does not require any great stretch of the imagination to fancy that the terrestrial globe resembles in many aspects two great mountains cohering by their bases at the equator, and culminating at the poles in summits covered with eternal ice and snow. As we proceed from the equator to either pole, we pass through zones of climate and vegetation similar to what we did in ascending the mountain, and find that each has sufficiently well-marked limits characterised by special forms of animals and plants.

But many mountains have more than one summit or peak, not so high or so extensive as the real or central peak, and on each of these secondary summits we find repeated, though possibly on a smaller scale and in a less degree, the features of vegetation presented by the whole mass. And so it is with the two imaginary hills that form the terrestrial globe. They have many smaller peaks (in other words, mountains), each of which pre-

sents in miniature and in some degree the botanical or zoological phenomena of the whole terrestrial mass. Each of these summits is a facsimile on a very small scale of the north or south pole, and the base of each is, *in comparison* to the apex, a tropical region. Near the arctic (or antarctic) circle a hill of moderate height will present these features, but as we go southwards an ever-increasing altitude is necessary. Thus we find that plants or animals which at the arctic circle are found at the sea-level, do not, in middle Europe, descend below one or more thousand feet above sea-level; in the Alps or Pyrenees several additional thousands of feet are necessary; and on hills south of the latitude of Europe a still greater altitude. So with species that inhabit the sea-level of northern (but not arctic) Europe; they, too, when existing further south, keep above a certain altitude, always increasing as the tropics are approached. Some species are very exorbitant in this respect, but others are better able to accommodate themselves to altered conditions, and hence have many advantages in the fight for existence.

From all this we may gather the intimate relations existing between latitude and altitude in the distribution of species.

From the zones of latitude or altitude inhabited by them, species may be classed in groups. Some are confined to the region within or near the arctic circle, and hence may be called *arctic* species; others are confined to the great mountain chains (including the Alps, Pyrenees, and other ranges north, south, east, or west of them), and are termed *alpine* species; others occur in both these regions, but not on the intervening lower ground, and to them the title of *arctic-alpine* species may be given.

To one or other of these groups all the species about to be treated of belong.

Of the 2000 species of Lepidoptera known to inhabit the British islands, not more than about fifteen can be considered as mountain species—meaning thereby species confined to the higher mountain ranges, and not usually descending below an altitude of about 1500 feet above sea-level. The majority of the species alluded to do not descend as low as 1500 feet, but some, at least in the far north of Scotland, descend much lower. Many other species of Lepidoptera may be frequently found at high altitudes, but as they descend to the low grounds, they cannot be considered as mountain species proper; whilst

some others which are confined to mountain districts do not as a rule live at a high altitude, so that they also cannot be included in this class.

The Lepidoptera which seem to merit the title—in Britain—of mountain species are the following. (The words within brackets show to which of the above-mentioned groups each species belongs.)

Erebia Epiphron, Kn. (alpine);
Zygæna exulans, Hchwh. (arctic-alpine);
Pachnobia hyperborea, Zett. (arctic-alpine);
Anarta melanopa (arctic-alpine);
" *cordigera* (arctic-alpine);
Psodos coracina (arctic-alpine);
Scopula uliginosalis, Stph. (alpine);
Scoparia alpina, Dale (? alpine);
" *gracilalis*, Dbld. (? alpine);
Crambus furcatellus (arctic-alpine);
Penthina Staintoniana, Brrt. (alpine);
" *Grevilleana*, Curt. (? alpine);
Swammerdamia nanivora, Stt. (alpine);
Zelleria saxifragæ, Stt. (alpine);

and possibly one or two species of *Nepticula*, which I will omit.

The distribution of these species in Britain and Europe is as follows :—

Erebia Epiphron occurs in the north-west of England, in the north-east and north-west of Scotland, and in the west of Ireland. It inhabits grassy places on the sides of the mountains, and seems to be very local, as I have gone over many parts of the Scottish Highlands which seemed well suited for it, without observing it—as, *e.g.*, in Aberdeenshire, eastern Inverness-shire, and Ross-shire. Its most northerly localities in Britain are—so far as our present knowledge goes—Rannoch and western Inverness-shire. Several varieties of this butterfly have received names, and on the Continent these varieties have a rather distinct distribution. *Epiphron* proper has a more decided band of rufous spots, and in the female the eye-spots have white centres. It is found on the mountains of the Black Forest and of Silesia, and, as far as I can judge, is the form that occurs in Rannoch and elsewhere in Scotland. The var. *Cassiope* F. has the rufous spots less distinct, and the eye-spots without white centres. This is the most widely distributed form, occurring on the mountains of Central Europe so far east as Hungary, and also in Britain. The var. *Pyrenaica*, H.S., is larger, and

has larger eye-spots. It is the Pyrenean form, but some of our Perthshire specimens resemble Herrich-Schäffer's figures very much.

In Scotland, *Epiphron* does not seem to descend lower than 1500 feet above sea-level, at which elevation I have found the larva.

Zygæna exulans inhabits grassy places on the mountains of Aberdeenshire, at an elevation of 2200 feet and upwards. On the Continent two forms occur—*exulans* proper, which is found on the higher Alps and Pyrenees, and is more or less suffused with ochreous; and the var. *vanadis* Dalm., which has scarcely any ochreous tinge, and is restricted to the Scandinavian mountains and to Lapland. Our form seems to be intermediate between these two, and I have proposed for it the name of var. *subochracea*.

Pachnobia hyperborea occurs on some of the higher mountains of Perthshire and Aberdeenshire—usually on the ridges of the hills. On the Continent it ranges from Lapland to the Swiss Alps, and eastwards to Carinthia (var. *carnica*) and Hungary. It is a very variable and beautiful insect, and does not in Britain probably descend below 2500 feet or thereby.

Anarta melanopa inhabits the higher parts of some of the mountains of Perthshire, Aberdeenshire, Sutherland, and Zetland, and has been reported from the west of Scotland. It generally does not descend below 2000 feet, but in Zetland has been taken at about 400 feet. Out of Britain it is almost confined to Lapland, though also occurring in Labrador, and a variety (which I have also seen alive) on the Swiss Alps.

A. cordigera is scarcely a true mountain species (as defined above); for though it occurs on the hills up to 2200 feet or upwards, yet it is frequent at as low an elevation as 1000 feet, or even lower, in Perthshire, Aberdeenshire, and Morayshire. On the Continent it occurs in central and north Europe, going as far south as the Alps, and as far east as the Ural. It also inhabits Labrador.

Psodos coracina (the *trepidaria* of British lists) is—so far as my experience goes—confined to the ridges of the higher mountains of the north-east and the north-west of Scotland, not descending below 2000 feet. In Europe it ranges from the mountains of Lapland to the Pyrenees, going east to the mountains of Galicia, and perhaps reaching east Siberia and the Amur. In Scotland I have almost invariably found it associated with *Azalea* (or

Loiseleuria) *procumbens*, and thought that that plant might be its food, since I have found the spun-up larvæ in close proximity to it; but as the *Azalea* is not a Pyrenean species, there must be another food-plant.

Scopula uliginosalis (the *alpinalis* of British lists, and perhaps a variety of the true *alpinalis* Schiff., which is apparently not a British species) inhabits grassy places on the sides of the mountains of the north-east and north-west of Scotland, occasionally, but rarely (as in Braemar), descending to 1200 feet, but usually not found under 2000 feet. On the Continent it occurs on the Alps, and on the mountains of Hungary and Galicia.

Scoparia alpina frequents grassy and mossy places—often on the ridges—of the higher hills of Perthshire and Aberdeenshire, usually not descending below 2000 feet. It has not yet been found out of Britain.

S. gracilalis occurs on the mountains of Perthshire and of Norway; but as it is the only one of the species of which this paper treats, which I have not personally observed, I cannot give any information as to its habits.

Crambus furcatellus most usually occurs on the grassy or mossy ridges of the higher hills of Scotland, north-west England, and Wales; but, like the other mountain species, it is very local. The lowest altitude at which I have noticed it is about 2300 feet. On the Continent it occurs on the Alps and Norwegian mountains, and in Lapland.

Penthina Staintoniana has been as yet found only in Scotland, where it occurs very locally, in sheltered places on the hills, at or above 2000 feet.

P. Grevilleana is also known only as a Scottish species, and one of very great rarity. Though I have taken it, I regret that I am unable to give any account of its habits.

Sericoris irriguana is sometimes considered to be a variety of *metallicana* Hb., but is more of a mountain species than that insect. In Britain it occurs very locally on the higher parts of mountains in the north-east and north-west of Scotland. On the Continent it inhabits the Alps, Norwegian mountains, and polar Norway, as well as the Altai.

Swammerdamia nanivora was, till lately, only known from a single specimen found, in the larval state, by me, in east Inverness-shire, at an altitude of about 2000 feet. It has lately been taken in Esthonia.

Zelleria saxifragæ is not uncommon, but rather local amongst

saxifrages, on the Perthshire and Aberdeenshire mountains, descending as low as 1000 feet. It also occurs on the Alps.

An examination of the distribution given above in detail will show that all the species occur in Scotland; one (*Erebia Epiphron*) in Scotland, England, and Ireland; and one (*Crambus furcatellus*) in Scotland, England, and Wales; and regarding their exotic distribution, eight species are found in North Europe (seven, if not all, reaching the arctic circle); seven are both arctic and alpine; three are alpine, but not arctic; and three occur on the Pyrenees (two of these being also arctic); two are found in America; and of four the distribution is imperfectly known.

The distribution may be presented in tabular form, thus:—

British distribution	Scotland, ...	all.
	Scotland, England, and Ireland, .	1
	Scotland, England, and Wales, .	1
Exotic distribution	Arctic and alpine, . . .	7
	Arctic or northern only, . .	1
	Alpine but not northern, . .	3
	Imperfectly ascertained, . .	4

We are now in a position to inquire, Whence, when, and how did these insects come to Britain? for I do not suppose that any one entertains the opinion that they (or at least the majority of them) originated in this country. Some conspicuous Lepidoptera are nearly or quite restricted to Britain, and have possibly been evolved from other and allied species within or near our borders; but the species under consideration, which seem to be confined to this country, probably only *appear* to be so, because, from their small size and close relationship to other species, they have as yet been overlooked elsewhere.

Whence, therefore, or from what direction, did these mountain Lepidoptera come?

When or at what period, relatively to the great mass of the native Lepidoptera?

How or by what agency and route were they brought in?

These are all questions easier to ask than to answer, and may be best considered together. To them we will add still another, What causes have governed and restricted the distribution?

Britain, as every one is aware, did not—apart from the changes wrought by man's agency—always present the same physical features that it does at the present day. There was once a time,

and that, from a geological point of view, not very remote, when the greater part of the country was covered by an immense ice-sheet. During that period there was probably no vegetation in any part of these islands, and hence we may be sure that there were no Lepidoptera. This state of matters had existed for many ages before the time I speak of, but not with uninterrupted severity. Warm periods occasionally occurred, when the icy shroud of the country was removed, and the land was clothed with vegetation, varying in its nature according to the character of the climate. Sometimes the plants belonged — as may be learnt from the vegetable remains still preserved in the east of England and elsewhere — to the alpine and arctic groups, including such species as *Betula nana* and *Salix polaris;* and we may be pretty certain that Lepidopterous larvæ were there to feed on the leaves. It is true that Lepidoptera have not, I think, been found in association with the plant remains, nor, from their fragile and perishable character, could we well expect them to be; but the remains of Coleoptera, both herbivorous and carnivorous, have been found, and it is not likely that other insects were absent. Therefore, though we cannot prove it, it seems very probable that some of the species treated of in this paper were then inhabitants of Britain. But, as I have already said, arctic conditions returned and destroyed all the plants and animals, and those whose descendants we see at the present day must have had a more recent introduction.

Two views have been advanced as to the condition of this country during the final stage of the icy or glacial period. The older view was, that most of the country was submerged, and that only the hills remained above water. To these island-hills icebergs drifted, and deposited their burdens of stones, earth, and other *débris,* including seeds of the various arctic-alpine species, which now form part of the flora of many of the high hills. Admitting that the same vehicles might have brought the mountain Lepidoptera, and that they were able to survive the dashing to and fro, the intense and prolonged cold, and the probable submergence in salt water, and that, moreover, there were localities whence it was at all likely that they could be brought, the proofs are wanting that such a condition of the country existed, while many incontestable proofs have been advanced in favour of the other and more modern view, set forth so admirably by Dr James Geikie in his 'Great Ice Age,' to which work I refer those desirous of examining into it for themselves.

This was the state of Britain during the final stage of the glacial period. All Scotland, and the northern half of England, were covered with a thick sheet of ice, pouring down from the mountain-ranges and concealing all the low ground; from the Welsh mountains another ice-sheet descended and joined the northern one; all the north as well as the centre of Ireland was also covered with ice, and in the mountainous south-west portion of that island were large local glaciers; the rest of England and Ireland was covered with thick snow, partially melting in summer, and giving rise to great floods; certainly no animal, and probably no vegetable life, existed anywhere in the whole country.

On the continent of Europe the same arctic climate existed. All the northern half was covered with an ice-sheet coming from the north, and which, in addition to overrunning the land, filled the bed of the German Ocean, and impinged upon the British ice-sheet. Then from the mountains of central Europe, from the Alps and Pyrenees, great glaciers descended, and spread for hundreds of miles over the low country. Where the ice-sheet did not reach, snow covered the ground in winter and heavy floods inundated it in summer. No plants, no animals anywhere except in the far south, and even there the climate was more of an arctic or sub-arctic than of a temperate nature, as we know from the remains of the plants and animals (including such species as the reindeer, musk-ox, lemming, &c.).

But at last a temperate climate began to predominate over a sub-arctic one; the ice-sheets began to melt and retreat to the north or up the mountains; the snow-fall was less heavy; and the plants and animals seized the ground vacated by the snow and ice, and occupied the territory from which their ancestors had been driven by the ice-sheet in its southward march.

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 shores than it is at present [1]), the land rose so much that the bed

[1] About 80,000 years ago.

of the German Ocean became dry land, and afforded a passage for the great mass of our plants and animals. That they did not cross all at once we may be sure. In the first place, it would be a long time before the soil of that wide plain would be in a fit condition to support plant-life. Probably the great floods that would frequently inundate it—for a large river flowed through it—deposited mud and gravel on which, as it became drier, plants could grow.

(*To be continued.*)

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 page* 62.)

19. Caprimulgus europæus, Linn. (Night Jar or Goatsucker.)

In the lower parts of the district the Night-Jar is now much less abundant than in former years. In the Highland quarter, however, it is still to be found fairly represented; but from its decidedly nocturnal habits, few opportunities occur of its being observed in broad daylight. Occasionally, however, and especially in autumn, solitary individuals are not unfrequently to be met along the moor-side or other exposed spots, squatted lengthwise on some dyke or rail, or perhaps seated on the ground motionless — resembling, in this peculiar position and colour of plumage, so much some natural excresence, as not to be easily detected from surrounding objects—till, suddenly rising on the wing, the passer-by is startled by its unexpected appearance from almost under his feet. Having always observed these autumn birds to be those of the season, I have been led to believe that the parent birds, though late in their arrival (about the end of May), are among some of the first of our summer visitants to take their departure, leaving their young to follow as best they may. Though never fortunate enough in this district to have come across the two eggs, which the female invariably deposits on the bare ground, without any form of nest, or to have obtained any information as to their breeding in any of the upper parts, yet, I think, from the fact of the young being found in autumn, and the peculiar churring note of the old birds being constantly

heard during all the early summer months, there can be little doubt but that they breed here regularly.

20. Cypselus apus, Jenyns. (Swift.)

Of all our Hirundines,[1] the Swift—the last to arrive and the first to depart—is perhaps the most constant, and generally diffused in the district; for wherever suitable accommodation is to be had for nesting purposes—be it steeple, railway bridge, or old ruin—there he is sure to be found, screeching, and wheeling round in a labyrinth of rapid succession of circles, from morning to night.

21. Hirundo rustica, Linn. (House or Chimney Swallow.)

22. Chelidon urbica, Boie. (House-Martin.)

23. Cotyle riparia, Boie. (Sand-Martin.)

Of late years—from what cause it is difficult to explain—the above three species have greatly diminished, at least in the lower part of the district, especially the two former; and it is to be feared that this is pretty general throughout. Mr Brooke of Cardney informs me that about Dunkeld they have become decidedly scarcer, and the House-Martin rarely to be seen. See remarks on Migration, and nesting of the House-Martin on Ben-y-Gloe, 'Scot. Nat.,' July 1878, p. 285. In this present season (1879), with the exception of the Swift, the whole tribe seem to be especially scarce.

24. Alcedo ispida, Linn. (Kingfisher.)

Thirty or forty years ago the Kingfisher was a constant resident on the river Almond, and was not unfrequently seen in many other localities, after which it became excessively scarce, and for long disappeared altogether from many of its former haunts. I am glad to say, however, that it seems now to be gradually on the increase. In the 'Scottish Naturalist' for October 1874, I made mention of several examples having been noticed that year, after a long interval, in the Carse of Gowrie. Since then, and especially last season, several others have been observed frequenting

[1] Some ornithologists think that the Swift has no other relationship to the Hirundines beyond resemblance in form and similarity in habits. They consider, and apparently with good reason, that its true affinities are with some groups of the Humming-birds.—Ed. 'Scot. Nat.'

their old places of resort; and Mr Malloch informs me that on the Almond he found it to be again breeding there. It is to be hoped, therefore, that this, the most beautiful of all our native birds, may long be allowed to remain unmolested; and that the morbid desire of seeing it in a glass case, or covered with dust on some cottage chimney-piece, rather than on its native river-side, may become less and less every year.

CORACIAS GARRULA, Linn. (Roller.)

UPUPA EPOPS, Linn. (Hoopoe.)

The visits of both the above species to the district must be looked upon as purely accidental, no other instance that I am aware of having occurred during a lapse of many years than those already recorded. See 'Scot. Nat.,' July 1878, p. 289.

25. LANIUS EXCUBITOR, Linn. (Great Grey Shrike.)

Of late years many instances have occurred of this bird having been shot in the district. Perched for hours, perhaps, on the extremity of a decayed branch, on the watch for some passing beetle, the Grey Shrike, with his breast shining full in the sun, becomes so conspicuous an object that, were it not for his extreme wariness, he would stand little chance of escaping from the gun, which, I regret to say, is ever ready to be pointed at him when occasion offers.

26. BUTALIS GRISOLA, Boie. (Spotted Flycatcher.)

The Spotted Flycatcher, the latest of all our summer birds to arrive, seems to be more frequent in the lowland part of the district than the upper. Mr Brooke informs me that about Dunkeld it is very sparingly distributed, but there are always one or two pairs about every summer. Higher up the country I have never noticed it. Its congener, the Pied Flycatcher (*Muscicapa atricapilla*, Linn.), I have never observed; but Sir Thomas Moncreiffe some time ago informed me that a bird, which he believed to be this species, was obtained near Moncreiffe, but, unfortunately, was not preserved. From the notice of it in the adjoining county of Stirling, it may possibly be found to occur in the more western parts of the district, but, from its very local habits, I consider this to be somewhat doubtful.

Ampelis garrulus, Linn. (Waxwing or Chatterer.)

There is no record, that I am aware, of this species ever having been noticed, but as it has frequently been observed in the counties adjoining the district, it may possibly turn out to be an occasional visitant.

27. Parus major, Linn. (Great Tit.)

Resident, and common throughout the district all the year.

28. Parus cæruleus, Linn. (Blue Tit.)

This is also common, and resident in most parts of the district. During autumn it resorts in large numbers to the extensive reed-brakes on the lower parts of the Tay, where all day long it may be seen in small companies actively ascending and descending the reed stalks, peering and prying into every leaf-joint in search of insect food, and often clinging to the pendent seed-tufts, the grain of which they possibly extract, though I have never actually detected the fact.

29. Parus ater, Linn. (Coal Tit.)

Another resident species, common at all seasons, and which possibly may, on more occasions than one, have been mistaken for the Crested Tit (*Parus cristatus*, Linn.), which Mr Yarrell quotes, on the authority of F. W. Bigge, Esq., of Hampton Court, as frequenting the Pass of Killiecrankie. Be this as it may, it is a spot which I am well acquainted with, and one most unlikely to find it in. The locality most suited for it in the district is the Black Wood of Rannoch, where I have made repeated search for it, but have never found it there, nor in any other part of the district. The nearest point to the Pass of Killiecrankie in which I have observed it, was many miles across the boundary march on the watershed of the Spey, in the old fir forest of Rothiemurchus, near Aviemore.

30. Mecistura caudata, Gould. (Long-tailed Tit.)

Though breeding and resident throughout the year, it is not so much observed in the summer months, when busily engaged in nesting employments, as it is in the autumn, winter, and early spring, when at that time they wander through the country in small trips, and in families, flitting across from one spot to another, where, meeting with some oak or other tree of their choice, they cling and hang among its branches in every attitude,

till summoned by the call-note of the leader, when off go the whole troop in search of further discovery.

31. Turdus musicus, Linn. (Song Thrush.)

The Song Thrush, which abounds during all the summer months throughout the district, from long observation I fully believe to be migratory, and, though not leaving our islands, that it generally retires during the winter months to warmer spots; and the same fact has been commented on by Professor Newton, as noticed by him in Norfolk.[1] It is curious, therefore, that this should be one of the birds recorded by Mr Geo. Sim as suffering from the effects of cold during the past winter in Aberdeenshire,[2] proving the Thrushes of the valleys of the Tay and the Earn to be more provident than those of the Don or the Dee, the former having wisely left for Torquay and other more genial parts of the country early in November before the cold weather set in, and not returning this year until a month later than usual —viz., the 6th of March, on which day they were noted to arrive in considerable numbers both on the banks of the Earn and the Tay. Last year (1878) the day of arrival was the 7th of February, and the year before that the first of that month, being the earliest date I have known them to appear.

32. Turdus viscivorus, Linn. (Missel-Thrush.)

The Missel-Thrush, now so numerous, and one of our greatest pests, robbing us of all our berries, even the very Pyracanthus at the window-side not being safe from his depredations, every berry being cleaned off long before Christmas, was within my own recollection unknown to the district, where now it abounds, or rather did so till this spring,—for though the strongest-looking and most robust of all our Thrushes, it seems to be one of the most delicate, as this last severe winter has doubtless proved, for in the space of several miles round I have as yet only observed one pair. This, however, may not generally be the case in all parts of the district. With regard to this seeming delicacy in the Missel-Thrush, Mr Gould remarks "that he has known Rooks, Starlings, Blackbirds, Thrushes, Fieldfares, and Redwings to suffer severely in a hard winter, but knows no species to succumb to the rigours of the season so completely as the Missel-Thrushes."[3] And yet these birds usually remain with us all

[1] 'Ibis,' 1860, p. 84.
[2] 'Scot. Nat.,' April 1879, p. 84.
[3] Gould, 'Birds of Great Britain,' vol. ii.

winter, whereas the Thrush, as stated above, is partially migratory.

33. Turdus iliacus, Linn. (Redwing.)

34. Turdus pilarus, Linn. (Fieldfare.)

Both the above species reach us from their summer quarters in the north about the end of October, the Redwings seeming to prefer woody places and shrubberies about dwellings, while the Fieldfare, a much shyer bird, keeps to the fields and more open ground during the daytime. The Redwing, which seems to be rather a sociable bird, may frequently be heard from some tree or bush near the dwelling previous to its departure in spring, where, assembled in large numbers, they hold a perfect concert of voices, warbling out their songs in the sweetest of tones, much in the way that our Brown Linnets do. Whether either of these birds ever breed in the district, or any other part of the mainland of Scotland, I believe has not yet actually been determined, but possibly both species may do so at times. The Redwing I have noticed in the low woods above Pitlochrie as late as the month of June, the very time it is known to be nesting in Norway and Iceland; it is therefore not unlikely that it occasionally does so here, especially as the late Dr Saxby discovered the nest in Wales early in May.

35. Merula vulgaris, Ray. (Blackbird.)

The Blackbird is perhaps of the whole family the most abundant and generally diffused throughout the district during the whole year, and though often a sufferer like the rest in very severe winters, seems to come out of it better than most; and in this exceptional year of severity, though greatly thinned, it is not nearly so reduced in numbers as many of the others. The Fieldfare and the Redwing, which left us to a bird, I have not noticed to return at all this spring, and consequently, I fear, large numbers of them must have perished.

36. Merula torquata, Boie. (Ring-Ouzel.)

The Ring Ouzel, which I have never noticed in any part of the lower section of the district, even during its migration in autumn or spring, seems to confine itself entirely to the upper part among the hills, arriving in April, when it immediately commences breeding; and up in Athole and other parts of the High-

lands, where it abounds, in the autumn months, previous to their departure, they descend in large numbers to the gardens, attacking the cherry and geane trees with such pertinacity that the gun has frequently to be brought into play, and even after being repeatedly fired at they will return to the same spot the moment a person's back is turned. These I have found to be all young birds, the parents probably having taken their departure.

37. Cinclus aquaticus, Bechst. (Water-Ouzel or Dipper.)

Frequent on most of our streams and rivers, and would possibly be more so were it not for the bad name he has obtained. Being constantly noticed on the salmon spawning-beds, where he may be seen plunging into the rapid stream, he has got the credit of destroying the spawn, and consequently most unjustly becomes a prey to the gun, for on examination it has been proved that, instead of devouring the spawn, it is the very creatures which feed upon it (the larvæ of numerous water beetles and other insects, with which the gizard will invariably be found to be crammed) that he has been in search of, showing that the Water-Crow, as he is more familiarly called, should be treated rather as a friend than as a foe.

38. Saxicola œnanthe, Bechst. (Wheatear.)

About our earliest bird to arrive, the Wheatear has a wide range,—from the mouth of the Tay, where in the months of May and June it is to be found breeding abundantly in the old rabbit burrows about the sand-hills, to the very furthest end of the district, becoming however more scattered, and confining itself to the hills and rocky places, from whence it descends in the autumn, and is then occasionally to be seen in the lower grounds, on the dykes about road-sides, &c., on its way to the coast. The old birds have then assumed a more dingy dress, similar to that of the young, in exchange for the bright costume in which they came. It is singular how little the general public know of the Wheatear, for many a time I not only have heard it described, but had it brought to me in one of its different stages of plumage, as some wonderful and curious bird.

39. Pratincola rubetra, Koch. (Whin-Chat.)

40. Pratincola rubicola, Koch. (Stone-Chat.)

Both of the above species are not uncommon, and about equally spread throughout the district, frequenting for the most part

the same sort of ground among whins and brush on the hill-sides. The Whin Chat, however, is perhaps the more frequently seen of the two, as he often descends to the lower grounds, where he nests. This applies, however, only to the interior, for on the low-lying districts at the mouth of the Tay, wherever suitable ground occurs, both species may be found the whole summer through. In the autumn both species frequent the fields, especially among peas and beans; but these I have generally noticed to be young birds. The Whin-Chat is strictly migratory, while the Stone-Chat occasionally remains the winter, moving further south should the weather be severe: in England it is quite sedentary.

41. Erythracus rubecula, MacGill. (Robin.)

The Robin, which is spread over the whole district, is in some seasons much more abundant than in others, probably from accessions it receives from the Continent, where it is migratory.

42. Ruticilla phœnicura, Bonap. (Redstart.)

Though nowhere very common, it is to be found in many parts of the district: in the Highlands, however, I have not noticed it much further north than Pitlochrie. It seems to be rather local in its habits, preferring certain spots to others, in which it is always to be found more or less every year.

43. Accentor modularis, Bechst. (Hedge-Sparrow.)

Common throughout the district, and, like the Robin and the Wren, braving our severest winters.

44. Sylvia cinerea, Lath. (Whitethroat.)

This, with the exception of the Willow-Wren, is of all our warblers the most abundant, at least in the lower part of the district, and Mr Brooke assures me that about Dunkeld it is very common, but I have no record of how much higher it extends: I have not noticed it myself in the higher parts of the district. Its congener, the Lesser Whitethroat (*Sylvia curruca*, Lath.), I have never seen in the district, but Sir Thomas Moncreiffe informs me that last year he noticed a pair of birds building at Moncreiffe, which, unfortunately, deserted their nest when nearly completed. These, from their general appearance and the form of the nest, he fully believed to be of this species, but could not be certain. These birds having occasionally been observed in Scotland, tends much in favour of their being found at Mon-

creiffe, a spot so adapted in all respects for the harbouring and breeding of all our rarer birds.

45. Curruca atricapilla, Briss. (Blackcap.)

46. Curruca hortensis, Flem. (Garden Warbler.)

Both the Blackcap and the Garden Warbler are to be found in several parts of the district, but of the two the Blackcap would seem to be the more frequent and less local. Probably it may be that, from its not being so shy and stealthy in its habits, it is more frequently noticed than the latter, which if in the slightest degree alarmed immediately places himself on the wrong side of some bush, through which he creeps, defying (especially from the similarity of song) all further identification. Mr Brooke tells me that both species are not uncommon about Dunkeld. The Blackcap I have not seen higher up, but the Garden Warbler I have more than once noticed beyond Faskally, and very possibly both species may extend throughout Strathtay and Strathearn.

47. Troglodytes europæus, Cuv. (Wren.)

48. Certhia familiaris, Linn. (Tree Creeper.)

Both these are resident and common to the whole district, the latter confining itself to the woods and trees along road-sides, &c.; the little Wren everywhere, from the cottage-garden to the hill-tops.

49. Phyllopneuste trochilus, Gould. (Willow-Wren.)

By far the most abundant, and seemingly the hardiest and most generally diffused, of all our summer visitants. This present season, 1879, when others have been conspicuous for their scarcity, the Willow-Wren, though some weeks later than usual, has been fully as abundant as ever. It is said that they do not make their appearance till the apple buds begin to break, and as these have been a month behind time, it may account for their tardiness. Supposing them to be endued with this instinctive knowledge, the question arises, How do they manage to time themselves? Do they purposely loiter on the road, inundating with their numbers the spots in which they rest on their journey, or do they delay their departure for a whole month, so as to arrive at the proper moment? These are among some of the mysteries of migration difficult to be solved. Its congener, the

little Chiff-Chaff (*P. rufa*, Bonap.), has never been noticed, that I am aware of, in any part of the district. Though bearing the strongest family likeness to the above, its striking difference of note, were it present, would at once distinguish it.[1]

50. Phyllopneuste sibilatrix, Bonap. (Wood-Wren.)

Though far more sparingly distributed than the Willow-Wren, the Wood-Wren may be considered to be more local than uncommon, confining itself to certain woods and copses of its choice. Without being familiar with its peculiar note or song, which assumes two distinct forms, with a ventriloquising effect, quite sufficient to mislead the uninitiated, and make him suppose that it proceeded from two different birds on two different trees, it would not be easy of detection, and it may thus often escape observation. It is very frequent at Moncreiffe, and some other places in the lower section of the district. In the woods about Dunkeld Mr Brooke tells me it is common, and I have observed it more than once in Faskally. There is no notice of it further up, but it may possibly extend still higher, and also be found to occupy many other parts both in Strathearn and Strathtay.

51. Regulus cristatus, Ray. (Gold-Crest.)

Resident and common throughout the whole district, frequenting in the autumn and winter months Spruce and Fir plantations, broomy knowes, &c., in company with the whole fraternity of Tits and Creepers. It is then often largely augmented by birds from the Continent: these, however, return in spring; at which season, and during the summer, so quiet and unobtrusive is the little Gold-Crest, that were it not for the beautiful pensile nest attached to the extremity of some slender branch of the old Yew next the house, which attracts our attention, we might

[1] Since writing the above, Mr William Horn, who has devoted some time to the birds of the northern and western part of the district, has drawn my attention to the occurrence of the Chiff-Chaff in Rannoch, as mentioned in the 'Zoologist,' 1871, p. 2656. I can scarcely, however, look upon its being found in Rannoch as anything more than merely accidental, for having traversed nearly every part of it both before and since the date mentioned, it has never come under my notice. Moreover, were it otherwise, it would be a singular fact that a tender bird like the Chiff-Chaff should pass over the warm sheltered woods and shrubberies of Moncreiffe, a very paradise for birds such as the present, as also the extensive orchards of the Carse of Gowrie and other tempting spots, where, to my knowledge, it has never yet been found, to the colder and more remote parts in Rannoch.—H. M. D. H.

have supposed the whole of them long ago to have taken their departure, when all the time there have been several pairs close at hand, which we would never otherwise have observed. The Fire-Crest (*R. ignicapillus*, Cuv.) I have often searched for, and though well acquainted with it, have never found it in any part of the district; but for all that, it may possibly be an occasional visitant.

52. Calamodyta phragmitis, Gray. (Sedge-Warbler.)

Frequent among the reeds on the lower parts of the Tay and the Earn, and on some of our loch sides, where in low, damp, bushy places, the passer-by cannot fail to hear its perpetual babbling, scolding notes, which go on all day long, and even sometimes through the whole summer night. Another bird inhabiting much the same sort of locality, only one specimen of which has ever been noticed or obtained in the district (near Methven), is the Grasshopper Warbler (*Locustella avicula*, Ray), mentioned in the 'Scot. Nat.' of July 1878; but as no other instance has occurred, I do not include it in this list.

(*To be continued.*)

Lepidoptera in the Spring of 1879.—Owing to the severity of the weather, I had no opportunity of making my usual entomological observations in January and February. When the first apparently genuine break in the storm came with the first week of March, some of the early insects began to put in an appearance. I noticed *Phigalia pilosaria* on March 2d, and for ten days subsequent to that date it was freely distributed in this locality. Of *Hybernia leucophearia* I saw one specimen on March 3d, and have only noticed about three specimens between that date and April 1st; on April 24th, however, I took a female off a birch trunk. It is usually abundant here. Owing to illness, I made no observations in the spring of 1878 until May: but in 1877 I have a record of these two insects on February 4th and 8th respectively. *P. pilosaria* appeared on February 2 in 1876, and in 1879 on January 31st, and *leucophearia* on February 15th. Judging from the above dates, they are both affected by the weather in their time of appearance; but the former does not appear to be diminished in number by the intense cold of this winter. I have observed no difference in depth of colour, or otherwise, from the ordinary type here. The cold has, however, evidently retarded their appearance in the imago stage.

The hybernated insects, as far as I have seen, have not suffered; as on the evening of March 7th, which was especially mild, I noticed a number of *Depressariæ* and of *Gelechia humeralis* swarming about a favourite Cupressus in my garden, as also a few specimens of *Cerostoma radiatella*. On March 31st I took a specimen of *Cymatophora flavicornis* at the back of Moncreiffe Hill, where the snow still lay in places, and where, a fortnight before, it was from

a foot to eighteen inches deep. I do not know if this insect had a prescience of the hard winter; but I took several specimens on April 1st, at least 200 feet lower than I could ever find it before, though I have searched carefully for some years. On March 31st I took *Tæniocampa gothica* at sugar, and noticed a good many *Scopelosoma satellitia* and one *Calocampa exoleta*. On April 1st *Tortricodes hyemana* and *Tæniocampa instabilis* first made their appearance. On April 6th I noticed another *T. gothica*, reversing the usual order of things here, as the early sallows first showed blossom on April 10th. The weather was too wet and cold for me to venture out at night in my then state of health; but on April 16th my son and Mr Herd reported numbers of *T. cruda*, *stabilis*, *instabilis*, and *gothica* at sallow blossom. The two former were of the usual type, the two latter were more uniformly dark in colour than usual.

On the high grounds in the north, probably, insect-life will be more affected than in this neighbourhood—as in the first week of May in Athole Forest the ice was thick enough on Loch Mark for a curling match; and at the present moment, May 31st, the hills are still covered with snow. As a rule, *Chimabacche fagella* appears here in March; this year it only appeared in May. *Semioscopis avellanella*, usually a common insect, I have not seen at all. I have, as yet, seen only one Tortrix, *Cnephasia musculana*, and a few Lithocolletidæ; whereas in 1876, for instance, I had *S. perlepidana*, *Coccyx hyrciniana*, *Heusimene fimbriana*, and several *Lithocolletis pomifoliella*, &c., by the end of April or first week of May. I have noticed few signs of hybernated larvæ, and I should very much doubt if it will be a good season for noctuæ. I have not observed that the imagos are affected in shades of colour, except in the case of two or three *Eupithecia abbreviata*, taken within the last day or two, which are unusually dark, if they are that insect. Such is our season in the north up to June 1st.—THOMAS MONCREIFFE, Moncreiffe, 1st June 1879.

Jottings from my Note-Book: Lepidoptera. March 28—*Hybernia rupicapraria*, 28 days later than 1878, and 16 days than 1877; colour is much lighter than in former years.

April 21—*Hybernia leucophearia*, 24 days later than 1878, and 26 days later than 1877; colour lighter.

April 26—*Vanessa urticæ*. I was well pleased to see this beauty in so fine condition. Having looked in vain all winter for hybernated specimens, I came to the conclusion that the two last wet seasons had nearly exterminated it. Can we not get a back-door for believing that insects have more instinct in choosing a place fitting for the coming weather than we are ready to admit? I was more convinced of the truth of it on April 29th, on finding fifteen *urticæ* in a small place, and where they would feel little of the hard winter.

April 36—*Tæniocampa gothica*, 18 days later than last year. I got thirty chrysalises on December 13th to try their power in standing the winter. I put ten in below the ground about four inches deep, ten on the outside of the window, and covered them over with moss to protect them from small birds, and kept 10 in the house between April 10th and 28th. The result was—of those I had in the house, four fine specimens came out first; of those on the outside of the window five came out, but not so fine; and eight of those I had below ground came out last, and good specimens, but not so fine as those in the house.

April 26—*Tæniocampa instabilis*, 17 days later than 1877; very plentiful.

April 26—*Trachea piniperda*, the first time I took it.

May 16—*Scopelosoma satellitia*, hybernated; poor specimen.

May 23—*Cidaria suffumata*, 4 days later than last two years.

May 23—*Pieris rapæ*, about the same time as formerly, but smaller.

May 28—*Fidonia atomaria*, 6 days sooner than in former years; females appearing two days before the males.

June 1—*Pieris brassicæ*, earlier than usual, and smaller.

June 1—*Cabera exanthemaria*, newly out of chrysalis; two days earlier than last year.

June 1—*Euclidia mi*, 7 days earlier than last two years; in fine condition.

June 1—*Euchloë cardamines*. As I only took this for the first time last July, I cannot give its time in former years. This and the last three were seen by me going to church; but the beauty of *cardamines* overcame the sanctity of the day—with hat in hand I captured it.—ROBERT RENTON, Fans, Earlston.

Notes on 'The Lepidoptera of Moncreiffe Hill.' *Thecla rubi.*—The difficulty about the food-plant is very puzzling. *Vaccinium* (blaeberry) seems to me altogether improbable; and bramble I believe to have been an absolute blunder from the first. Is there no *Genista anglica* or broom near? I should think *Lotus corniculatus* or *L. major* not improbable, and even *Ornithopus*, or any vetch, more likely than *Vaccinium*.

[*Ornithopus* is too local a plant in Scotland to be more than an occasional food-plant, if even that; *Genista anglica* and broom are often not within miles of the places frequented by *Thecla rubi; Lotus* is more likely, but even it is not present always where the insect is. All I can affirm on the matter is that *Vaccinium myrtillus* (blaeberry) has almost, if not quite, invariably been present where *Thecla rubi* occurred, and been, in fact, *the* plant of the locality. This is Sir T. Moncreiffe's experience as well as mine. I wish some one who has an opportunity would obtain eggs of *Thecla rubi* and try the larvæ on *Vaccinium*, &c.—Editor 'Scottish Naturalist.']

Apamea unanimis.—The late Mr Newman's remark on this being 'larger than *gemina*' is evidently a blunder.

Miana fasciuncula.—It is very curious that the varieties should inhabit distinct localities. Usually they are mixed together, but the paler specimens are frequently females.

To find *Agrotis obelisca*, *Noctua depuncta*, and *N. ditrapezium*, all in the same place is really wonderful, and upsets our ideas of distribution a good deal.

Anchocelis lunosa comes best to light.

Plusia gamma feeds up at all times in the autumn and winter, and seems to take the first favourable chance of emerging. I have found a spun-up pupa in December, and the moth has appeared in a fortnight; yet I hardly think the perfect insects hybernate or survive a severe frost.

Mr Herd's discovery that *Hybernia rupicapraria* ♂ *carries* its ♀, if not a mistake, is a most interesting one. Is it certain that he did not sweep the pair accidentally from overhanging bushes? I do not say that it is *impossible*, but such a circumstance is hardly known in any creature. I have supposed that the larvæ of these species with apterous females must sometimes travel, and so distribute themselves.

Professor Zeller still doubts the distinctness of *Oporabia dilutaria* and *O. autumnaria*, but I think that Dr Buchanan White has proved it.

The great point of distinction between *Eupithecia castigata* and *E. lariciata* is the different shape of the fore-wings, and, consequently, of the strigæ upon them. *E. dodonæata* is something like *abbreviata*, but smaller and more sharply marked, and its fore-wings are more pointed.

Sericoris urticana is very partial to *Vaccinium* here, feeding on it in plenty. Is not the small form of *Sericoris cespitana* the ?

Mixodia palustrana.—Wilkinson's knowledge of this was derived evidently from some one who had taken it in the Black Wood of Rannoch. It is certainly common there among fir-trees, but only *because* the tall heather and *Vaccinium* among which it flies grow under them.

Diplodoma marginepunctella feeds on the powdery green lichen at the foot of old palings and on tree-trunks, but not on fungi, I believe. It eats dead insects willingly.

Tinea semifulvella is said to have been reared from birds' nests, so it probably feeds on hair or feathers. I have sometimes brought home old nests of the chaffinch and reared plenty of *Tinea lapella* from them, and think that in a suitable locality *semifulvella* might be obtained.

It is difficult to find the larva of *Depressaria pulcherimella* at work, but it is easily obtained by sweeping.

I think that *Œcophora fuscescens* feeds as a larva on dry vegetable refuse. I once beat it in clouds out of old heather-thatch, and found it always pretty common among thatch of that description.

I once found larvæ and moths of *Argyresthia dilutella* in a small bushy juniper growing singly in a garden. I never saw it in the ordinary tall junipers. The moth skulks in the middle of the bush, and is hard to disturb. The larva feeds in the young shoots.—CHAS. G. BARRETT, Pembroke, May 18, 1879.

Id.—I find I omitted in my notice of *Eupicilia atricapitana* to record a specimen which I took on May 30, 1875. Ragwort and *Centaurea nigra* were the prominent plants. As a curiosity I append a note of my captures on that day: *Lycæna alsus*, *Notodonta camelina*, *Plusia chrysitis*, *Hepialus lupulinus*, *Caradrina cubicularis*, *Hadena glauca*, *Cidaria corylata*, *Halonota scutulana*, *Plutella cruciferarum*, *P. porrectella*, *Mixodia Schulziana*, *Micropteryx allionella*, *Tinea bisontella*, *Gelechia acuminatella*, *Tinea lapella*, *Lobophora hexapterata*, *Emmelesia albulata*, *Capua ochraceana*, *Swammerdamia griseocapitella*, *Dicrorampha herbosana*, &c.—rather a contrast to the meagre list of May 30, 1879. To-day (June 3, 1879) I took another specimen of *Eup. atricapitana*. The only other insects I noticed on the same ground on which I observed quite one half of the above list in 1875, were *Halonota cirsiana*, *Micropteryx subpurpurella*, and *Polyommatus Phlæas*. This is, therefore, a backward season, but I see that both Wilkinson and Mr Stainton give only July and August for the time of the appearance of the perfect insect.—THOS. MONCREIFFE, Moncreiffe, Bridge of Earn.

Food-plant of Gelechia acuminatella.—Last summer I found in Glen Tilt some small larvæ eating the leaves of the Melancholy Thistle (*Carduus heterophyllus*), and have this spring reared *Gelechia acuminatella* from them.—F. BUCHANAN WHITE.

PHYTOLOGY.

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

GAELIC—at one time the only language of the Celtic inhabitants of the Highlands of Scotland, and still in very extensive use, not only in Scotland but in some of the colonies where Highlanders are numerous—possesses a rich vocabulary of plant-names, and though many of these names are preserved in the literature of the language, others have never been printed, and are in danger of being forgotten—a fate, it is feared, which has already overtaken some of them.

With the object, therefore, of preserving these names from oblivion, and of making them accessible to teachers and others interested in the matter, I have occupied myself for the last five or six years, at the suggestion of the Editor of the 'Scottish Naturalist,' in collecting from every available source all Gaelic names of plants,—both those indigenous to the Scottish Highlands, or which have otherwise come under the observation of the Highlanders.

Amongst the sources whence I have drawn my information are the works of M'Donald, M'Intyre, Stuart, Shaw, O'Reilly, Armstrong, Brockie, M'Alpine, M'Leod, and Dewar's Dictionaries, and frequent conversation and correspondence with Highlanders in various parts of the country.

When possible, the probable meaning and derivation of the Gaelic name has been given, as well as quotations showing its use: while for purposes of comparison, many names in the closely allied Welsh and Irish languages are added.

J. CAMERON.

SUNDERLAND, *May* 1879.

RANUNCULACEÆ.

Thalictrum—(θαλλω, *thallo*, to grow green).

Gaelic: *rugh*, *rù*, *ruigh*, } Rue (or plants resembling *Ruta*
Irish: *ruib*, }

graveolens). See Gerard.

T. alpinum.—*Rú ailpeach:* Alpine meadow-rue.

T. minus.—*Rú beg:* Lesser meadow-rue. RUE is nearly the same in most of the ancient languages; said to be from ῥυω, to flow; Gaelic—*ruith*, flow, rush; their roots, especially *T. flavum*, possessing powerful cathartic qualities like *rhubarb*. Compare also *ru*, *run*, a secret, mystery, love, desire, grace. Welsh: *runa*, hieroglyphics (Runic). The Thalictrum of Pliny is supposed to be the *meadow-rue*. (See Freund's Lexicon.)

"I'll set a bank of rue, sour herb of grace"—SHAKESPEARE.

"Mo *rùn* geal og!"—My fair young *beloved* one!

"Oir a ta sibh a toirt deachaimh 'a mionnt, agus a *rù*, agùs gach uile ghnè luibhean."—For ye tithe mint and *rue*, and all manner of herbs.

The Rue of Shakespeare is generally supposed to be *Ruta graveolens* (*Rù gharaidh*), a plant belonging to another order, and not indigenous.

Anemone nemorosa—Wind-flower. Gaelic: *plùr na gaoithe*, wind-flower (Armstrong). Welsh: *llysiau'r gwyut*, wind-flower, because some of the species prefer windy habitats. Irish: *nead chailleach*, old woman's nest.

Ranunculus.—From Gaelic, *ran;* Egyptian, *ranah;* Latin, *rana*, a frog, because some of the species inhabit humid places frequented by that animal, or because some of the plants have leaves resembling in shape a frog's foot. *Ranunculus* is also sometimes called crowfoot. Gaelic: *cearban*, raggy, from its divided leaves. *Gair-cean*, from *gair*, a smile; *cean*, love, elegance. Welsh: *crafrange y frân*, crows' claws.

R. aquatilis—Water crowfoot. Gaelic: *fleann uisge*, probably from *lean*, to follow, and *uisge*, water, follower of the water. *Lìon na h'aibhne*, the river-flax. Irish: *neul uisge*,—*neul*, a star, and *uisge*, water. *Tuir chis*,—*tuir*, a lord; *chis*, purse (from its numerous achenes).

R. ficaria—Lesser celandine. Gaelic: *grain-aigein*, that which produces loathing. *Searraiche*, a little bottle, from the form of the roots. Welsh: *toddedig wen*, fire dissolvent; *toddi*, melt, dissolve.

R. flammula—Spearwort. Gaelic: *glas-leun*,—*glas*, green;

leun, a swamp. *Lasair-leana,—lasair*, a flame, and *leana* or *leun*, a swamp. Welsh: *blaer y guaew*, lance-point.

R. auricomus — Goldilocks. Gaelic: *follasgain*; probably from *follais*, conspicuous. Irish: *foloscain*, a tadpole. The Gaelic may be a corruption from the Irish, or *vice-versa*; also *gruag Mhuire*, Mary's Locks.

R. repens—Creeping crowfoot. Gaelic: *buigheag*, the yellow one. Irish: *bairgin;* more frequently *bairghin*, a pilgrim's habit. *Fearban,—fearba*, killing, destroying.

R. acris—Upright meadow crowfoot. Gaelic: *cearban feoir*, the grass rag. Irish: the same name. This plant and *R. flammula* are used in the Highlands, applied in rags (*cearban*), for raising blisters.

R. bulbosus—Bulbous crowfoot. Gaelic: *fuile thalmhainn*, blood of the earth (it exhausts the soil). Welsh: *crafange y frân*, crows' claws.

R. sceleratus — Celery-leaved crowfoot. Gaelic and Irish: *torachas biadhain;* probably means food of which one would be afraid.

Caltha palustris—Marsh Marigold. Gaelic: *a chorrach shod*, the clumsy one of the marsh. *Lus bhuidhe bealtuinn*, the yellow plant of Beltane or May,—*Bel* or *Baal*, the sun-god, and *teine*, fire. The name survives in many Gaelic names—*e.g*, *Tullibeltane*, the high place of the fire of *Baal*.

> "Beath a's calltuinn latha-*bealthuinn*."—M'Kay.
> Birch and hazel first day of May.

Irish: *plubairsin* from *plubrach*, plunging. *Lus Mairi*, Mary-wort, Marygold.

Helleborus viridis — Green hellebore. Gaelic: *elebor*, a corruption of *helleborus* (from the Greek ἑλεῖν, *helein*, to cause death; and βορα, *bora*, food—poisonous food).

> "Mo shròn tha stocpt à dh'*elebor*."—M'Donald.
> My nose is stopped with hellebore.

H. fœtidus — Stinking hellebore. *Meacan sleibhe*, the hill-plant.

Aquilegia vulgaris—Columbine. Gaelic: *lus a cholamain*, the dove's plant. Irish: *cruba-leisin*, from *cruba*, crouching, and *leise*, thigh or haunch; suggested by the form of the flower. *Lusan cholam* (O'Reilly), pigeon's flower. Welsh: *troed y glomen*, naked woman's foot.

Aconitum napellus—Monkshood. Gaelic: *fuath mhadhaidh* (Shaw), the wolf's aversion. *Curaichd mhànaich* (Armstrong), monkshood. Welsh: *bleiddag*, from *bleidd*, a wolf, and *tag*, choke.

Nigella damascena—Chase the devil. Gaelic: *lus an fhograidh*, the pursued plant. Irish: *lus mhic Raonail*, MacRonald's wort. Not indigenous, but common in gardens.

Pæonia officinalis—Peony. Gaelic: *lus a phione*. A corruption of *Pæon*, the physician who first used it in medicine, and cured Plato of a wound inflicted by Hercules. Welsh: *bladeu'r brenin*, the king's flower. Irish: *lus phoinc*.

Berberidaceæ.

Berberis vulgaris—Barberry. Gaelic: *barbrag* (a corruption from *Phœnician* word *barar*), the brilliancy of a shell; alluding to their shining leaves. Greek βερβερι, *berberi*, a shell. *Preas nan gear dhearc*, the sour berry-bush. *Preas deilgneach*, the prickly bush. Irish: *barbrog*.

Nymphæaceæ.

(From νυμφη, *nymphe*, a water-nymph, referring to their habitats.)

Nymphæa alba—White water-lily. Gaelic: *duileag bhaite bhàn*, the drowned white leaf.

> "Feur lochain is tachair,
> An cinn an *duileag bhàite*."—M'Intyre.
> Water, grass, and algæ,
> Where the water lily grows.
>
> "O *lili* righ nam fleuran."—M'Donald.
> O lily, king of flowers.

Rabhagach, giving caution or warning; a beacon. *Lili bhàn*, white-lily. Welsh: *Lili-r-dŵfr*, water-lily. Irish: *buillite*. (Shaw.)

Nuphar luteum—Yellow water-lily. Gaelic: *duileag bhaite bhuidhe*, the yellow drowned leaf. *Lili bhuidhe n'uisge*, yellow water-lily. Irish: *liach laghor*, the bright flag. *Cabhan abhain*,—*abhan*, a hollow plain, and *abhain*, of the river.

Papaveraceæ.

Papaver rhœas—Poppy. Gaelic: *meilbheag*, sometimes *beilbheag*, a little pestle (to which the capsule has some resemblance).

"Le *mèilbheag*, le noinean, 's le slan-lus."—M'Leod.
With a poppy, daisy, and rib-grass.

Fothros, corn-rose, from *Ioth* (Irish), corn; *ros*, rose. *Cromlus*, bent weed. *Paipean ruadh*,—*ruadh*, red, and *paipean* a corruption of *papaver*, from *papa*, pap, or *pappo*, to eat of pap. The juice was formerly put into children's food to make them sleep. Welsh: *pabi*.

P. somniferum—Common opium poppy. Gaelic: *codalian*, from *codal* or *cadal*, sleep.

Chelidonium majus. Common celandine (a corruption of χελιδων, *chelidon*, a swallow). Gaelic: *an ceann ruadh*,[1] the red head. Irish: *lacha cheann ruadh*, the red-headed duck. Welsh: *llysie y wennol*, swallow-wort. The flower is yellow, not red. *Aonsgoch* is another Gaelic name for swallow-wort, meaning the lonely flower,—*aon*, one or alone, and *sgoth*, a flower.

Glaucium luteum — Yellow horned poppy. Gaelic: *barrag ruadh* (?), the valiant or strong head. The flower is yellow, not red.

Fumariaceæ.

(From *fumus*, smoke. "The smoke of these plants being said by the ancient exorcists to have the power of expelling evil spirits" (Jones). French: *fume terre.*)

Fumaria officinalis — Fumitory. Gaelic: *lus deathach thalmhainn* (Armstrong), the earth-smoke plant. Irish: *deatach thalmhuin* (O'Reilly), earth-smoke. Welsh: *mwg y ddaer*, earth-smoke. Another Irish name is *caman scarraigh* (O'Reilly), —*caman*, crooked, and *scaradh*, to unfold.

Cruciferæ.

(From Latin *crux*, *crucis*, a cross, and *fero*, to bear, the petals being arranged crosswise.)

Crambe maritima—Sea-kale. Gaelic: *praiseag tràgha*, the shore pot-herb, from the Irish *praiseach;* Gaelic: *praiseag*, a little pot (a common name for pot-herbs). *Càl na màra*, sea-kale (from Greek, καυλος; Latin, *caulis;* German, *kohl;* Saxon, *cawl;* English, *cole* or *kale;* Irish, *càl;* Welsh, *cawl.*)

Isatis tinctoria — Woad. Gaelic: *guirmean*, the blue one.

[1] *Ruadh* does not mean absolutely red, but reddish. Welsh: *Rhydh.* It means also power, virtue, strong, valiant.

Irish and Gaelic: *glas lus*, pale-blue weed. Welsh: *glas lys*. Formerly called *Glastum*.

Ancient Celts used to stain their bodies with a preparation from this plant. Its pale-blue hue was supposed to enhance their beauty, according to the fashion of the time.

"Is *glas* mo luibh."—OSSIAN.
Pale-blue is the subject of my praise.

On account of the brightness of its manufactured colours the Celts called it *gwed* (*quède* in French to this day), whence the Saxon *wad* and the English *woad*.

Thlaspi arvense—Penny-cress. Gaelic: *praiseach feidh*, deer's pot-herb. Irish: *preaseach fiadh*, a deer's pot-herb.

Capsella Bursa-pastoris—Shepherd's purse. Gaelic: *lus na fola*, the blood-weed; *an sporran*, the purse. Irish: *sraidin*, a lane, a walk. Welsh: *purs y bugail*, shepherd's purse (*bugail*, from Greek βυκολος, a shepherd).

Cochlearia officinalis — Scurvy grass. Gaelic: *a maraich*, sailor; *carran*, the thing for scurvy, possessing antiscorbutic properties. "*Plaigh na carra*," the plague of leprosy (Stuart). "*Duine aig am bheil carr*," a man who has the scurvy (Stuart in Lev.). Welsh: *mor luyau*, sea-spoons; *llysie'r blwg*, scurvy grass (from *blwg*, scurvy). Irish: *biolair tràgha*,—*biolair*, dainty, and *tràgha*, shore or sea-side.

Armoracia rusticana (*armoracia*, a name of Celtic origin from *ar*, land; *mor* or *mar*, the sea; *ris*, near to, a plant growing near the sea). English: *horse-radish*. Gaelic: *meacan-each*, the horse-plant. Irish: *racadal*, perhaps from an old word *rac*, a king, a prince, and *adhal*, desire—*i.e.*, the king's desire.

Raphanus raphanistrum—Radish. Gaelic: *meacan ruadh*, the reddish plant, from the colour of the root. Irish: *fiadh roidis*, wild radish.

Cardamine pratensis—Cuckoo-flower, ladies' smock. Gaelic: *plur na cubhaig*, the cuckoo flower. *Gleoran*, from *gleote*, handsome, pretty. The name is given to other cresses as well. *Biolair-ghriagain*, the bright sunny dainty.

Cakile maritimum—Sea gilly-flower rocket. Gaelic: *fearsaid-eag*, meaning uncertain, but probably from Irish *saide*, a seat (Latin, *sedes*), the sitting individual—from its procumbent habit.

(*To be continued.*)

RECENT ADVANCES IN BRITISH BRYOLOGY.

By the Rev. J. FERGUSSON.

DURING the past year very considerable progress has been made in investigating the bryology of the country. A considerable amount of light has been thrown upon plants which, until now, have been the objects of doubt and discussion; and their true position and character have been finally determined. Many new localities for several of the rarer species have been discovered, and species previously unknown as British, or erroneously regarded as such, are now, on satisfactory evidence, shown to be entitled to a place in the British list. Besides this, interesting and unsuspected varieties of well-known species have been detected; and bryologists being at present more on the alert than usual, are likely to detect something of consequence in the course of the present year.

In a recent number of the 'Naturalist,' Mr Whitehead has raised anew, and, we think, finally settled, the question whether the European plant usually called *Hypnum* (*Plagiothecium*) *elegans* be identical with that gathered by Menzies in Vancouver Island in 1787, and so named by Hooker in his 'Musci Exotici.' Mr Spruce was of opinion that they were not, and in consequence of this distributed our European plant under the name of *Hypnum Borrerianum*. On the other hand, Wilson, who examined both plants, pronounced them to be identical; and his decision has been generally accepted, although Lindberg has recently withdrawn the assent which he gave to it in 1867. Mr Whitehead adopts the opinion of Spruce, and gives the following reasons for doing so. The American plant is described and figured by Hooker as having ovate-lanceolate, scarcely pointed leaves, cernuous capsule, and red outer peristome, whereas the European plant has leaves so strongly acuminate as to be almost piliferous, horizontal, or sub-erect, capsules, and a pale-yellow outer peristome. Upon the whole, we think that the difference in the forms of the leaves of the two plants by no means warrants their separation as distinct species, for our British plant is very variable in the form of its leaves as well as in the colour of its stems; but the direction of the capsule, and, above all, the colour of the outer peristome, seem insurmountable objections to the two plants being included in one species. This conclusion renders imperative the rejection of the name by which our European

species has so long been known, and the substitution of another in its place. Certainly no name of later date than Spruce's *Hypnum Borrerianum* can be adopted; and indeed it is very probable that this also must give place to *Hypnum planifolium*—a name given by Bridel to a moss gathered in Normandy, and held by Wilson and Lindberg to be identical with the so-called European *Hypnum elegans*. Bridel's description of the Normandy plant seems to fit the other sufficiently though not perfectly well. If, therefore, Wilson and Lindberg be right in allying this plant specifically with the *Hypnum elegans* of the 'Bryologia Britannica' instead of with *Hypnum silesiacum*, as C. Muller does, Bridel's name of *Hypnum* (*Plagiothecium*) *planifolium* ought henceforward to prevail. Three well-marked forms or varieties of this species occur in Great Britain.

At the autumn gathering of the Woolhope Club, the Rev. Augustin Ley of St Leonard's read a most interesting and excellent paper on the Mosses of Herefordshire, of which there are upwards of 230 species. Among those enumerated there are none new to Britain; but there are many great rarities—such as *Systegium multicapsulare*, *Pottia cæspitosa*, *Grimmia subsquarrosa*, *Bryum Barnesii*, *Atrichum crispum*—and several others almost equally rare. A very extraordinary, and to me unaccountable, fact is brought to light in this paper. It appears that not a single *Ulota* has yet been detected in Herefordshire, although the closely-allied genus *Orthotrichum* is well represented there. The cause of the absence, in so wide a district, of a whole genus, embracing many species, and generally diffused throughout the British Isles, is one of those subtle ones which may account for some of the most extraordinary phenomena of the geographical distribution of plants, but which have hitherto defied the keenest researches of botanists. It is probable that a careful inquiry into the climatal and geological conditions of the areas in which these plants abound, and into the same conditions of those areas in which they are either altogether unknown or very rare, may explain what, for the present, is involved in obscurity; but it is possible that the cause may be still more recondite, and that the traces by which one might be led to its discovery have been obliterated long long ago.

Recently good work has been done amongst our British *Campylopi*. One of the most beautiful and characteristic of the genus—viz., *C. Schwarzii*, may now be said to be pretty generally diffused throughout the greater portion of the mountainous

region of Scotland lying to the north of the Forth. I have it from various localities in the counties of Argyle, Perth, Forfar, Inverness, Ross, Sutherland, and Caithness. To the south of the Forth it appears to be very rare, but has been gathered in the Lake District in the north of England, by Professor Barker; and it is said that it was gathered by Wilson on the Welsh mountains, though I have been unable to obtain satisfactory confirmation of the report. There is every probability that it is a denizen of Wales; for it would be somewhat singular if it were not so, since it occurs not only on many of the Scottish and Irish mountains, but is well distributed in Europe from Scandinavia to the Alps. The grandest of all the *Campylopi* is *C. setifolius*, which has not yet been met with outside the British Isles. For many years it was known as a native of the south-west of Ireland only, and there I have gathered specimens about a foot in length, but in that region of warmth and moisture almost every moss assumes gigantic dimensions. Several years ago the late Mr Hunt detected it on Sligachan in Skye, a region also celebrated for its rains. The plants found in this locality were males, whereas in Ireland, so far as is yet known, they are all females. It has now been observed in several counties in Scotland, in one in England; and last year it was gathered in Wales, and with old fruit, too—the first fruit, I believe, ever seen by human eyes. Though the British specimens are much less stately than the Irish ones, the plant may readily be recognised by its large, lax, soft tufts of a deep green hue with a dash of black in the upper part. It can only be mistaken for the unpiliferous form of *C. longipilus*, but the tufts are quite soft, loose, and not nearly so black. Moreover, it lives almost exclusively on our western mountains, and may be regarded as belonging to the Atlantic type of mosses, like *Myurium hebridarum*, *Didymodon recurvifolium* (which has recently been found in Wales by Mr Holmes), *Leskea* (*Hypnum*) *micans*, *Hookeria læte-virens*, &c., although its presence in two of our eastern counties is opposed to a certain extent to our so regarding it. Another important species or sub-species of this genus is *Campylopus paradoxus* Wils. I recently detected it in a collection gathered by Professor Barker in Glencoe in 1870, and most beautiful specimens have been found in Yorkshire by Mr Wesley. Specimens of so-called *C. paradoxus* have been sent to me from very many quarters, but these are almost the only ones which, in my opinion, can be admitted without any hesitation, to be identical

with authentic specimens found near Wooler by Messrs Hardy and Boyd, and bearing the imprimatur of Wilson. The most interesting and the rarest of all the European *Campylopi* is *C. brevifolius*—a species which may be regarded as having its existence in Britain satisfactorily established during the past year. It had been previously recorded and described as British, and Mackinlay's specimens from Arrochar, &c., were quoted in proof. On careful examination of Mackinlay's specimens, I find them to belong to a stunted state of *Campylopus Schwarzii*, a species in which the auricles are sometimes so undeveloped that they may be regarded as obsolete. About three years ago I gathered the genuine plant near Fern, but there were only a few minute stems of it, and though I mentioned the discovery to some of our Scottish botanists, I had some doubts about it. In October last year I rediscovered the plant, still in very small quantity, and any hesitation I had about the species was removed by Mr Boswell's distinct opinion that it was genuine *C. brevifolius*. Its place of growth here, and in the few localities where it has been met with on the Continent, is greatly different from that of all the European *Campylopi*. It is invariably found on the gravel or sand of old roads and waysides, and keeps company with *Archidium*, *Pleuridium alternifolium*, *Racomitrium canescens*, &c., while they invariably select a soil in which there is a considerable preponderance of peat. I believe, though the plants require to be examined, that I have recently found a new locality for this minute rarity in the neighbourhood of Perth. It may be known at sight from *C. fragilis*, its nearest ally, of which I suspect it may be little more than a depauperated form, by its looser, subgregarious mode of growth, much smaller size, and stems destitute of tomentum except at the very base. The hyaline tips of the leaves are quite inconspicuous, and are composed of very few cells.

On turning to the closely allied genus *Dicranum*, I find one or two discoveries of importance. In the spring of 1876 Professor Barker gathered *Cynodontium* (*Dic.*) *virens* var. *serratum* in the north of England. It does not appear to have been previously observed on the other side of the Tweed; but now when attention has been directed to it, we may expect to hear more of it from the higher mountains of Westmoreland and north-west Yorkshire. A short time ago, in examining a very extensive and remarkably varied collection of British *Dicrana*, gathered by Professor Barker, I found that that gentleman, in company with

Mr Roy of Aberdeen, had picked up a specimen of *D. elongatum* in Inverness-shire during their excursion there in 1870. In 1873 Mr Roy and myself gathered abundant and very characteristic specimens of the same plant in Aberdeenshire. They were half recognised at the time on the field, and fully determined soon after. Schimper's description of this plant is not only insufficient for its identification, but is in some respects misleading, inasmuch as it declares the leaves to be "integerrima," whereas, as has been pointed out by Milde, they are either quite entire or weakly toothed at the apex and on the back of the nerve. The appended description, amended and detailed, may be of service in identifying a species which I suspect may occur not unfrequently on our higher mountains :—

D. elongatum, Schwaegr. Suppl. 1811.—Tufts large, pale yellowish green above, *remarkably compact* and *matted together* from below the apex by abundant dense ferruginous tomentum. St. 2—6 in. long, *slender*. L. *small* 1½—2 *lines long*, *erecto-patent* or *slightly secund;* lanceolate shortly subulate, semitubular about the middle, *very acute*, *quite or nearly entire at the apex*. N. narrow, pale, concolorous, a *little prominent on the back*, smooth or faintly toothed at the apex, continuous. *C. at extreme apex elongate-oblong;* lower down rhombic or subquadrate; in the lower 3″ elongate with rounded or sometimes oblique ends; *all of them rather distant*, *not continuous;* the enlarged ones at the basal margin, golden yellow (sometimes with a few hyaline), *not reaching to the nerve.* Outer perich. l. suddenly subulate from a *very short and broad sheathing* base; the inner with a longer base. Caps. cernous, ovate, gibbous, with a distinct neck, sulcate when dry, greenish brown. Lid conical, with a pale, subulate beak, longer than the caps. Ring narrow. Teeth of peristome irregularly bifid striate red. Seta yellow, 1 in. long. Fr. Augt.

Var. *β orthocarpum*. *D. sphagni* Brid. Bryo. Univ. More slender; l. and caps. erect and smaller.

Hab. and Dist. Moist peaty places and rocks on the mountains, with *Cynod. virens*, *Leptot. flexicaule*, &c. Rare and barren.

Little Craigandal, Braemar, J. Roy and J. Fergusson. Corrie Ardor, Inverness-shire, Professor Barker and J. Roy.

Abundant within the Arctic circle, Norway, Swed. Rhaetian, Styrian, and Jurassic Alps, Siberia, U. States of America.

One of the most interesting discoveries of recent years is that of *Aulacomnium turgidum*, Wahl. This plant, which is so re-

markably abundant within the Arctic circle, like the last-named species, and which, like it, also advances southward to the Styrian Alps, was gathered by Professor Barker on Ben More, Perthshire, in July 1871, but was only determined last year. Last year it was gathered in a second British locality, on Whernside, Yorkshire, by Messrs West and Lees. The Ben More plant has a much closer resemblance to Arctic forms than the Whernside plant has, and is more easily identified. The latter to a certain extent simulates *A. palustre* var. *imbricatum*, which is almost exactly intermediate between *A. palustre* and *A. turgidum*. Now that attention has been called to this new British species it is probable that it will be found in other localities, though it is likely to prove local, or even rare, like some of the other recently discovered Scottish species. A scarcely less important discovery is that of *Seligeria acutifolia* by Mr Whithead, of Dukinfield. This minute species was found by him on limestone rocks at Arncliffe, Yorkshire; but, like so many of our recent "finds," it was not recognised at the time when it was collected. It was only a few months ago that the discoverer, on a re-examination of his *Seligeriæ*, became aware of the true character of this little gem. It will probably be discovered by-and-by in Scotland, and may at once be known by the long perichætial leaves reaching up to the mouth of the capsule. Diligent search should be made all over our limestone districts, not only for this but for *S. diversifolia*, a Scandinavian species, with short, ovate, obtuse leaves, which may be reasonably expected to exist in this country; but these *Seligeriæ* are such minute entities, that they will reveal themselves only to very sharp and practised eyes with a knowing man behind them.

Among the more interesting varieties that have been recently brought to light is one of *Campylopus brevipilus*—viz., var. *auriculatus*. It differs from the type in having leaves more or less conspicuously auricled, the auricles being composed of large fuscous cells. It seems to be much more abundantly distributed over Great Britain than is the type.

For many years I had looked earnestly, but in vain, on the thatched roofs of cottages throughout Scotland for *Didymodon gemmascens*, Nutt., which has been noticed in a few localities in England. Last month I found it in abundance on thatched cottages near Liff, to the west of Dundee. Between this and Rossie Priory to the west, there are several excellent mosses, such as *Zygodon Stirtonii* cf., *Scleropodium cæspitosum*, *Hypnum*

depressum, &c., &c., as well as important varieties of commoner species.

Other varieties new to Britain are *Cynodontium virens*, vars. *Wahlenbergii* and *compactum*. The former was gathered by myself in Glencallater in 1871, and the latter by Mr Roy and myself in Braemar, in July 1873, at an altitude of about 2200 feet, where it was associated with *Ranunculus ficaria*, *Ditrichum flexicaule*, var. *compactum*, *Dicranum elongatum*, and a number of most interesting boreal plants.

Two new localities have been detected for *Grimmia commutata* and *G. contorta*. The former has been found in Kircudbrightshire by Mr M'Andrew, and the latter in Wales by Mr Holmes of London. This summer little can be done, I fear, on the Scottish mountains. At the present time the higher ranges are covered by deep snow down nearly to 2000 feet above the sea-level. On the last day of May the road leading across the Cairnwell, from Glenshee to Braemar, was cleared of the snow which covered it to a depth of from three to seven feet. This is not very encouraging to botanical workers on the mountains, but the lower are fully as much in need of exploration as the higher lands.

FERN, BY BRECHIN.

Notes on the Botany of Loch Lindores, Fifeshire.—On the 23d of last August, Colonel Drummond Hay and I spent three hours in an examination of the shores of the Loch of Lindores. At the west end of the loch is a rather extensive marsh, usually too wet to be easily examined. Here *Typha angustifolia* abounds, but, as is often the case elsewhere, seldom flowers. In the dry and hot summer of 1868 Colonel Drummond Hay found it flowering freely, and it was in hope that this would be again the case this season that we were led to visit the loch. Our expectations were realised, though the great majority of the plants were flowerless. To get at the flowering ones it was necessary to wade nearly knee-deep through a very mal-odorous mixture of water and mud. In the dryer parts of the marsh, *Lythrum salicaria*, a rare plant in the east of Scotland, abounds; and in some parts another rather scarce plant, *Ranunculus lingua*, is not uncommon. Among the immense beds of *Menyanthes* we found a few plants of *Carex filiformis*. Leaving the marsh, we turned our attention to the loch, where great masses of one of the batrachian *Ranunculi* were conspicuous. This turned out to be the local *Ranunculus circinatus*, which seems to be almost the only representative of its group in the loch. Here, also, was *Myriophyllum spicatum*, a rare plant north of the Forth in our experience. A still more local plant, *Callitriche autumnalis*, occurred more sparingly. (To keep it company we placed in the loch some living plants of *Naias flexilis* from Loch Cluny, where the two grow together,

and take this opportunity of recording our having done so.) The *Potamogetons* noticed in the loch were *crispus*, *rufescens*, *natans*, *obtusifolius*, *pusillus*, and its variety *tenuissimus*—the latter form being by far the most abundant, and in great profusion. Possibly an examination of the loch from a boat would add to the number. On the muddy shores *Scirpus acicularis* was far from rare, and in one or two places we noticed *Sparganium simplex*. On a gravelly shore *Chenopodium rubrum* occurred rather sparingly, along with a patch or two of *Lycopus europæus* and a single plant of *Silene noctiflora*. At the same place we found a curious form of *Littorella lacustris* with channelled and somewhat hairy leaves, very different from the usual character of the plant, though not previously unobserved.—F. BUCHANAN WHITE.

Trametes pini in Morayshire.—By a remarkable coincidence two specimens of *Trametes pini*, Fr., a fungus which I have been long looking for and inquiring after, were sent to me to-day, one from the Castle Grant woods near Grantown, and the other from Darnaway.—J. KEITH, Forres, 22d April, 1879.

Notes of the Spring of 1879.—I have from time to time noticed, since 1877, the dates of the flowering of plants in my "rock-garden," which faces the south and south-west, and is about 170 feet above sea-level. As the past winter has been so unusually severe, a record of some of these dates for the year may prove interesting. Where possible, I have added the dates for the two previous years, many of which are of the same individual plants. The other notes will explain themselves.

In January frost and snow had an almost undisturbed reign ; and I have no notes of any interest except that, when curling one day towards the end of the month, a specimen of the winter gnat (*Trichocera hiemalis* ♀) was seen flying over the ice. Rabbits about this time were put to great straits to obtain food, and barked the hawthorn hedges where the bark was not too rough : they also attacked trees of considerable size. A Little Auk was found dead 7 or 8 miles west of Perth, and had, no doubt, been driven inland by the severity of the weather.

In February a thaw began, and lasted for a short time. On the 2d, several rooks were noticed wading in the river Tay, and putting their heads below the water in search of food, which, perhaps, they saw the gulls obtaining in a similar manner. On the 7th the Common Snowdrop was in flower, being only a day or two later than in 1878 ; also *Potentilla alba*, which, in 1878, remained in flower all winter. Before the end of the month, *Potentilla fragariastrum* came into bloom—several weeks later than the previous year. On the 6th, the ground was nearly uncovered by snow, which, except for a day and a half at the beginning of January, had concealed it since November—the thermometer during the same period having seldom marked above 40°, and been often for days at a time under 30°. Towards the end of the month the snow returned, and there was a considerable amount of frost. When the snow vanished again, many Snowdrops were seen which had come into flower below it.

The weather in March was a mixture of frost, snow, and thaw. The following plants came into flower :—

Bellis perennis, 7th (1878, 2d week of February).
Eranthis hiemalis, 7th (1878, 1st week of February).

Saxifraga oppositifolia alba, 10th (1877, March 2 ; 1878, February 20).
Veronica rupestris, 10th (1878, in flower most of the winter).
Saxifraga oppositifolia major, 12th (1877, March 18).
,, ,, vulgaris, 20th (1877, March 22).
Dondia epipactis, 20th.
Arabis procurrens, 20th (1878, in flower most of the winter).
Primula denticulata, 20th (1878, February 23).

On the 4th, *Phigalia pilosaria* appeared; and on the 8th, *Hybernia rupicapraria*. On the 4th, a tub in which some water-plants were growing was, for the first time since November, free from ice. On the 14th, the Snowdrops which had come well into flower were all drooping, as the thermometer had fallen to 18° or less. They afterwards recovered perfectly.

April was a cold and variable month, with snow and frost. The following plants flowered :—

Scilla siberica, 4th (1878, February, 2d week).
Primula vulgaris, 4th (1878, end of March).
Chrysosplenium alternifolium, 6th (1878, February, 2d week).
Corydalis cava, 10th (1878, end of March).
Schivereckia podalica, 10th.
Aubrietia purpurea, 12th (1878, February, 2d week).
Eriophorum vaginatum, 12th (1878, end of April).
Ranunculus ficaria, 15th (1878, February, 2d week).
Ribes sanguineum, 18th.
Salix caprea, 18th.
Arabis albida, 20th (1878, end of March).
Apricot (on wall), 20th.
Myosotis dissitiflora, 22d (1878, February 23).
Viola hirta, 22d (1878, end of March).
Corydalis bulbosa, 24th (1878, end of March).
Arabis alpina, 25th (1878, January, remaining in flower from December).
Omphalodes verna, 27th (1877, May 9; 1878, February 23).
Myosotis collina, 28th (1878, end of April).
Thlaspi alpestre, 28th.

The Swallow and House-Martin were reported to me as having been seen on the 31st, on which, in the morning, the ground was white with snow.

Vanessa urticæ (the small tortoiseshell butterfly) appeared in the garden, after hybernation, about the 10th. This butterfly was, a week or two later, commoner in the garden than I have ever noticed it before. It was not unusual to see four or five specimens at once, though there were no nettles (the food-plant of the larvæ) to attract them. Colonel Drummond Hay tells me that he noticed an unusual number at Seggiden also; on the other hand, Sir Thomas Moncreiffe says that he has not seen at Moncreiffe more than about the usual number. The commonest of the humble-bees (*Bombus lucorum*) has also been unusually common this spring. The severe winter, probably, kept their enemies, the mice, from searching for them. About the 21st, *Hybernia progemmaria*, a moth usually abundant with us in February and early March, was rather common—in good condition.

The weather in May was not much better than in April. Frost and snow-showers were very frequent, and even when the day was bright and sunny there was usually a cold wind, and frost at night. The water-lily tubs were again frozen at the beginning of the month—being the seventh month in succession in which they were in that condition. The mountains have still a great quantity of snow on them; Ben Ghlo, seen from Perth Bridge, is entirely white; and several of the Highland lochs are still covered with ice, so strong, that about the beginning of the month a fox, which, according to the old saying, "will not trust the ice after Candlemas," was seen walking across Loch Callater, in Braemar.[1] About the 15th the hawthorn hedges were only beginning to get a little green. The Corncrake was heard in the field behind my garden on May 16th—May 15th being its date in the two preceding years. It did not, however, make much noise till the 22d. The following plants flowered:—

Carex ornithopoda, 1st (1878, end of March).
Oxalis acetosella, 3d (1877, May 6; 1878, April 24).
Luzula campestris, 3d (1878, April, end).
Primula veris, 4th (1878, April, end).
Anemone nemorosa, 4th (1878, April, end).
Hierochlöe borealis, 4th (1878, April, end).
Androsace vitaliana, 4th.
Glechoma hederacea, 5th (1878, April, end).
Cardamine trifoliata, 7th (1877, May 1; 1878, end of March).
Potentilla maculata, 8th (1877, May 19; 1878, April, end).
Anemone hortensis, 8th (1878, May 15).
Claytonia siberica, 8th.
Salix serpyllifolia, 8th (1877, March 28).
Viola sylvatica alba, 10th (1878, April, end).
" " vulgaris, 10th (1878, middle of May).
" palustris, 10th.
Lamium maculatum album, 12th (1878, end of March).
Viola lutea amœna, 12th (1877, April 30; 1878, April 7).
Geum montanum, 12th (1877, June 17; 1878, May 15).
Geranium lucidum, 15th (1877, May 16; 1878, May 15).
Saxifraga tricuspidata, 15th (1878, May 15).
Valeriana montana, 16th (1877, May 22; 1878, April, end).
Arenaria balearica, 16th (1877, May 4; 1878, April 24).
Saxifraga Stansfieldii, 16th (1877, May 9).
Sibbaldia procumbens, 17th (1878, May 15).
Caltha palustris minor, 17th (1878, May 15).
Veronica repens, 19th (1877, May 8; 1878, end of April).
Myosotis alpestris, 20th (1877, May 16; 1878, April 30).
Cotoneaster vulgaris, 20th (1877, May 13).
Thalictrum alpinum, 20th.
Saxifraga granulata, 22d (1878, April 30).

[1] Since the above was written, I have heard that there was ice in the beginning of June on one of the lochs beside Lochnagar, and at an altitude of a little more than 2000 feet, of sufficient quantity and strength to permit of curling, if such had been attempted.

Saxifraga palmata, 22d (1877, May 22 ; 1878, April 30).
" affinis, 22d (1878, May 15).
Geranium Robertianum album, 22d (1877, May 23 ; 1878, April, end).
Apple (on wall), 22d (1877, May 19).
Phlox setacea, 23d (1877, May 23 ; 1878, April, end).
Stellaria holostea, 24th (1878, April, end).
Salix reticulata, 24th (1878, middle of May).
" herbacea, 24th (1878, middle of May).
Epilobium alpinum, 24th.
Linaria alpina, 25th (1877, June 4 ; 1878, May 15).
Arenaria purpurascens, 25th (1877, June 6 ; 1878, May 15).
Cerastium arvense, 27th (1877, May 23 ; 1878, May 15).
Saxifraga atropurpurea, 27th (1877, May 29 ; 1878, May 15).
" pectinata, 28th (1877, May 26 ; 1878, May 15).
" hypnoides, 28th (1878, beginning of May).
Potentilla lupinoides, 28th.
Vinca herbacea, 29th (1878, May 15).
Wulfenia carinthiaca, 30th.
Geranium sanguineum, 30th (1877, June 6).
Saxifraga recta, 30 (1878, May 15).
" rosularis, 30th (1878, May 15).
Alchemilla alpina, 31st (1877, May 30 ; 1878, beginning of May).
" conjuncta, 31st (1878, beginning of May).
Daphne laureola, 31st (1877, May 16 ; 1878, May 15).
Oxyria reniformis, 31st (1877, May 20 ; 1878, beginning of May).
Veronica chamædrys, 31st (1877, May 23 ; 1878, May 15).

The first leaf of a copper beech appeared on May 10th or 11th (in 1878 on April 30, and in 1877 on May 9) ; about the 18th or 20th it was half in full leaf (May 21 in 1877) ; and about the 22d or 23d it flowered (May 22 in 1877). On the 3d Swallows and Fly-catchers appeared in the garden, and on the 14th Swifts at Perth Bridge (being eleven days later than in 1878).

F. Buchanan White.

VARIOUS NOTES.

Messrs Friedländer & Sohn, the well-known scientific booksellers of Berlin, have published, since the beginning of the year, a fortnightly list of the **Current Literature of all Nations on Natural History and the Exact Sciences.** The value of such a list, if complete and accurate—and such Messrs Friedländer's seems to be—needs no comment. The title of it is **Naturæ Novitates.**

Miss Ormerod's **Notes of Observations of Injurious Insects: Report 1878** (West, Newman, & Co., London), contains a lot of useful matter on many common and some rarer insects in all parts of the country. Information is requested on various points relating to such matters as the spread of common-crop insects (*e.g.*, the Turnip Fly) from common crop-weeds, &c., &c. ; and probably there are many farmers and others interested in the cultivation of the land who would gladly assist in contributing information, in the hope that

such would eventually help—as no doubt it would—the discovery of remedies for the evil. Amongst the insects treated of are the Onion Fly, Wireworm (several kinds), Celery Fly, Wheat Midge, and others. As a cure for the Carrot Fly or "Rust Maggot," Miss Ormerod has found frequent watering with a very dilute application of the fluid sold under the name of "Soluble Phenyle" by Messrs Morris & Little, Doncaster, to be efficacious. About a tablespoonful to a gallon of water was the usual strength used. Illustrations are given of most of the insects mentioned.

Those who rear Lepidoptera, especially the larger silkworms, will find Mr P. H. Gosse's little pamphlet on **The Great Atlas Moth of Asia** (same publishers) interesting and instructive. It is illustrated by a coloured plate of the transformation of the insect.

Nature Cared for, and Nature Uncared for: the result upon the Hearts of Men (same publishers), is a very *suggestive* lecture on Ornithology, by Dr Hewetson, of the Yorkshire Naturalists' Union, and will well repay perusal.

Mr Larbalestier (Roche Vue, St Aubin's, Jersey), whose Lichen discoveries are so well known, tells us that he is preparing for publication in the course of the summer a series of fasciculi of the Lichens of West Ireland, England, and the Channel Islands. Many new or rare species and varieties will be included.

Le Naturaliste (E. Deyrolle, Paris) is the title of a new magazine which has succeeded 'Les Petites Nouvelles Entomologiques.' Like its predecessor, it is published fortnightly, but is not confined to entomological subjects. We wish it all success.

We have always advocated the necessity of preserving a record of the history of every natural history object that is placed in a public or private museum or collection. To some specimens it is easy to attach a label setting forth all the necessary particulars, but others (*e.g.*, pinned insects) are too small to conveniently carry such a label. To such a number must be attached, and the record made in a suitable book. We found a difficulty in procuring suitable printed numbers, and were obliged to have a series printed for ourselves, which both we and some of our friends have found very useful. These numbers ran from 1—1000, and as higher numbers necessitated an inconvenient increase in the size of the paper to be attached to the specimen, we adopted the plan of using different colours for every thousand above the first. We learn that Mr Marsden, of Gloucester, has printed for sale a series of numbers (running from 1—1500, and in five different colours) on this plan, and having seen a specimen we can recommend them.

The meeting of the Cryptogamic Society of Scotland is arranged to take place at Forres on September 16th and following days. It is unnecessary to remark that all cryptogamic botanists who may attend will receive a hearty welcome. The Rev. Mr Keith, minister of Forres, whose researches in the cryptogamic botany of Morayshire are so well known, is the President for this year.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

(*Continued from p.* 48.)

EDITED BY D. SHARP, M.B.

BARYPEITHES Seid.

BRUNNIPES Ol.

Recorded in Murray's Catalogue as "occasional." I have not seen any individual found in Scotland of the species.

SULCIFRONS Boh. Very local.

DISTRIBUTION—EAST Tweed Forth o o o o o o

WEST. o o o o o

PLATYTARSUS Seid.

ECHINATUS Bons. Rare.

DISTRIBUTION—EAST. Tweed Forth o o o o o o

WEST. o o o o o

TRACHYPHLŒUS Th.

LATICOLLIS Boh. Extremely rare.

DISTRIBUTION—EAST. o o o o o o o o

WEST. Solway o o o o o

SCABRICULUS L. Rare.

DISTRIBUTION—EAST. Tweed o o o o o o o

WEST. Solway o o o o

SCABER L. Rare.

DISTRIBUTION—EAST. Tweed Forth o o Moray o o o o

WEST. o o o o o

ARISTATUS Gyll. Very local.

DISTRIBUTION—EAST. o o o o o o o o o

WEST. Solway o o o o

PHYLLOBIUS Th.

CALCARATUS Fab. Common on bushes, especially on alder.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee ♀ o o o
WEST. Solway ♀ o o o

ALNETI Fab. Common on nettles and low plants.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o o
WEST. Solway ♀ o o o

PYRI L. Common.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ Moray o o o
WEST. Solway ♀ o o o

ARGENTATUS L. Abundant on bushes.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o o
WEST. Solway ♀ o o o

MACULICORNIS Germ. Common on bushes.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o o
WEST. Solway ♀ o o o

OBLONGUS L. Local. On bushes.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ Moray o o o
WEST. Solway ♀ o o o

POMONÆ Ol. Common on herbage.
DISTRIBUTION—EAST. ♀ Forth Tay Dee Moray o o o
WEST. Solway ♀ o o o

A variety with the scales of a dull grey colour occurs commonly at Aberlady.

UNIFORMIS Marsh. Common. On herbage.
DISTRIBUTION—EAST. ♀ ♀ Tay ♀ ♀ o o o
WEST. Solway ♀ o o o

VIRIDICOLLIS Fab. Local. On *Alchemilla*.
DISTRIBUTION—EAST. ♀ Forth Tay Dee ♀ o o o
WEST. Solway ♀ o o o

TROPIPHORUS Th.

MERCURIALIS Fab. Common in flood refuse.
DISTRIBUTION—EAST. ♀ Forth Tay Dee Moray o o o
WEST. Solway ♀ o o o

CNEORHINUS Th.

GEMINATUS Fab. Usually maritime. Common.
DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray o o Shetland
WEST. Solway ♀♀ o o o

LIOPHLŒUS Th.

NUBILUS Fab. Scarce.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

BARYNOTUS Th.

OBSCURUS Fab. Not very common.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ Dee Moray o o o
WEST. Solway ♀♀ o o o

SCHÖNHERRI Zett. Rather common in flood refuse.
DISTRIBUTION—EAST. ♀♀ Forth Tay Dee ♀♀ o o Shetland
WEST. Solway ♀♀ o o o

MŒRENS Fab. Rather common in flood refuse.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀♀ o o o

STROPHOSOMUS Th.

CORYLI Fab. Abundant on various trees.
DISTRIBUTION—EAST. ♀♀ Forth Tay Dee Moray o o o
WEST. Solway ♀♀ o o o

OBESUS Marsh. Local.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

RETUSUS Marsh. Local.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

FABER Hbst.
DISTRIBUTION—Doubtful.

Recorded in Murray's Catalogue as "not uncommon," but I have not fallen in with the species in Scotland, neither am I aware of any recorded locality.

LIMBATUS Fab. Common on heather.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee ♀ o o o
WEST. Solway ♀ o o o

SITONES Th.

[GRISEUS Fab. Very rare.
DISTRIBUTION—EAST. o o Tay o Moray o o o
WEST. o o o o o

The occurrence of this species in Scotland requires confirmation.

FLAVESCENS Marsh. Common.
DISTRIBUTION—EAST. ♀ Forth Tay Dee Moray o o o
WEST. Solway ♀ o o o

SUTURALIS Steph. Not common.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀ o o o

ONONIDIS Sharp. Very rare.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o o

SULCIFRONS Thun. Common.
DISTRIBUTION—EAST. ♀ ♀ Tay ♀ Moray o o o
WEST. Solway ♀ o o o

TIBIALIS Hbst. Common.
DISTRIBUTION—EAST. ♀ ♀ Tay ♀ ♀ o o o
WEST. Solway ♀ o o o

BREVICOLLIS Schön. Local.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

LINEELLUS Gyll. Rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. Solway o o o o

CRINITUS Ol. Rare.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. Solway o o o o o

CAMBRICUS Steph. Rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

CINERASCENS Fab. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. o Clyde o o o

REGENSTEINENSIS Hbst. Abundant on *Ulex*.
DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray o o o
WEST. Solway Clyde Argyle o o

PUNCTICOLLIS Steph. Common.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

LINEATUS L. Very common on clover.
DISTRIBUTION—EAST. ♀♀ Forth Tay ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

HISPIDULUS Fab. Rather common.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀♀ o o o

HUMERALIS Steph. Rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. Solway o o o o

POLYDRUSUS Th.

UNDATUS Fab. Common on various trees and bushes.
DISTRIBUTION—EAST. Tweed Forth Tay Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

PTERYGOMALIS Sch. Not uncommon.
DISTRIBUTION—EAST. Tweed Forth ♀♀ Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

CERVINUS L. Common on Scots fir.
DISTRIBUTION—EAST. ♀♀ Forth Tay Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

CHRYSOMELA Ol. Maritime. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

MICANS Fab.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. o Clyde o o o

This species is unknown to me as Scottish, and the above distribution is given on the authority of Murray's Cat. I am inclined to suspect an error of determination.

SCIAPHILUS Th.

MURICATUS Fab. Occasional in moss and herbage.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♂♀ o o o

TANYMECUS Th.

PALLIATUS Fab. Rare.
DISTRIBUTION—EAST. o o o o o o o
WEST. Solway o o o o

ORTHOCHÆTES Germ.

SETIGER Germ.
DISTRIBUTION—EAST. Tweed Forth o o o o o
WEST. o o o o o

I record this on Murray's authority, no Scottish specimens having come under my observation.

LIOSOMUS Steph.

OVATALUS Clair. Amongst moss. Not common.
DISTRIBUTION—EAST. ♂♀ ♂♀ ♂♀ Dee ♂♀ o o
WEST. Solway ♂♀ o o o

ALOPHUS Sch.

TRIGUTTATUS Fab. On herbage. Often abundant in flood refuse.
DISTRIBUTION—EAST. ♂♀ ♂♀ ♂♀ ♂♀ Moray o o
WEST. Solway ♂♀ o o o

HYPERA Germ. (Phytonomus Sch.)

PUNCTATA F. Common.
DISTRIBUTION—EAST. ♂♀ ♂♀ ♂♀ ♂♀ ♂♀ o o
WEST. Solway ♂♀ o o o

FASCICULATA Hbst. Maritime. Excessively local.
DISTRIBUTION—EAST. o Forth o o o o o
WEST. o Clyde o o o

RUMICIS L. On dock.
DISTRIBUTION—EAST. Tweed Forth Tay ♂♀ Moray o o o
WEST. Solway Clyde o o o

SUSPICIOSA Hbst. Rare.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. ♀♀ ♀♀ o o o

PLANTAGINIS de Geer. Rare.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

MURINUS Fab. Very rare.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

VARIABILIS Hbst. Rare.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

POLYGONI L. Occasional.
DISTRIBUTION—EAST. ♀♀ Forth Tay ♀♀ Moray o o o
WEST. Solway Clyde ♀♀ o o o

NIGRIROSTRIS Fab. Abundant.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

TRILINEATUS Marsh. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

LIMOBIUS Th.

DISSIMILIS Hbst. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Queensferry sea-shore, among Ononis arvensis. Dr Greville." Murray Cat.

CLEONUS Th.

SULCIROSTRIS L. Rare. Maritime.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

HYLOBIUS Th.

ABIETIS L. Abundant on fir-trees. Often found in houses.
DISTRIBUTION—EAST. ♀♀ Forth Tay Dee Moray . o o o
WEST. Solway ♀♀ o o o

PISSODES Th.

PINI L. Local. On Scots fir.
DISTRIBUTION—EAST. o Forth Tay Dee Moray o o o
WEST. o o o o o

NOTATUS Fab. Rare. Highland. On Scots fir.
DISTRIBUTION—EAST. o o o Dee Moray o o o
WEST. o o o o o

GRYPIDIUS Th.

EQUISETI Fab. Local.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. Solway ♀ o o o

ERIRHINUS (and DORYTOMUS Th.)

BIMACULATUS Fab. Maritime. Very local.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

ÆTHIOPS Fab. Rare.
DISTRIBUTION—EAST. Tweed ♀ Tay o o o o o
WEST. Solway o o o o

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

VORAX Fab. Rare.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway Clyde o o o

SILBERMANNI Wenck. Common.
DISTRIBUTION—EAST. ♀ Forth Tay Dee ♀ o o o
WEST. Solway ♀ o o o

MACULATUS Marsh. Common.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

(*To be continued.*)

J. HENDERSON, PERTH.

In Memoriam

Sir THOMAS MONCREIFFE, Bart.[1]

IT is with feelings of very deep sorrow that I, as editor of this magazine, perform the melancholy duty of recording in its columns the death of one who, nearly from the commencement, was one of its warmest supporters and frequent contributors, and who, I expected—with, as it seemed, no vain expectation—would have continued to have been so for many years to come.

Sir Thomas Moncreiffe, the eldest son of Sir David Moncreiffe of Moncreiffe—the representative of a very ancient Perthshire family—was born on the 9th of January 1822, and succeeded his father in 1830. He entered the army at an early age, having obtained a commission in the 1st Scots Fusilier Guards in 1839, retiring after three years' service. In 1858 Sir Thomas became honorary colonel of the Royal Perthshire Rifles; and on the death of Sir W. Stirling-Maxwell was appointed Vice-Lieutenant of the county. He was also chairman of the Perthshire Conservative Association—a position occasionally entailing considerable labour, and the duties of which he discharged with his usual tact, ability, and energy.

About three years ago Sir Thomas Moncreiffe's health began to give way a little, but not to such an extent as to cause serious alarm. During the past summer he suffered from several attacks of illness, but only a week before his death was able to be in Perth and transact business. He died on August 16th, in the 57th year of his age, leaving behind him no more popular man in the county of Perth.

It may be said of the naturalist, as of the poet, that *nascitur non fit.* The love of nature may be developed and trained; but unless it already exists, no amount of training will produce it. There are also naturalists and naturalists. Some who think

[1] The excellent portrait (by Mr Henderson of Perth) that accompanies this notice, is presented by the Perthshire Society of Natural Science.

themselves, and are often considered by others, to be naturalists, are merely collecting-machines, who, by some chance, collect specimens of natural history instead of china, postage-stamps, and so forth. To this class, too many persons, dignified by the name of entomologists, belong, and hence entomology has been, and still is, rather contemptuously regarded by students of other departments of natural science. Another class are the species-mongers, whose science begins and ends with the describing of new species, and to whom classification, structure, development, and œconomy, are but secondary matters of comparatively little interest.

But there are others who go through life with their eyes open,—to whom it is a pleasure to observe all the habits and peculiarities of every natural object that comes within their reach, and to inquire of the Great Mother the why and wherefore of everything. To them the study of nature is a pure delight—never cloying, but ever increasing more and more as knowledge is added to knowledge. These are true naturalists; and when they put pen to paper, then such delightful books as old Gilbert White's 'Natural History of Selborne' are produced. There may be not much "science" in their methods of working, and the conclusions they draw from their observations may be often erroneous, still they are the material out of which scientific naturalists are formed. But as in everything else, however great may be the love of nature and the ability to observe, there must be an education and training in science before great things can be accomplished. Some persons receive this education early in life, to others it does not come till later. To the latter class it befell Sir Thomas Moncreiffe to belong.

Always imbued with a great love of nature, and endowed with a keen and observant eye,—whose powers were, no doubt, increased by the various games of skill in which he excelled,—it was only of late years that Sir Thomas found time, amidst his numerous duties, to devote himself to the practical study of natural history. Entomology was the branch of science that he selected, and the order Lepidoptera the special object of his research. At first, he confined himself to the observation of the species inhabiting the rich district surrounding his ancestral home. How rich this district is, and how well he explored it, may be seen from the list recently published in this magazine. In the list in question, only the species inhabiting one square mile of the Moncreiffe estate are noticed—the restric-

tion of the area under observation being made purposely to exhibit the relations, *inter se*, of the distribution of the species, as well as how many species inhabit a square mile of richly-varied country in central Scotland. In the list are many observations on the habits, &c., of species, but only a tithe of what the author could have published from his observations, and which, no doubt, he would have given had he been longer spared to us.

After Sir Thomas had become tolerably well acquainted with the productions of his own district, he began to turn his attention to other parts of Perthshire, and especially to Glen Tilt and Athole Forest, whose previously unknown entomological riches he did much to elucidate. Little more than a month before his death, and when scarcely recovered from an attack of illness, he spent some days in Glen Tilt, and met with several rare species hitherto unobserved in that district.

Though thus confining himself for the most part to the Lepidoptera of Perthshire as objects of study, Sir Thomas Moncreiffe did not restrict himself to the literature of the British Lepidoptera, but made himself acquainted with the more important works on the species of the European fauna, of which, of course, the British species form but a small portion.

Without being a botanist, Sir Thomas had a fair knowledge of the plants of Perthshire, due in great measure to his close habits of observation, and in no small degree to his desire to help those of his friends who were botanically inclined. Seldom did I go out on a walk or an excursion with him that he did not ferret out some plant that would otherwise have escaped notice. And it was the same with all other branches of natural history. For this reason he was unanimously elected President of the Cryptogamic Society of Scotland, when that Society met at Perth in 1875; and to him is due the great success of that meeting, and its unparalleled show of fungi.

In January 1872, Sir Thomas joined the Perthshire Society of Natural Science, and soon became one of its most active members, attending the meetings often at great inconvenience to himself, and doing all that he could to promote the interests of the Society and to further its objects. In March 1874 he was elected President, an office which he continued to occupy till the time of his death. He was also Cairn-master (or President) of the Perthshire Mountain Club, an offshoot of the Perthshire Society of Natural Science, formed for the object of exploring the Perthshire hills. In connection with this Club, an instance may be

given of Sir Thomas's desire to oblige others, even at great personal inconvenience. It had been arranged that the Club should meet on the top of Ben Ghlo, a high and remarkably steep mountain in Athole. As some of the members were located on opposite sides of the mountain, it was agreed to meet at the summit. When the day arrived—a very hot and fatiguing day—Sir Thomas was ill and in bed, at the foot of the hill; but knowing how much disappointment his absence would cause, he got up, managed to crawl up the hill in some manner, though so weak that he could scarcely cross the various burns on the way, attended the meeting, and returned to Forest Lodge to go immediately to bed again!

Finding so much pleasure to himself in the study of nature, and thoroughly impressed with the belief that others would be benefited by similar studies, it was but natural to a man of Sir Thomas Moncreiffe's kindly disposition to cast about for a method in which that desire might be realised. This he thought might be accomplished by establishing in Perth a good educational museum of the natural productions of the county, the museum being, however, but the centre round which should be clustered in course of time lecture and class rooms, laboratories, and other aids to the study of science. He therefore took advantage of his position as President of the Perthshire Society of Natural Science, to advocate in one of his annual addresses a scheme for the establishment of such an institution. Though he has not lived to see his cherished project realised, yet, thanks to the skill and energy with which he advocated it, and the support that it has received, it bids fair to be soon an accomplished fact, the more especially as it is felt that such would be a fit and desirable memorial of the originator of the idea.

Though gone from amongst us, the memory of Sir Thomas Moncreiffe will ever be held in loving remembrance by those with whom and for whom he laboured; and when we wander amongst those scenes of nature which he so dearly loved, in the bosky woods or on the heather-clad hills, our thoughts will often turn to the quiet spot where all that was mortal of him reposes.

F. B. W.

ZOOLOGY.

THE MOUNTAIN LEPIDOPTERA OF BRITAIN: THEIR DISTRIBUTION AND ITS CAUSES.

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

(*Continued from p.* 105).

THE very earliest of the higher plants would be those arctic or north temperate forms which grow in the immediate vicinity of salt water, on the sea-shore,[1] or in salt marshes; and it may be noted that some of these inhabit mountains also.[2] Conversely, some of the mountain plants occur on the sea-shore, especially in the north. A saline element is necessary for the species restricted to the vicinity of the sea, but those common to sea-shore and mountain inhabit these localities, not entirely by choice, but because they have been driven out of the more favoured intermediate ground to less crowded situations, or at least into situations in which their constitutions enable them to hold their own against other plants. For the same reason some of the mountain plants descend and some of the maritime plants ascend along the shingly or sandy margins of rivers, where they have usually less of a crowd to contend with. This is one of the reasons why we find some of the so-called maritime plants high up on the mountains, their presence having been at one time considered to afford a proof of the theory that these mountains were once islands in an iceberg-laden sea.

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

[1] *E.g.*, *Mertensia maritima*, *Psamma baltica*, and, in a less degree, *Juncus balticus*.

[2] Such as *Armeria*, *Plantago*, and *Silene*, *maritima*, *Carex incurvata*, &c.

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 that 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.

But to return to our insects. Whenever plants had become established, herbivorous insects would follow, each pursuing the food plant or plants of its larva. The first insects would likely be those attached to cryptogamic plants, such as mosses or lichens; and it is possible that if the *Crambus* and *Scopariæ* in the list given above have larvæ which feed on such plants—at present their food-plants being unknown — they were the first to cross the Germanic plain. Of the higher plants, those which are not so dependent as others upon insect agency for the fertilisation of their flowers would possibly be first in possession of the ground, and the insects which use them as food would thus get a start in the race, and by their presence assist in the spread of the plants depending on their assistance for fertilisation.

Thus *Erebia Epiphron* is a grass-feeder, and grasses being wind-fertilised, are independent of insect agency. The *Erebia*, consequently, would find food before *Pachnobia*, the *Anartæ*, &c., which are attached to the Ericaceous plants, which are usually fertilised by insect agency.

These are the known or probable food-plants of the insects treated of in this paper:—

Erebia Epiphron—Grasses.
Zygæna exulans—Low plants (Trifolium? Empetrum? &c).
Pachnobia hyperborea—Vaccinium myrtillus.

Anarta melanopa—Vaccinium and Arctostaphylos.
" *cordigera*—Arctostaphylos uva-ursi (&c. ?).
Psodos coracina—Calluna ?
Scopula uliginosalis—
Scoparia alpina—Mosses ?
" *gracilalis*—Mosses ?
Crambus furcatellus—Grasses? mosses?
Penthina Staintontiana—Vaccinium myrtillus.
" *Grevilleana*—Arctostaphylos?
Sericoris irriguana—
Swammerdamia nanivora—Betula nana.
Zelleria saxifragæ—Saxifraga aizoides, &c.

Of these plants, the grasses and *Betula nana* are wind-fertilised; *Vaccinium*, *Arctostaphylos*, and *Saxifraga* are generally insect-fertilised.

It may be argued that the insects in question, being furnished with wings, were not dependent on a land-connection with continental Europe for their introduction into Britain; and it is quite possible that some of them may have found their way across the narrow seas. Whether in that case they would make good their footing, would depend on whether their own peculiar food-plants had become established. That some plants had reached this country before the land-connection took place is very likely, but that the majority of the plants crossed by land (or at least when the water-barrier was much narrower) seems more probable. Another objection to a theory of passage across the sea is that most of the insects in question seem to be—now, at least—of a very unmigratory disposition; and unless their habits in former times were different, they would not be likely to venture across the sea. On the mountains there are many places, which appear as suitable as those inhabited by the various species, which remain untenanted; and though it would be very rash to say that these spots will remain untenanted, yet if the insects in question had been of a roving disposition, they would probably have colonised or recolonised them. As for involuntary migration, by means of the wind-currents, these mountain insects seem to have a wholesome dread of wind, and will not as a rule venture out in a breeze unless compelled by dire necessity, either concealing themselves in the scanty herbage or taking shelter under stones, as I have seen *Psodos* do. Many of the lowland insects get caught by the wind and blown on to the mountains, as I observed by finding large quantities of them scattered on snow-fields on one of our hills. I was at the time especially

struck by the fact that none of the mountain Lepidoptera had been caught in this manner. Of course it is quite, and perhaps extremely, probable that this habit of avoiding wind-currents may have been acquired since these insects colonised their present mountain homes, and that they were in former times as incautious as the lowland species. Moreover, even supposing that they were cautious, a single female of each of the species may have been carried by the wind and founded a colony.

On the whole, however, I think the probabilities are in favour of the passage by land, or rather by land only slightly interrupted here and there by very narrow water-barriers; and if we can judge from the present distribution of the species, we may hazard a guess at the sequence in which they came. I say the "present distribution," for we cannot tell of course what changes may have taken place—such as the extinction of species in localities once frequented by them—during the many thousand years that have elapsed since their first arrival.

But, first of all, what kind of a country did the dry sea-bed make, and what were its physical features? It might be thought that some idea of these might be obtained by studying the Admiralty charts of the various depths at present existing round our shores and in the German Ocean; but geologists think that many of the great banks which occur in the southern reaches of the German Ocean probably consist, in large measure, of glacial deposits, and their presence tends to obscure the physical features that obtained in pre-glacial and inter-glacial times. Were one to judge from the present depths, the first dry land lay between Holland and North Lincoln or South Yorkshire, and the Rhine, Thames, and other rivers ran west through the English Channel; the Elbe and other rivers north of the Rhine running, on the other hand, northwards. But geologists incline to believe that the Rhine flowed northwards, and was joined by the Elbe, Thames, and other rivers. However that may be, it is pretty certain that great plains, intersected by rivers of varying breadth, occupied the present bed of the German Ocean, and that all parts of that sea of less depth than one hundred fathoms were then dry land. The hundred-fathom line (beyond which the depths increase suddenly) reaches from Denmark to the north of the Zetland Islands, but does not touch Norway, which is cut off by a deep channel. From beyond the Zetlands it passes outside the Hebrides, Ireland, and the south-west of England, and gradually approaches the coast of France in the extreme

south-west. Between England and Ireland was a large lake reaching from opposite Wales to beyond the north of Ireland.

Assuming that *Crambus furcatellus* is (as is most probably the case) a grass or moss eater, we may regard it as one of the earliest of our mountain Lepidoptera to arrive. In the first place, because of its probable food-plant, which, as already said, would be one of the first to be established; and in the second place, because it is the only one of the species known to inhabit Wales. When the plants and animals began their northward march the arctic-alpine species would, as already remarked, follow closest on the retiring ice-sheet, and close behind them would come the more numerous species that inhabit the lower and less arctic localities. As these seem to be stronger, they would occupy all the ground behind, where, moreover, the climate would be becoming somewhat unfavourable to the mountain and arctic species. There would therefore be no possibility, on the part of the latter, of turning back, and they would be driven either up the hills or to the north. Some of the *Crambus furcatellus*, therefore, we may imagine, were pressed up the Welsh hills, where the then still existing local glaciers would afford a climate suitable to them and adverse to their pursuers; others would be driven northwards, and find resting-places on the hills of the north-west of England and of Scotland, on which, doubtless, the species had once a wide range. Another view of the possible history of the arrival and spread of *Crambus furcatellus* may be taken—namely, that it managed to get across the sea to the south of England, and thence gradually spread northwards, taking Wales on its way.

Perhaps the next—if not as early an—arrival would be *Erebia Epiphron*, which we know is a grass-feeder. It does not occur in Wales, and perhaps never did, but entering England on the east has left colonies on the north English and Scottish hills. From Scotland it probably reached Ireland by the north of the great lake, which, as we have seen, occupied a large part of the Irish Sea, and which to such a weak flier as the *Erebia* would prove an obstacle to direct migration from England. Ireland, or at least the north and west of it, not having been in all probability fully colonised, would not present such obstacles to a southward march as would the more accessible sister country.

The insects most likely to be next in succession would be *Zelleria saxifragæ* and *Swammerdamia nanivora*.

The *Zelleria* feeds on various species of saxifrages, especially (in this country) on *Saxifraga aizoides*, but also on *S. oppositi-*

folia, and (in Switzerland) on *S. aizoön*. *Saxifraga aizoides* must have been a very widely-spread species in this country before it was crowded out by other plants, as, though it is chiefly confined to the mountains, it yet occurs in various low-lying localities to which it cannot have been brought by water from the hills. It also descends the rivers. A curious fact in its distribution is that, though common in Ireland, it has not been found in Wales. We may therefore suppose that it entered England on the east, and reached Ireland by way of Scotland. The *Zelleria* doubtless followed it, and, though as yet only noticed (in Britain) in a few localities in Scotland, is probably of much wider distribution than is imagined. I am led to suppose this by finding it in every suitable locality in which I have looked for it. Against this theory of its line of migration must be set the fact that *Saxifraga oppositifolia*, on which it also feeds, does occur in Wales. The plant *par excellence* to which it is attached is, however, *S. aizoides*.

The *Swammerdamia* had better be considered with the remaining insects. The latter, so far as their food-plants are known, feed on ericaceous plants—species which mostly affect a peaty soil, and which, perhaps, would scarcely cross to Britain, or at least spread widely there, till a suitable soil had been prepared for them.[1] Some of these plants will scarcely flourish except when there is a large amount of peat in the soil; but others, though mostly found on such soils, will grow well enough where there is no peat, and probably only occupy the peat because they find on it less of a struggle for existence—or, in other words, they can flourish on it, while other plants which, on a different soil would overgrow them, cannot. Be this as it may, this kind of soil results from the previous growth and decay of other plants, more especially such as love a damp situation or climate. Now we have good reasons for believing that after the close of the glacial epoch great alternations of wet and dry periods of climate took place. During the wet periods moisture-loving and marsh-plants would find conditions most favourable for their existence and spread, and consequent on their growth and decay peat and peaty soil would be formed. During the dry periods the reverse would happen, and the vegetation would consist of plants that prefer a

[1] I need scarcely remind my readers that wherever the ice-sheet had spread (and that was over the greater part of the country), the peaty soil which had accumulated in the pre-glacial or inter-glacial periods was, except in a few sheltered places, swept away by the grinding ice, and replaced or overlaid by the boulder-clay or till.

drier soil and climate—as, for example, many of our forest trees. That such alternations of climate took place we may learn from a study of deep sections of peat, where—with greater or less distinctness—the succession of wet periods, characterised by marsh plants, and of dry periods, characterised by forest trees, may be seen. Of course there was no sudden change from one period to another, but a gradual one from wet to dry, and *vice versa*. In those intermediate periods—neither very wet nor very dry—the plants that affected an intermediate condition would grow and spread, and the insects that feed on such plants would be sure to follow them.

Betula nana is one of the plants that like a moderately damp situation, such as is afforded by a spongy sphagnum-covered morass. The ericaceous plants (*Arctostaphylos*, *Vaccinium*, and *Calluna*) prefer drier ground, and though lovers of a peat soil are not dependent on it. They are, however, species that probably spread during the wet or intermediate periods. Except the *Arctostaphylos*, these plants are of wide distribution in this country, and hence the range of the insects is not restricted by that of the food-plants, even supposing that they were (or are) always confined to these plants, which there are grounds for believing not to be entirely the case.

Judging, however, from the present distribution in Britain of these insects (namely, their being confined to the northern half of Scotland), it seems quite possible that they were never inhabitants of England, but that spreading along the shore (extending, as has been pointed out, between the Continent and Scotland) of the North Sea they reached Scotland, and ascended to the mountains when these were sufficiently free of snow and ice, and when the low grounds could be no longer held. In this manner the Zetlands were reached by *Anarta melanopa*. Of course, on the other hand, it is equally possible that they did inhabit England, but did not succeed in maintaining their position.

The reason already suggested for the non-persistence of those alpine species in lowland localities, once necessarily occupied by them, and which reason may be briefly defined by the now classical expression, "survival of the fittest," would be brought about by various agencies, more or less obscure or imperceptible to us in their action, but not the less efficacious. None of the Lepidoptera in question seem to be less protected from the attacks of enemies (such as birds, carnivorous or parasitic insects, &c.) than the majority of other species, though such enemies are

decidedly less numerous in the high-lying localities inhabited by these insects. Their want of success in holding their own must therefore, in part at least, be due to other causes. It is probable that their vital constitutions are different from that of the species which have supplanted them, and some of which even contest with them their present habitats. In one respect their constitutions must be hardy enough to sustain life at all in alpine and arctic districts; and it is probably not entirely (though in some degree) the greater summer heat of low-lying localities that makes such unsuitable for them, but the less severe and shorter-lasting cold of winter. In the high altitudes or high latitudes which they inhabit there is a continuous frost all through the winter, and none of the alternate frosts and thaws, accompanied by damp, that forms the winter of the northern lowlands, and which we know is so much more destructive to insect-life than a continuous low temperature. They are, moreover, protected at this season by a thick covering of dry snow.

Climate, therefore, is likely to have been an important factor in the distribution of these species. It must be remembered, however, that *Anarta melanopa* inhabits low elevations in the Zetlands, whose climate is pre-eminently an "insular" one, and where the mean winter temperature is comparatively high and the summer temperature low. In Zetland, however, the competition between species is much less than that in Britain. With this exception of *Anarta melanopa*, most of the species appear to prefer a "continental" climate to an "insular" one; and this is possibly the reason why more of them do not occur in Ireland, where the influence of the Atlantic Ocean is greatest. While the connection of Britain with continental Europe across the floor of the German Ocean lasted, our climate was much more continental[1] than at present, when we have what is termed an "insular" climate, reaching its maximum on our western shores. It is to this insular climate that, I believe, the poorness of our fauna, compared with parts of continental Europe situated much further north of us, is partly due. For example, compare the Butterflies of Finland with those of Scotland. Finland has 89 species, Scotland only about 36 (Britain altogether only 64); and though Finland is situated to the north of any part of Britain, yet many of its species are those which are—in Britain

[1] That is to say, the summer heat was greater and the winter cold more severe and continuous,—both due to a less humid atmosphere, caused by the less near proximity of the sea.

—only found in those parts which have a more continental (or a less insular) climate, and are insects which do not reach Scotland or the north of England.[1]

That many species, now confined to a few localities in the south of England, had at one time a much wider range in Britain, is extremely probable; and it is equally probable that perhaps many other European species once inhabited this country, but failed to survive the change to a more insular climate. On the other hand, we possibly owe to our insular climate (and situation) many of the curious varieties of Lepidoptera that are found only in Britain.

One more point in connection with our mountain Lepidoptera merits attention, and that is, their comparative age as species, as well as the probable place where they originated.

There seems great reason to believe that the countries of the north temperate hemisphere, and even the north circumpolar lands, were the regions where many of the species of plants and animals at present in existence were evolved, and that the last and other glacial periods were very instrumental in dispersing these species over the earth's surface. We have proofs that many species now only existing in a living state in the warmer temperate regions once flourished near the North Pole, in company with other species now extinct, but which seem to have been the more immediate ancestors of certain living species. Probably very many other species (including many living now) once flourished along with these, but from their more fragile nature have left no remains.

To go no further back than the last glacial period, it is easy to understand how the change of climate of that epoch acted as a dispersing agent, driving the plants and animals before it step by step, and, doubtless, utterly destroying many species that failed to make good their escape to more genial climes. We must not think of this change of climate, and its accompanying phenomena of ice-sheets and heavy snows, as having occurred suddenly. It would happen gradually—probably very gradually—and possibly, had any naturalists been then existent to study the change induced in the fauna and flora, it would have required the observations of many generations before such changes became established—or, rather, admitted—facts.

[1] Amongst other species may be noticed *Papilio Machaon*, *Thecla betulæ* and *pruni*, *Melitæa cinxia*, *Argynnis Latonia*, &c. &c.

All the same, slowly but surely the changes were taking place. The species at one time abundant in the suppositious locality under observation would become rarer and rarer, till they had ceased to live in that locality at all; but their places would be supplied by other—more northern or mountain—species, which, mingling with the others, would gradually supplant them, but would in their turn be supplanted by still more alpine or arctic species. And what would happen in one locality would happen in all to which the phenomena of the glacial period extended—the more northerly or more alpine suffering first, the southerly and low grounds at a later period.

Moreover, there were times in which the change in the climate (and consequent alteration in the fauna and flora) would not only not alter for the worse, but, to a greater or less extent, for the better. And in these periods ("inter-glacial periods") the species driven out would return, though perhaps not all of them, and perhaps others would come which had not previously inhabited the locality, all however to be again driven out or supplanted when that inter-glacial period came to an end.

At last, however, the great glacial period would reach its maximum intensity, and the climate would gradually (but, as before, interruptedly) become better, and would be accompanied by similar phenomena of a changing fauna and flora.

In short, there were during all this long period—extending over many thousand years—great but gradual oscillations of climate, and consequent shiftings in the component parts of the fauna and flora, which could not fail to make immense alterations in the species.

From all this we may gather that it is probable that the species whose distribution at the present day is widest are the more ancient, and that those of a less wide range have possibly had a later evolution.

Of the species discussed in this paper, *Anarta cordigera* is the most widely distributed, and *A. melanopa* ranges nearly as far. These are the only species (amongst our mountain Lepidoptera) which occur in America, and therefore probably existed as arctic species before the glacial period. In America they have been reported from Labrador only, so that apparently they are not circumpolar.

European (or palæarctic) species had two routes by which they might have gone to America (the nearctic region). One was by a broad land-connection, reaching south of Greenland, that united

North Europe and North America, which geologists suppose to have once existed; the other is across Behring's Straits or by the Aleutian islands. As, however, these species of *Anarta* do not occur in the eastern palæarctic region (*i.e.*, Siberia, &c.) nor on the western side of North America, the route seems more likely to have been by Greenland or polar lands north of it. It is quite possible that the species originated in these polar lands, and when driven southwards colonies were sent both to Europe and America.

Of the other species under discussion, the macro-lepidoptera (the *Erebia*, *Zygæna*, *Pachnobia*, and *Psodos*), all range pretty widely, but, with the exception of *Psodos* (a doubtful inhabitant of Siberia), are confined to Europe. I expect that some of these species may, like many of the arctic-alpine plants, inhabit the Himalaya, or even some of the African and other mountains, but I have not been able to find any evidence of this. These species may be as ancient as the *Anartæ*, or they may not. Their absence from America is slightly suggestive of the latter.

Some of the micro-lepidoptera in question are also likely to be of ancient origin; but some of them may be, if they are confined to Britain—a fact possible, but not probable—of comparatively recent evolution.

In conclusion, the facts and suggestions put forward in this paper may be thus summed up :—

1. The British isles being at one time subject to extreme arctic conditions, had no fauna or flora.

2. At the close of the last glacial period they were peopled by plants and animals from continental Europe.

3. Most of these plants and animals reached Britain across the dry or nearly dry bed of the German Ocean.

4. Plants necessarily arrived before animals; and of the former, certain classes of cryptogamic plants, and the maritime and wind-fertilised species of the higher plants, were the first comers.

5. The arctic and arctic-alpine plants and animals, being those that followed closest on the retreating ice, were amongst the earliest arrivals, and had a wide range through the country.

6. From their present distribution in Britain it is probable that all the species (in question) did not enter Britain at the parts nearest continental Europe, but that they reached it at various points on the present east coast.

7. The distribution of the species (treated of in this paper) is not co-extensive with that of their food-plants.

8. Climate has been a chief factor in producing the present distribution.

9. Ireland derived some of its insects from Scotland.

10. At least some of the British mountain lepidoptera existed as species previous to the last glacial period.

The answers, therefore, to the questions asked at the beginning of this paper are briefly these :—

Whence did our mountain Lepidoptera come?

From continental Europe south of the latitude of Britain, or at least south of all except the south of England.

At what stage (or time) relatively to the majority of the Lepidoptera?

Amongst the very first, or at least before most of the others.

By what route were they brought?

By a continuous or nearly continuous land-passage across the bed of the German Ocean.

What causes have produced the present distribution?

Climatic conditions and other agencies which, separately or conjointly, result in causing the survival of the fittest.

Notes on Lepidoptera.—Three months ago, when I sent to you a few notes on Lepidoptera, lovers of that study had a gloomy looking forward to. The general belief was, if there could be got a few to replace some of the decayed ones it would be all; but as the old saying is, "There is nothing surer than disappointment:" and such has been the case with moth and butterfly collectors this summer. At least so far my experience has been. I have taken this summer 162 species within two miles round about this place; and Berwickshire, as far as I know of, contributes amongst the *Diurni*, *Nocturni*, *Geometræ*, and *Noctuæ*, 314 species to the list of Lepidoptera.

Moths and butterflies have been more numerous this summer than for the few past years, and instead of the extreme severity of the last winter destroying insect-life it has saved it. In species whose larvæ bury themselves in the earth in order that their pupæ may be protected from birds and atmospheric influences, let the pupa be ever so hard frozen, as long as it is covered, it will take no harm. I have tried a few, and I find that pupæ which are buried in the earth, if exposed in fresh weather to the air for a while, some may become perfect insects; but I never could succeed in rearing insects from pupæ which were removed from the earth in frosty weather, although they were replaced in the earth a short time afterwards. Pupæ whose nature is to hang on grass, palings, &c., can stand any amount of frost. Last autumn I put a few pupæ of the Fox Moth (*Bombyx rubi*), the Emperor (*Saturnia carpini*), and the Light Knot Grass (*Acronycta menyanthidis*), on the outside of the window, exposed to all the frost and rain: I took them into cover in the beginning of May, and without exception every one became a beautiful moth. Can it not be the case with the snow protecting them from the frost, the

frost hardening the ground so as the moles, rats, and mice could not turn over the earth and destroy the pupæ, that moths are so plentiful this season?

The moths in the beginning of June were nearly seven days earlier than in 1878, and from two to three weeks earlier than in 1877; and at the end of June, when the weather was so wet and cold, they stopped for ten days altogether. From the 27th of June till the 6th of July I never saw a moth that had come newly out of the pupa state, and very few much worn ones. I have seen more mutilated insects this summer than ever I saw before—some wanting parts of their under-wings, others their fore-wings—which may have been caused by the long-continued frost on the pupa. Had the hot weather continued which was in the middle of July, moths would have made their appearance earlier than in the last few years. On the 18th, 19th, and 20th of July I took forty-two different species, all fresh and new, out. Last season the Artaxerxes Butterfly was never seen here; this year it is abundant. The common Blue Butterfly was very rare here in former years; this summer I have seen above fifty. The only ones, so far as I have seen, that are not so plentiful this year are the Ghost Swift (*Hepialus humuli*) and the Clouded Border (*Lomaspilis marginata*). Last season I only saw one Barred Straw (*Cidaria pyraliata*); this year, in the middle of August, they were to be seen in thousands, hanging to the grass with their under side uppermost. On August 6 I took one fine Gold Spangle (*Plusia bractea*) on nettles.

Another moth whose habits should be better known amongst lepidopterists is the Death's-Head Moth (*Acherontia atropos*). Does it hibernate? is it double-brooded? or have we to believe in the blown-over theory? If it hibernates, which we have little reason to believe it does, specimens would have been sometimes seen during winter in a dormant state. If it was double-brooded, we would have its larvæ at two different times in one season. Like all the other moths which are known to be double-brooded, every writer that I have read about it gives September as the time for the moth appearing, and the caterpillar in August. It is rather out of the way of nature for such a large caterpillar as *Atropos* to go into the chrysalis state and become an insect in so short a time. For the blown-over theory, proofs are strong in its favour.[1] Mr Brotherston, Kelso, captured two in 1878—one on the 21st of May, the other on the 3d of June—both much worn, and having apparently experienced some rough weather.

Mr Hardy, Oldcambus, reports[2] one in June from Innerwick, East Lothian. I have one fine specimen in my collection, got at Galashiels on the 20th of September 1878, and by its appearance new out of the chrysalis. On the 25th of June this year I received by post one living Death's-Head Moth, which was taken on the German Ocean, twenty-five miles from land (wind in the east), flying in the direction of Shields about 3 o'clock A.M. There were a few more moths seen at the same time. Mr Charles Form, Eastbourne, writes me to-day: "I quite believe that the Death's-Head Moth is frequently a traveller on its own account, for it is at times met with on the cliffs near here, where there is no doubt that it has landed from the opposite shores of France." May not all the Death's Heads which we get here in early summer come the same way? Let all who are interested try to find out.—ROBERT RENTON, Fans, Earlston.

[1] 'Scottish Naturalist' for July 1878, p. 292.

[2] 'Proceedings of the Berwickshire Naturalists' Club,' 1878, p. 532.

PHYTOLOGY.

EFFECTS OF THE PAST WINTER AND PRESENT SUMMER ON HARD-WOODED PLANTS.

By Colonel H. M. DRUMMOND HAY, C.M.Z.S.

HAVING been asked to give my experience of the effects on hard-wooded plants of the last severe winter of 1878-79, which has been followed by one of the coldest and wettest summers on record, and as the subject is in many points an interesting one, I have ventured to draw up a list of a few evergreen and deciduous trees and shrubs which have come more immediately under my notice in this locality, four miles east of Perth, on the banks of the Tay; and in doing so I have endeavoured, by grouping the plants according to the several countries in which they are found, to give, as it were, a comparative view of the respective climates from which they have been introduced. To carry this out effectually, however, it would require a thorough knowledge of locality, altitude, &c., which, unfortunately, I have not at present the means of obtaining. So much depends on circumstances, the nature of the soil into which plants have been introduced, the aspect, moisture, or otherwise, exposure to winds, as also whether the preceding summer has been dry and hot, or wet and cold,—to define what is really hardy and what is not. Thus, plants having last year experienced a very hot and dry summer, naturally had their buds matured and wood well ripened, and were consequently placed under the most favourable circumstances for contending against a severe and long-protracted winter such as we have lately passed through. On the other hand, many plants usually considered perfectly hardy, may, after passing through a severe winter, have to endure a cold, sunless, wet summer, like the present, in which case they will probably succumb, though surviving uninjured the previous winter's frost. This has been pre-eminently the case in the present season—and should next winter be as severe as the last, we may expect, from the immature

buds and unripened state of the wood, a much larger number of casualties than have been recorded in the present list. It may be as well to note that the whole of the plants mentioned have been grown in the open ground, as standing trees or bushes, on a south-west aspect, in a somewhat stiff, moist, clayey loam, partially exposed to easterly and south-westerly winds, and much subject in spring to hoar-frosts from the river :—

British Islands.

1. *Calluna, Erica, Menziesia,* and their varieties,	All the British and Irish heaths, including *Menziesia*, have been uninjured, but for the greater part of the winter were well protected by snow.
2. *Cytisus* (*Sarothamnus*) *scoparius*,	Suffered severely, especially in exposed places.
3. *Daphne Laureola*,	Uninjured.
4. *Genista tinctoria*,	
5. *Hippophäe rhamnoides*,	
6. *Potentilla fruticosa*,	
7. *Rhamnus frangula*,	Unripened shoots killed, and slightly retarded, but otherwise uninjured, and made a good growth.
8. *Ruscus aculeatus*,	Uninjured.
9. *Ulex europæa* (*flor. plen.*),	Though slightly injured and some shoots killed, has flowered well, but was a good deal protected by heavy snow; the common whin, on the other hand, has suffered greatly everywhere in the neighbourhood, and in some cases has been entirely killed.
,, *hibernica*,	It is curious to note that out of several bushes of this species, all should have been entirely killed, with the exception of one plant, which, from some unexplained cause, remained perfectly uninjured, though growing only within a few yards' distance from the others, and under exactly the same conditions as to age, soil, moisture, and exposure.

NORTHERN EUROPE, *RUSSIA, AND †SIBERIA.

10. *Andromeda tetragona*, .	Injured, and shoots much browned where not well protected with snow. Flowered badly.
11. *Daphne Mezereon*, . .	Perfectly hardy and uninjured.
12. *Ledum palustre*, . .	
13. †*Rhododendron daurica*, *atrovirens*, . .	
14. †*Spiræa chamædrifolia*, .	
,, *cratægifolia*, .	
† ,, *sibirica*, . .	
† ,, *sorbifolia*, . .	
* ,, *tobolskii*, . .	
* ,, *salicifolia alpestris*, . .	
15. †*Syringa sibirica*, . .	

CENTRAL EUROPE, GERMANY, AND SWITZERLAND.

16. *Cornus mascula variegata*,	Uninjured and perfectly hardy.
17. *Erica herbacea*, *alba* and *carnea*, . . .	
17*a*. *Euonymus latifolia*, .	
18. *Genista sagittalis*, . .	
19. *Polygala chamæbuxus*, .	
20. *Rhododendron chamæcistus*	
,, *ferrugineum*	
,, *hirsutum*, .	

SOUTH OF FRANCE, *SPAIN, AND †PORTUGAL, INCLUDING THE AZORES.

21. †*Cerasus lusitanica*, .	Uninjured, and perfectly hardy; the hardiest of all the laurel tribe.
,, *azorica*, . .	Unripened shoots killed, and leaves browned, otherwise uninjured; has made a good growth.
22. **Cistus laurifolius*, . .	Though apparently uninjured from frost, seems to have suffered much from the effects of the cold wet summer, after the long protracted winter by blight, otherwise it may be said to have been uninjured.
* ,, *formosus*, . .	Uninjured, on a rockery, otherwise killed where not protected by a wall.

23. *Erica multiflora*, . . Uninjured.
24. **Genista hispanica*, . Slightly injured, and some shoots killed; but has since flowered well, and made good growth.
24*a*. †*Cytisus albus*, . . Uninjured.
25. **Picea pinsapo*, . .
26. **Pinus pyrenaica*, . . Uninjured.
27. **Rosa pyrenaica*, . .
28. **Rhododendron ponticum*, Uninjured; but reported to have suffered severely in Forfarshire.

ATLAS AND MADEIRA.

29. *Cedrus atlanticus*, . . Uninjured.
30. *Ilex maderiensis*, . .

ITALY AND SOUTHERN EUROPE, INCLUDING * CORSICA, † SICILY, AND THE || BALEARIC ISLANDS.

31. *Arbutus unedo*, . . Uninjured with me, but in some places has greatly suffered.
32. || *Buxus balearicus*, . . Utterly killed.
33. *Cerasus colchica*, . . Uninjured; seemingly one of the hardiest of the laurels.
34. *Cistus salviæfolius*, . . Killed to the roots, though in a great measure protected by snow; has, however, made fresh growth, and flowered well.
35. *Circis siliquastrum*, . Many of the terminal buds killed, and much retarded, but notwithstanding has made good growth.
36. *Colutea arborescens*, . Uninjured.
37. *Daphne collina*, . . Perfectly uninjured, and flowered profusely.
„ *Fioniana*, . .
38. *Erica mediterranea*, . A good deal injured, but coming away well again from the roots.
39. *Juniperus Sabina*, . . Uninjured.
40. || *Ilex balearica*, . .
41. *Laurus nobilis*, . . Much injured, and retarded where not sheltered by a wall.
„ *nobilis angustifolius*
42. *Lonicera alpigena*, . .
43. *Philadelphus coronarius*, .
44. *Phillyrea angustifolia*, . Uninjured.
„ *latifolia*, . .
„ *media*, . .
45 *Pinus laricio*, . . .

46. *Populus dilatata* (Lombardy Poplar), . . — Much retarded, and in many instances made little or no growth; in some places in the neighbourhood much injured or killed.

47. *Rhamnus alaternus, aurea-variegatus*, . . — Shoots browned, and a good deal retarded.

48. *Rhus Cotinus*, . . — Shoots killed, and a good deal retarded, but has since made good growth.

49. *Rosmarinus officinalis*, . — Every plant entirely killed, some of them upwards of twenty years old, having withstood the severe winter of 1860-61 with impunity.

50. *Ruscus hypoglossum*, . — Uninjured, though grown in the open border, without the protection of trees, which it requires in this climate; was, however, well protected by snow.

51. *Tamarix gallica*, . . — Uninjured, and has flowered profusely.

52. *Viburnum Tinus*, . . — Leaves browned, and much injured, and in some instances killed to the roots.

„ „ *hirtum*, . — Leaves browned, and unripened shoots killed, otherwise uninjured.

Levant and Asia Minor.

53. *Azalea pontica*, . . — Uninjured.

54. *Cistus cyprius*, . . — Slightly injured and retarded, but seems to have suffered more from the effects of the cold wet summer, coming immediately after so long and severe a winter, producing blight.

55. *Cerasus Lauro-Cerasus*, . — In many instances browned, and unripened shoots killed, otherwise uninjured.

56. *Pinus cilicea*, . . . — This pine, which is of early habit, frequently suffers severely from spring frosts; this year, owing to its having been retarded, was perfectly uninjured, and is now making profuse growth.

PERSIA.

57. *Syringa vulgaris*, . . Lilacs, though apparently uninjured from the effects of the winter, and flowering well, have suffered much from the cold wet summer coming immediately after it, especially the white varieties, which in many instances have been killed.

,, *persica*, Uninjured.

(*To be continued.*)

THE GAELIC NAMES OF PLANTS.

BY JOHN CAMERON.

(*Continued from p.* 124.)

Nasturtium officinalis—Water-cress. Gaelic, *biolair*, a dainty, or that which causes the nose to smart, hence agreeing with *nasturtium* (Latin: *nasus*, the nose, and *tortus*, tormented). *Dur-lus*,—*dur*, water, and *lus*, plant. *Dobhar-lus*,—*dobhar*, water. Welsh: *berwyr dwfr*, water-cress. The Gaelic and Irish bards used these names indefinitely for all cresses.

"Sa *bhiolair* luidneach, shliòm-chluasach.
Glas, chruinn-cheannach, chaoin ghorm-nealach;
Is i fàs glan, uchd-ard, gilmeineach,
Fuidh barr geal iomlan, sonraichte."—M'INTYRE.

Its drooping, smooth, green, round-leaved water-cress growing so radiantly, breast-high, trimly; under its remarkably perfect white flower.

"*Dobhrach* bhallach mhìn."—M'INTYRE.

Smooth-spotted water-cress.

Barbarea vulgaris—Winter cress. Gaelic and Irish: *treabh-ach*, —*treabh*, a tribe, tillage; or from *traigh*, the sea-shore, strand.

Sisymbrium sophia—Flixweed. Gaelic: *fineal Mhuire*, the Virgin Mary's fennel. Welsh: *piblys*, pipe-weed.

Erysimum alliaria—Garlic mustard, Sauce-alone. Gaelic: *garbhraitheach*, rough, threatening. Irish: *gairelach collaid; gairleaz*, garlic, and *collaid*, hedge garlic. *Bo-coinneal*, cow candle.

Cheiranthus Cheirii—Wallflower, gilly-flower. Gaelic: *lus leth an samhraidh*, half the summer plant. Irish: the same. Welsh: *bloden gorphenaf*, July flower or gilly-flower. Wedgwood says gilly-flower is from the French *giroflée*.

Brassica rapa—Common turnip. Gaelic, *neup;* Irish, *neip;* Welsh, *maipen;* Scotch, *neep* (and *navew*, French, *navet*); corruptions from Latin *napus.*

B. campestris—Wild navew. Gaelic: *neup fiadhain*, wild turnip.

B. oleracea—Seakale or cabbage. Gaelic and Irish: *praiseach bhaidhe*, the pot-herb of the wave (*baidhe*, in Irish, a wave). *Morran,—mor* (Welsh), the sea, its habitat the seaside. *Cal colbhairt*—the kale with stout fleshy stalks (from *coibh*, a stalk of a plant, and *art*, flesh), *càl* or *cadhal.* Welsh: *cawl*, kale. Gaelic: *càl-cearslach* (*cearslach*, globular), cabbage; *càl gruidhean* (with grain like flowers), cauliflower; *colag* (a little cabbage), cauliflower; *garadh càil*, a kitchen-garden.

> "Dh' itheadh biolair an fhuarain
> 'S air bu shuarach an *càl.*"—M'Donald.
>
> I would eat the cress of the wells,
> Compared to it, kale is contemptible.

Sinapis arvensis—Charlock, wild mustard. Gaelic: *marag bhuidhe*, the yellow sausage (to which the pod is supposed to bear some resemblance). *Sceallan*, a kernel. *Sgealag* (Shaw), *—sgealpach*, biting. *Mustard*, from the English.

> "Mar ghrainne de shìol *mustaird.*"—Stuart.
>
> Like a grain of mustard-seed.

Caran buidhe, the yellow head. *Praiseach garbh*, the rough pot-herb. Irish: *cusag*, quantity, because it grows abundantly.

Resedaceæ.

Reseda luteola—Weld, yellow weed. Gaelic: *lus buidhe mòr*, the large yellow weed. *Am buidhe fhliodh*, the yellow excrescence. Irish: *buidhe mòr*, the large yellow. Welsh: *llysie lliw*, dye-wort. *Reseda*, from Latin *resedo;* Gaelic: *reidh*, to calm, to appease.

Cistaceæ.

(From Greek κίστη, *kiste*, a box or capsule, from their peculiar capsules. Latin, *cista;* Gaelic, *ciste;* Danish, *kiste.*)

Helianthemum vulgare—Rock-rose. Gaelic: *grian ròs*, sun-rose; *plùr na gréine*, flower of the sun (also heliotrope). Welsh: *blodau'r haul*, sun-flower.

Violaceæ.

(From Greek ἴον, *ion*, a violet,—the food given to the cow Io, one of Jupiter's mistresses.)

Viola odorata—Sweet violet. Gaelic: *fail chuach*, scented bowl; *fail*, scent, and *cuach*, a bowl hollow as a nest—(Scotch: *quaich*, *cogie* (dim.), a drinking-cup), or *cuach*, a cuckoo.

> "*Fail chuachaig* ar uachdar a fheoir."—M'Farlane.
> Scented violet on the top of the grass.

V. canina—Dog-violet. Gaelic: *dail chuach*, field-bowl (*dail*, a field. Danish: *dal*, a valley.)

> "Gun sobhrach, gun *dail chuach*,
> Gun lus uasal air càrnn."—M'Intyre.
> Without primrose or violet,
> Or a gay flower on the heap.

Sàil chuach,—*sail*, a heel (from its spur), cuckoo's heel.

> "Coille is guirme *sàil chuach*."—Old Song.
> A wood where violets are bluest.

Irish: *biodh a leithid*, the world's paragon; also *fanaisge*, probably from *fan*, weak, faint, agreeing in meaning with the Welsh name, *crinllys*, a fragile weed.

V. tricolor—Pansy, heartsease. Gaelic: *spog na cubhaig*, the cuckoo's claw. Irish: *gorman searraigh*.

Droseraceæ.

(From Greek δροσερός, *droseros*, dewy, because the plants appear as if covered with dew.)

Drosera rotundifolia—Round-leaved sundew. Gaelic: *ròs an t'solais*, sun rose or flower; *geald-ruidhe* or *dealt ruaidhe*, very red dew; *lus na fearnaich*, the plant with shields (its leaves have some resemblance to shields).[1] Irish: *eil druich* (*eil*, to rob, and *druich*, dew), the one that robs the dew; *druichdin mona*, the dew of the hill. Welsh: *doddedig rudd*,—*dod*, twisted thread, and *rudd*, red, the plant being covered with red hairs.

Polygalaceæ.

(From Greek πολύ, *poly*, much, and γάλα, *gala*, milk.)

Polygala vulgaris—Milkwort. Gaelic: *lus a bhàine*, milkwort. Irish: *lusan baine*, the same meaning, alluding to the reputed effects of the plants on cows that feed upon it.

[1] *Fearnaich*, a distemper among cattle, caused, it is supposed, by eating a poisonous herb, for which the *sundew* is supposed to be an effectual remedy.

CARYOPHYLLACEÆ.

Saponaria officinalis—Soapwort, bruisewort. Gaelic: *gairgean-cregach.* Irish: *gairbhin creugach,* the bitter one of the rocks; *garbhion,* bitterness, and *creugach,* rocky. The whole plant is bitter, and was formerly used to cure cutaneous diseases. *Lus an siabuinn,* the soapwort. Welsh: *sebonllys,* the same meaning (*sebon,* soap, Latin *sapo*), so called probably because the bruised leaves produce lather like soap. Soap was a Celtic invention.

> "Prodest et *sapo,* Gallorum hoc inventum,
> Rutilandis capillis, ex sevo et cinere."—PLINY.
>
> Soap is good,—that invention of the Gauls,—for
> Reddening the hair, out of grease and ash.

Lychnis flos-cuculi—Ragged Robin. Gaelic: *plur na cubhaig,* the cuckoo flower; *curachd na cubhaig,* the cuckoo's hood. Irish: *caorag leana,* the swamp spark. *Lus siode,* silk-weed, from its silky petals.

L. diurna—Red campion. Gaelic: *cìrean coileach,* cockscomb; in some places *corcan coille,* red woodland flower.

L. githago—Corn-cockle. Gaelic: *brog na cubhaig,* the cuckoo's shoe. *Luibh laoibheach,—laoi,* day, and *beachd,* to observe—*i.e.,* the plant observed for a day. Irish: *cogall,*[1] from *coch* (Welsh), red; hence *cockle.* French: *coquille.* Welsh: *gith,* cockle or its seed, a corruption from *githago,* or *vice versâ.*

Spergula arvensis—Spurrey. Gaelic: *cluin lin,—cluin,* fraud, and *lin,* flax—*i.e.,* fraudulous flax. *Carran,* twisted or knotted. Scotch: *yarr.* Irish: *cabrois,—cab,* a head; *rois,* polished.

> "Gun deanntag, gun charran."—M'DONALD.
> Without nettle or spurrey.

Arenaria alsine—Sandwort. Gaelic: *flige,* perhaps from *fliche,* water, growing in watery or sandy places.

Stellaria media—Chickweed. Gaelic: *fliodh,* an excrescence (Armstrong), sometimes written *fluth.* Irish: *lia,* wetting (Gaelic: *fluich,* wet); compare also *floch,* soft (Latin: *flaccus*). Welsh: *gwlydd,* the soft or tender plant.

S. Holostea—The greater stitchwort. Gaelic: *tursach,* sad, dejected. Irish: *tursarrain,* the same meaning; and **Stellaria**

[1] Similar ideas occur in other Irish names respecting this plant: *Beachnuadh Columcille, beachnuadh beinionn, beachnuadh firionn,—beach,* to embrace; *nuadh,* new; *beinionn,* a little woman; *firionn,* a little man.

graminea, *tursarranin*, the lesser stitchwort. Welsh: *y wenn-wlydd*, the fair soft-stemmed plant, from *gwenn* and *gwlydd*, soft tender stem.

Cherleria sedoides—Mossy cyphel, found plentifully on Ben Lawers. No Gaelic name, but *seorsa còinich*, a kind of moss.

Cerastium alpinum—Mouse-ear chickweed. Gaelic: *cluas an luch*, mouse-ear.

LINACEÆ.

Linum usitatissimum—Flax. Gaelic: *lìon*, gen. singular *lìn*. Welsh: *llin*. "Greek λίνον and Latin *linum*, a thread, are derived from the Celtic."—LOUDON.

"Iarraidh i olan agus lìon."—STUART (Job).
She will desire wool and flax.

L. catharticum—Fairy flax. Gaelic: *lìon na bhean she*, fairy woman's flax; *miosach*, monthly, from a medicinal virtue it was supposed to possess; *mionach*, bowels; *lus caolach*, slender weed: compare also *caolan*, intestine (Latin: *colon*, the large intestine). Both names probably allude to its cathartic effects. Stuart, in Lightfoot's 'Flora,' gives these names in a combined form,—*an caol miosachan*, the slender monthly one. Irish: *ceolagh*.

MALVACEÆ.

Latin: *malvæ*, mallows. Gaelic: *maloimh*, from Greek μαλάχη, *malache*, soft, in allusion to the soft mucilaginous properties of the plants.

"A' gearradh sios *maloimh* laimh ris na preasaibh, agus freumhan aiteil mar bhiadh."—STUART (Job xxx. 4).

"Who cut up *mallows* by the bushes, and juniper roots for their meat."

Welsh: *meddalai*, what softens. Gaelic: *mil mheacan*, honey-plant; *gropais* or *grobais* (M'Donald) from Gothic, *grob*, English, *grub*, to dig. The roots were dug, and boiled to obtain mucilage.

Malva rotundifolia—Dwarf mallow. Gaelic and Irish: *ucas frangach*,—*ucas* from Irish *uc*, need, whence *uchd*, a breast (Greek, ὄχθη)—the mucilage being used as an emollient for breasts—and *frangach*, French—*i.e.*, the French mallow.

M. sylvestris—Common mallow. Gaelic: *ucas fheadhair*, wild mallow.

Althæa officinalis—Marsh-mallow. Gaelic and Irish: *leamhad*, perhaps from *leamhach*, insipid; *fochas*, itch, a remedy for the itch (*ochas*, itch). Welsh: *morhocys*,—*mor*, the sea, and *hocys*, phlegm-producer, it being used for various pulmonary complaints.

Tiliaceæ.

Tilia europea—Lime-tree, linden. Gaelic: *craobh theile.* Irish: *crann teile,—teile*, a corruption from *tilia.* Welsh: *pis gwydden.*

Hypericaceæ.

Hypericum perforatum — The perforated St John's wort. Gaelic and Irish: *eala bhuidhe* (sometimes written *eala bhi*), probably from *eal* (for *neul*), aspect, appearance, and *bhuidhe* or *bhi*, yellow.

> "An *eala bhuidhe* s'an noinean bàn
> S'an t'sobhrach an gleann fàs, nan luibh
> Anns am faigheadh an leighe liath
> Furtach fiach, do chreuch a's leòn."—Collath.

In the glen where the *St John's wort*, the white daisy, and the primrose grow, the grey doctor will find a valuable remedy for every disease and wound.

"The belief was common among the Caledonians that for all the diseases to which mankind is liable there grows an herb somewhere, and not far from the locality where the particular disease prevails, the proper application of which would cure it."—M'Kenzie.

> "Sobhrach a's *eala bhi* 's barra neoinean."—M'Intyre.
> Primrose, *St John's wort*, and daisies.

Allas Mhuire (*Mhuire*, the Virgin Mary; *allas*, perhaps another form of the preceding names)—Mary's image, which would agree with the word *hypericum.* According to Linnaeus it is derived from Greek ὑπέρ, *uper*, over, and εἰκών, *eikon*, an image—that is to say, the superior part of the flower represents an image.

Caod aslachan Cholum chille, from *Colum* and *cill* (church, cell), St Columba's flower, the saint of Iona, who reverenced it and carried it in his arms (*caod*,—(Irish) *caodam*, to come, and *aslachan*, arms), it being dedicated to his favourite evangelist St John.[1] "Formerly it was carried about by the people of Scotland as a charm against witchcraft and enchantment" (Don). Welsh: *y fendigaid*, the blessed plant. French: *la toute-saìne.* English: *tutsan.*

The badge of Clan M'Kinnon.

Aceraceæ.

("*Acer*, in Latin meaning sharp, from *ac*, a point, in Celtic."—Du Theis.)

[1] This plant is sometimes called *Curach na Cubhaig*, and *Cochal*—(hood or cowl). Latin: cucullus.

Acer campestris—Common maple. Gaelic and Irish: *craobh mhalip* or *malpais*; origin of name uncertain, but very likely from *mal*, a satchel or a husk, from the form of its samara. Some think the name is only a corruption of *maple*—Anglo-Saxon, *mapal*. Welsh: *masarnen*. Gothic: *masloenn* (from *mas*, fat), from its abundance of saccharine juice.

A. pseudo-platanus—Sycamore. Gaelic and Irish: *craobh sice*, a corruption from Greek *sycaminos*. The old botanists erroneously believed it to be identical with the sycamine or mulberry-fig of Palestine.

"Nam biodh agaidh creidimh, theiradh sibh ris a *chraobh shicamin* so, bi air do spionadh as do fhreumhaibh."—STUART.

If ye had faith ye might say to this *sycamore tree*, Be thou plucked up by the root.—St Luke xvii. 6.

Craobh pleantrinn, corruption of platanus or plane-tree. Irish: *crahn bàn*, white tree. *Fir chrann*, same meaning.

The badge of Clan Oliphant.

(*To be continued.*)

PRELIMINARY LIST OF THE FUNGI OF PERTHSHIRE.[1]

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

AS the first volume of the 'Flora of Perthshire' is not yet quite ready for the press, and as, consequently, a considerable time must elapse before the second volume (treating of the cryptogamic portion of the flora) can be prepared, some account of the present state of our knowledge of the fungi of this large county may prove interesting and not be altogether devoid of use to students of mycology. At the same time it must be remembered that this list is not more than what its title implies—a preliminary list. When the county has been more extensively and systematically explored, many additions may be expected to be made to the list. In fact, it is not at all improbable that twice as many species as are at present known to inhabit Perthshire may yet be detected in the county.

The sources of information whence this list has been compiled and the districts examined are the following: The district round Perth partially examined by some of the cryptogamic botanists

[1] Communicated to the Cryptogamic Society of Scotland, at the Forres Conference, September 1879.

who attended the Perth Conference (1875) of the Cryptogamic Society of Scotland; and by Mr Stevenson and myself at other times, the localities being more especially Moncreiffe and Kinnoull Hills, Scone and Dupplin; the district round Dunkeld during the time of the conference of 1877; that round Killin at the conference of 1876; the neighbourhood of Balinluig, Killiecrankie, Aberfeldy, and Kenmore, by Mr Stevenson, during a residence of a few weeks in 1877; Blair Athole and Glen Tilt by Mr Stevenson (one day) and myself; and the country round Loch Rannoch by myself in 1875. A few other places have been still more slightly explored; and some additions to the list have also been made from the collections sent from other Perthshire localities to the Perth and Dunkeld shows.

I have thought it unnecessary to mention many localities in this list. When a species is said to be "common," it has been seen in most of the localities explored, and is probably distributed in suitable places throughout the county; "frequent" and "not uncommon" signify nearly as wide a distribution; but when a species seems to be really rare, or has been recorded from very few localities, these are mentioned, though in the latter case it is quite probable that more extensive exploration will show that the species is not uncommon.

HYMENOMYCETES.

AGARICINI.

I. AGARICUS L.

i. *Amanita.*

1. Phalloides, Fr. Killin.
2. Vernus, Bull. Killin.
3. Muscarius, L. Common.
4. Pantherinus, Fr. Moncreiffe.
5. Rubescens, Fr. Common.
6. Asper, Fr. Balinluig.
7. Vaginatus, Fr. Common. Var. *nivalis*, Grev. Ben Bhrackie.
8. Strangulatus, Fr. (= *Cecilia*, B. and Br.) Moncreiffe.

ii. *Lepiota.*

9. Procerus, Sc. Seggieden, Dunkeld, Balinluig.
10. Rhacodes, Vitt. Frequent.
11. Acutesquamosus, Weinm. Scone.
12. Cristatus, A. and S. Dupplin, Scone, Kenmore, Killin.
13. Carcharias, P. Moncreiffe.
14. Cinnabarinus, A. and S. Scone.
15. Granulosus, Batsch. Common.
16. Amianthinus, Sc. Kinnoull, Rannoch.

iii. *Armillaria.*

17. Robustus, A. and S. Blackwood of Rannoch.
18. Gliodermus, Fr. Aberfeldy, Balinluig.
19. Melleus, Vahl. Common.
20. Mucidus, Schr. Dupplin.

iv. *Tricholoma.*

21. Equestris, L. Not uncommon.
22. Portentosus, Fr. Kinnoull, Rannoch.
23. Flavobrunneus, Fr. Kenmore.
24. Albobrunneus, P. Rannoch.
25. Ustalis, Fr. Killin.
26. Rutilans, Schæff. Frequent.
27. Columbetta, Fr. Scone, Killin, Rannoch.
28. Imbricatus, Fr. Moncreiffe, Balinluig, Killiecrankie, Rannoch.
29. Vaccinus, P. Not uncommon.
30. Murinaceus, Bull. Balinluig, Killiecrankie.
31. Terreus, Schæff. Frequent. Var. *argyraceus*, B. Kinnoull.
32. Saponaceus, Fr. Moncreiffe, Killin.
33. Cartilagineus, Bull. Killiecrankie.
34. Cuneifolius, Fr. Killin.
35. Virgatus, Fr. Kinnoull.
36. Sulphureus, Bull. Scone.
37. Lascivus, Fr. Kinnoull, Rannoch.
38. Carneus, Bull. Moncreiffe.
39. Albus, Schæff. Scone, Birnam.
40. Grammopodius, Bull. Killiecrankie.
41. Nudus, Bull. (=*Lepista nuda.*) Rannoch.

v. *Clitocybe.*

42. Nebularis, Fr. Common.
43. Clavipes, P. Not uncommon.
44. Odorus, Bull. Moncreiffe, Dupplin, Killiecrankie, Glencarse.
45. Candicans, P. Aberfeldy, Killiecrankie, Killin.
46. Gallinaceus, Scop. Moncreiffe.
47. Fumosus, P. Scone.
48. Maximus, Fr. Not uncommon.
49. Infundibuliformis, Schæff. Common.
50. Geotropus, Bull. Rannoch.
51. Inversus, Scop. Aberfeldy, Killin, Rannoch, Blair Castle.
52. Flaccidus, Sow. Scone, Glencarse.
53. Brumalis, Fr. Kinnoull, Birnam, Dunkeld.
54. Fragrans, Sow. Not uncommon.
55. Laccatus, Scop. Common.

vi. *Collybia.*

56. Radicatus, Rehl. Common.
57. Maculatus, A. and S. Not uncommon.
58. Butyraceus, Bull. Frequent.
59. Velutipes, Curt. Frequent.
60. Confluens, P. Not uncommon.

61. Conigenus, P. Moncreiffe, Killin.
62. Tuberosus, Bull. Frequent.
63. Tenacellus, P. Frequent.
64. Dryophilus, Bull. Not uncommon.

vii. *Mycena.*

65. Aurantiomarginatus, Fr. Kinnoull, Nov. 1875.
66. Rubromarginatus, Fr. Killin, Balinluig.
67. Purus, P. Common.
68. Rugosus, Fr. Kinnoull, Birnam, Balinluig.
69. Galericulatus, Sc. Kinnoull, Dupplin, Killin, Rannoch.
70. Polygrammus, Bull. Moncreiffe, Killin, Rannoch.
71. Parabolicus, Fr. Rannoch.
72. Atroalbus, Bolt. Not uncommon.
73. Dissiliens, Fr. Kinnoull, Scone, Rannoch.
74. Alcalinus, Fr. Not uncommon.
75. Ammoniacus, Fr. Near Perth.
76. Plicosus, Fr. Balcraig, near Perth, Nov. 1875 ; Killin.
77. Metatus, Fr. Rannoch.
78. Ætites, Fr. Rannoch, Kinnoull.
79. Vitreus, Fr. Birnam.
80. Filopes, Bull. Birnam, Balinluig, Killin.
81. Mirabilis, C. and Q. (=*marginellus* Fr. non P.) Balinluig.
82. Speireus, Fr. Rannoch.
83. Hæmatopus, P. Moncreiffe.
84. Sanguinolentus, A. and S. Balinluig.
85. Galopus, P. Balinluig.
86. Epipterygius, Sc. Common.
87. Vulgaris, P. Birnam, Balinluig.
88. Roridus, Fr. Balinluig.
89. Stylobates, P. Scone, Birnam.
90. Tenerrimus, B. On old wine corks in a cellar at Annat Lodge.
91. Pterigenus, Fr. Rannoch, Killin.
92. Corticola, Schum. Killin, Rannoch.

viii. *Omphalia.*

93. Umbilicatus, Schæff. Moncreiffe.
94. Pyxidatus, Bull. Parkfield, Rannoch.
95. Muralis, Sow. Balinluig.
96. Umbelliferus, L. Common.
97. Stellatus, Fr. Rannoch.
98. Campanella, Batsch. Rannoch.
99. Pictus, Fr. Killin.
100. Fibula, Bull. Balinluig, Aberfeldy, Killin.
101. Gracillimus, Weinm. Glen Tilt.

ix. *Pleurotus.*

102. Mutilus, Fr. Glen Tilt.
103. Ostreatus, Jacq. Blair Athole (Rev. J. Keith).
104. Serotinus, Schrad. Rannoch.
105. Mitis, P. Rannoch, Killin.

106. Applicatus, Batsch. Kinnoull (on dead Spruce).
107. Unguicularis, Fr. Kinnoull (on dead Mountain Ash); probably this species.
108. Reniformis, Fr. Moncreiffe (on dead Silver Fir), Nov. 1876.
109. Porrigens, P. Rannoch.
110. Septicus, Fr. Killin, Rannoch.

x. *Pluteus.*

111. Cervinus, Schæff. Moncreiffe, Dupplin, Balinluig, Killin.

xi. *Entoloma.*

112. Sinuatus, Fr. Moncreiffe, Scone.
113. Bloxami, B. Rannoch.
114. Jubatus, Fr. Killiecrankie, Killin, Glen Tilt.
115. Sericellus, Fr. Killin, Moncreiffe.
116. Sericeus, Bull. Killiecrankie.

xii. *Clitopilus.*

117. Prunulus, Scop. Methven, Scone, Moncreiffe, Killin.

xiii. *Septonia.*

118. Lampropus, Fr. Not uncommon.
119. Æthiops, Fr. Killin, Glen Tilt.
120. Solstitialis, Fr. Glen Tilt.
121. Serrulatus, P. Balinluig, Killiecrankie.
122. Euchrous, P. Killin.
123. Chalybeus, P. Balinluig, Killiecrankie, Glen Tilt.

xiv. *Eccilia.*

124. Nigrella, P. Glen Tilt.

xv. *Nolanea.*

125. Pascuus, P. Frequent.

xvi. *Claudopus.*

126. Variabilis, P. Rannoch.

xvii. *Pholiota.*

127. Aureus, Matt. Var. *Vahlii*, Fr. Moncreiffe, Inver, Dunkeld.
128. Terrigenus, Fr. Kenmore.
129. Erebius, Fr. (= *Leveillianus*, D. and M.) Moncreiffe, Nov. 1876.
130. Radicosus, Bull. Rannoch.
131. Squarrosus, Müll. Common.
132. Flammans, Fr. Moncreiffe, Scone, Inver.
133. Mutabilis, Schæff. Moncreiffe, Inver.

xviii. *Inocybe.*

134. Dulcamarus, A. and S. Rannoch (*uniformis*, P.), Killiecrankie.
135. Scaber, Müll. Scone, Killiecrankie, Glen Tilt.
136. Maritimus, Fr. Rannoch.
137. Lacerus, Fr. Killin, Perth.
138. Deglubens, Fr. Not uncommon.
139. Fastigiatus, Schæff. Balinluig.
140. Hiulcus, Fr. Glen Tilt.
141. Rimosus, Bull. Not uncommon.

142. Auricomus, Batsch. (=*descissus*, Fr. var.) Kinnoull.
143. Trinii, Weinm. Balinluig.
144. Sambucinus, Fr. Kinnoull, Nov. 1875.
145. Geophyllus, Sow. Frequent.
146. Whitei, B. and Br. Rannoch, 1875.

xix. *Hebeloma.*

147. Fastibilis, Fr. Moncreiffe, Kinnoull.
148. Testaceus, Batsch. Scone.
149. Claviceps, Fr. Killin.
150. Crustuliniformis, Bull. Moncreiffe, Killin, Rannoch.
151. Elatus, Batsch. Kinnoull, Scone Den.

xx. *Flammula.*

152. Conissans, Fr. Moncreiffe, Killiecrankie.
153. Inopus, Fr. Balinluig.
154. Sapineus, Fr. Inver.

xxi. *Naucoria.*

155. Cucumis, P. Moncreiffe, Dunkeld.
156. Rimulincola, Rab. Rannoch, Oct. 1875.
157. Melinoides, Fr. Kinnoull.
158. Semiorbicularis, Bull. Balinluig, Killin.
159. Erinaceus, Fr. Moncreiffe.

xxii. *Galera.*

160. Tener, Schæff. Common.
161. Ovalis, Fr. Balinluig, Killin.
162. Vittæformis, Fr. Balcraig near Perth, Nov. 1875.
163. Hypnorum, Batsch. Killiecrankie, Killin.
164. Muiophilus, Lasch. Rannoch.

xxiii. *Tubaria.*

165. Cupularis, Bull. Balinluig.
166. Furfuraceus, P. Frequent.
167. Paludosus, Fr. Rannoch.

xxiv. *Crepidotus.*

168. Mollis, Schæff. Not uncommon.

xxv. *Psalliota.*

169. Arvensis, Schæff. Moncreiffe, Seggieden, Dupplin.
170. Campestris, L. Common.
171. Silvaticus, Schæff. Kinnoull.

xxvi. *Stropharia.*

172. Æruginosus, Curt. Common.
173. Thraustus, Kalck. Rannoch.
174. Stercorarius, Fr. Killin.
175. Semiglobatus, Batsch. Common.

xxvii. *Hypholoma.*

176. Sublateritius, Schæff. Frequent.
177. Capnoides, Fr. Rannoch.
178. Epixanthus, Fr. Pitroddie, Kinnoull, Rannoch.

179. Fascicularis, Huds. Common.
180. Dispersus, Fr. Rannoch.
181. Storea, Fr. Glencarse.
182. Lacrymabundus, Fr. Moncreiffe.
183. Velutinus, P. Dupplin.
184. Cascus, Fr. Rannoch.
185. Appendiculatus, Bull. Kenmore.

xxviii. *Psilocybe.*

186. Ericæus, P. Rannoch.
187. Agrarius, Fr. Kinnoull.
188. Physaloides, Bull. Balinluig.
189. Semilanceatus, Fr. Frequent.
190. Spadiceus, Fr. Moncreiffe, Dupplin, Balinluig.
191. Fœnisecii, P. Balinluig.

xxix. *Panæolus.*

192. Separatus, L. Balinluig, Killiecrankie, Killin.
193. Fimiputris, Bull. Killin, Glen Tilt.
194. Campanulatus, L. Dunkeld, Balinluig, Glen Tilt.
195. Papilionaceus, Fr. Dunkeld, Kenmore, Killin.

xxx. *Psathyrella.*

196. Gracilis, Fr. Killiecrankie.

II. COPRINUS, P.

197. Comatus, Fr. Frequent in the Lowland districts.
198. Atramentarius, Fr. Killin.
199. Niveus, Fr. Killin.
200. Micaceus, Fr. Not uncommon.
201. Deliquescens, Fr. Balinluig.
202. Radiatus, Fr. Glen Tilt.
203. Ephemerus, Fr. Killin.
204. Plicatilis, Fr. Not uncommon.

III. BOLBITIUS, Fr.

205. Fragilis, Fr. Balinluig.
206. Titubans, Fr. Glen Tilt.

IV. CORTINARIUS, Fr.

i. *Phlegmacium.*

207. Claricolor, Fr. Killin, Moncreiffe, Kippendavie.
208. Cyanopus, Fr. Kinnoull, Dunkeld, Moncreiffe, Killin.
209. Glaucopus, Fr. Seggieden, Rossie Priory.
210. Purpurascens, Fr. Birnam.

ii. *Myxacium.*

211. Collinitus, Fr. Not uncommon.
212. Elatior, Fr. Kinnoull, Killin.
213. Arenatus, P. Scone.
214. Livido-ochraceus, B. Moncreiffe.

iii. *Inoloma.*

215. Violaceus, Fr. Not uncommon.
216. Pholideus, Fr. Moncreiffe, Scone.

iv. *Dermocybe.*

217. Diabolicus, Fr. Moncreiffe, Killin.
218. Caninus, Fr. Moncreiffe, Dunkeld, Birnam.
219. Anomalus, Fr. Rannoch.
220. Sanguineus, Fr. Scone, Dunkeld, Inver.
221. Cinnamomeus, Fr. Frequent.
222. Orellanus, Fr. Scone, Kinnoull.
223. Venetus, Fr. Rannoch.

v. *Telamoma.*

224. Torvus, Fr. Not uncommon.
225. Evernius, Fr. Kinnoull.
226. Armillatus, Fr. Dupplin.
227. Limonius, Fr. Scone.
228. Helvolus, Fr. Kinnoull.
229. Hinnuleus, Fr. Not uncommon.
230. Gentilis, Fr. Kinnoull.
231. Iliopodius, Fr. Scone.
232. Hemitrichus, Fr. Inver, Killin.

vi. *Hydrocybe.*

233. Duracinus, Fr. Kinnoull.
234. Leucopus, Fr. Moncreiffe, Nov. 1876.
235. Obtusus, Fr. Killin.
236. Acutus, Fr. Kinnoull, Scone, Balinluig.

V. GOMPHIDIUS, Fr.

237. Glutinosus, Fr. Not uncommon.
238. Viscidus, Fr. Balinluig.
239. Maculatus, Fr. Var. *gracilis*, B. Scone.

VI. PAXILLUS, Fr.

240. Involutus, Fr. Frequent. Var. *leptopus*, Fr. Glen Tilt, Kenmore.
241. Panuoides, Fr. Seggieden, Killiecrankie.

VII. HYGROPHORUS, Fr.

242. Cossus, Fr. Kenmore.
243. Hypothejus, Fr. Frequent.
244. Pratensis, Fr. Frequent.
245. Cinereus, Fr. Killin, Rannoch.
246. Virgineus, Fr. Frequent.
247. Niveus, Fr. Dupplin, Rannoch.
248. Ovinus, Fr. Kinnoull, Killiecrankie, Rannoch.
249. Sciophanus, Fr. Balcraig near Perth.

250. Lætus, Fr. Arnbathie, Moncreiffe.
251. Ceraceus, Fr. Moncreiffe, Rannoch.
252. Coccineus, Fr. Not uncommon.
253. Miniatus, Fr. Dupplin, Balinluig, Killiecrankie.
254. Turundus, Fr. Scone, Aberfeldy.
255. Puniceus Fr. Frequent.
256. Conicus, Fr. Frequent.
257. Calyptræformis, B. Methven, Moncreiffe.
258. Chlorophanus, Fr. Frequent.
259. Psittacinus, Fr. Frequent.
260. Unguinosus, Fr. Balinluig, Aberfeldy.
261. Nitratus, P. Not uncommon.
262. Glauconitens, Fr. Killiecrankie.

VIII. LACTARIUS, Fr.

263. Torminosus, Fr. Frequent.
264. Cilicioides, Fr. Killin, Rannoch.
265. Turpis, Fr. Frequent.
266. Blennius, Fr. Common.
267. Uvidus, Fr. Moncreiffe.
268. Pyrogalus, Fr. Not uncommon.
269. Vellereus, Fr. Not uncommon.
270. Deliciosus, Fr. Frequent.
271. Pallidus, Fr. Moncreiffe.
272. Quietus, Fr. Killin, Rannoch, Moncreiffe.
273. Cyathula, Fr. Moncreiffe.
274. Rufus, Fr. Not uncommon.
275. Glyciosmus, Fr. Frequent.
276. Fuliginosus, Fr. Rannoch.
277. Volemum, Fr. Not uncommon.
278. Theiogalus, Fr. Killin.
279. Serifluus, Fr. Not uncommon.
280. Mitissimus, Fr. Frequent.
281. Subdulcis, Fr. Common.

IX. RUSSULA, Fr.

282. Nigricans, Fr. Common.
283. Adusta, Fr. Dupplin, Scone.
284. Rosacea, Fr. Kinnoull, Seggieden.
285. Sardonia, Fr. Kinnoull, Rannoch.
286. Virescens, Fr. Balinluig, Aberfeldy, Killin.
287. Rubra, Fr. Common.
288. Vesca, Fr. Scone.
289. Cyanoxantha, Fr. Frequent.
290. Heterophylla, Fr. Aberfeldy.
291. Fætens, Fr. Common.
292. Emetica, Fr. Common.
293. Pectinata, Fr. Killiecrankie.

294. Ochroleuca, Fr. Kinnoull, Scone, Killin.
295. Fragilis, Fr. Dupplin, Moncreiffe, Rannoch.
296. Integra, Fr. Common.
297. Alutacea, Fr. Kinnoull, Scone, Rannoch.
298. Vitellina, Fr. Killiecrankie.

X. CANTHARELLUS, Fr.

299. Cibarius, Fr. Common.
300. Aurantiacus, Fr. Common.
301. Tubæformis, Fr. Kinnoull. Var. *lutescens*, Bull., Rannoch.
302. Lobatus, Fr. Rannoch (at about 2000 feet.)

XI. NYCTALIS, Fr.

303. Asterophora, Fr. Dupplin, Methven, Lynedoch.
304. Parasitica, Fr. Dupplin, Scone.

XII. MARASMIUS, Fr.

305. Urens, Fr. Kinnoull.
306. Peronatus, Fr. Frequent.
307. Porreus, Fr. Kinnoull, Scone, Rannoch.
308. Oreades, Fr. Not uncommon.
309. Scorteus, Fr. Moncreiffe.
310. Amadelphus, Fr. Killin.
311. Ramealis, Fr. Killin.
312. Rotula, Fr. Killiecrankie, Kenmore, Killin.
313. Androsaceus, Fr. Frequent.
314. Saccharinus, Fr. Killin.
315. Epiphyllus, Fr. Killin, Rannoch.

XIII. LENTINUS, Fr.

316. Cochleatus, Fr. Murthly, Inver.

XIV. PANUS, Fr.

317. Stipticus, Fr. Rannoch.

XV. TROGIA, Fr.

318. Crispa, Fr. Moncreiffe, Inver, Dunkeld.

(*To be continued.*)

GEOLOGY.

THE AURIFEROUS QUARTZ OF WANLOCKHEAD.[1]

By W. LAUDER LINDSAY, M.D., F.L.S.

IN March 1877 Mr Dudgeon of Cargen exhibited to this Society a specimen of auriferous quartz found at Wanlockhead in 1872, of which specimen a short descriptive note is given in the Society's published Proceedings (vol. ix. p. 338). The specimen in question has since been placed in the Museum of Science and Art, and it had previously been figured in a beautiful coloured lithograph that forms the frontispiece of a 4to pamphlet printed for private circulation by Mr Dudgeon in 1875.[2]

Not till July 1877 had I an opportunity of inspecting the said specimen, or of collecting evidence regarding the circumstances under which it was found. But the result of the examination and inquiries then made convinces me that what I have already spoken of elsewhere—and will now for the sake of brevity and convenience speak of—as the "Gemmell Quartzite"[3]—is much more probably *Australian* than Scotch, albeit it was found, as alleged, at Wanlockhead.

The object of the present short paper is simply to call attention to this opinion as to its *foreign* origin, and to the kind of evidence on which the opinion is founded; though I submit that it is rather for those who contend for the *Scottish* nativity of the specimen to prove *their* case.

I may, however, first remind the Society, that so long ago as February 1863—at a conversazione of the Society—I made an exhibit of the gold and gold-rocks of New Zealand, especially of those of the province of Otago; while, in a special descriptive prospectus of the said exhibits, I endeavoured to direct attention to the probable auriferous riches of Scotland—basing my

[1] A Paper read before the Royal Society of Edinburgh on March 4, 1878.

[2] 'Historical Notes on the occurrence of Gold in the South of Scotland.'

[3] "The Auriferous Quartzites of Scotland," 'Scottish Naturalist,' vol. iii. p. 54.

conclusions on a comparison between the gold-rocks of Otago and the Lower Silurians of Scotland. Since that date I have published twenty papers[1] on various subjects connected with actual or possible gold-fields, gold-finds, or gold-diggings in Scotland;[2] all having it in view to stimulate to some sort of systematic testing of the auriferous wealth of our Silurians and their *débris*. No public interest, however, was taken in the matter till the discovery by Robert Nelson Gilchrist in Sutherlandshire, and the effects of his discovery, demonstrated unmistakably the auriferous riches of that part of Scotland.[3] Since the date of the Sutherland gold-diggings (1869), much public interest has been manifested in all alleged finds of gold in different parts of Scotland; an interest culminating now and then in newspaper discussions—sometimes in one part of Scotland, sometimes in another. But since at Kildonan what has been variously stated at £12,000 to £15,000 worth of gold was turned out by the rough operations of a few returned Australian diggers, there has been a tendency to too great credulity as to the nativity of gold-finds in Scotland,—the wish being naturally father to the thought that occurring in Scotland they must be of Scotch material—the genuine produce of our own rocks. If I have not myself been regarded by certain geologists and mineralogists as over-credulous regarding the gold products of Scotland, and especially its gold-quartz, I have been considered at least peculiarly sanguine. I mention all this to show that, had I any bias at all in the matter, it would be to make out the Gemmell Quartzite, if possible, Scotch or native. And, in point of fact, when in 1874 and 1875 I assisted in giving publicity to the discovery of the Gemmell Quartzite, which was first made known by Dr Grierson of Thornhill, Dumfriesshire, in 'Nature,' in 1873, I was under the impression that its Scottish nativity would be proven, though I distinctly pointed to "a flaw in the evidence as to the said quartzite belonging to the rocks of Wanlockhead."

My suspicions regarding the real nativity of the Gemmell Quartzite were aroused by a visit I had in 1875 from the Rev. Dr Moir Porteous of Wanlockhead, who has been ten or twelve

[1] Some of the principal are specified in the 'Scottish Naturalist,' vol. iv. p. 268.

[2] The latest series—on "The Gold-Field and Gold-Diggings of Crawford-Lindsay"—is to be found in the 'Scottish Naturalist,' vol. iv. (1878).

[3] The latest reference I have seen to these Sutherland Diggings was contained in a leader in the 'Northern Ensign' of April 25, 1878, on "Australian Gold-quartz in Scotland."

years resident there, and whose manse looks down upon the spot where that gold-quartz specimen was found. These suspicions were confirmed by the statements contained in a topographical account of the district, published by Dr Porteous in the following year[1] (1876); and these doubts of mine were of such a character that I determined on visiting the district, collecting evidence, and personally examining the specimen. This I could not do till after it had been consigned to the Museum of Science and Art. But with all the evidence *now* before me I find it impossible to regard the Gemmell Quartzite as Scotch, until at least some more satisfactory proof than at present can be adduced is brought forward as to its connection with the auriferous quartzites of Wanlockhead. I doubt very much whether any such proof will ever be forthcoming, unless it can be shown by chemists and mineralogists that there is some peculiarity in the said quartzites whereby they may be distinguished from those that are *Australian*, and that the Gemmell Quartzite possesses the peculiarity in question.

On the other hand, it cannot be *proved* that the specimen is Australian—perhaps never will be proved that it is so. But the *presumptive evidence* that it is so is the following—and I ask the attention of the Society to the nature of that evidence—which is rather of an ordinary or circumstantial, than of a scientific, kind; and hence a general verdict may be given by those accustomed to the weighing of evidence, who make no pretensions nevertheless to specific chemical or mineralogical knowledge.

1. No such specimen of gold-quartz was ever before found in Scotland: or at least there is no *authentic* record of any such find.[2]

2. No such gold-quartz *in situ* has yet been found in Scotland: or at least there is no authentic record of any such discovery.

3. Within a stone's-throw of the place where the Gemmell Quartzite was found, one of the lead-miners of Wanlockhead has, or had in his house, a large collection of *Australian* gold-quartz specimens.

4. On a certain day in 1872 a "flitting" took place from another house in the village to this one—the said gold-specimens being conveyed between the two houses in an open *hand-barrow*, as so much road-metal might have been.

5. On the day following this flitting, the Gemmell Quartzite

[1] 'God's Treasure-House in Scotland: a History of the Times, Mines, and Lands, in the Southern Highlands.'

[2] *Vide* Dr Porteous's 'Treasure-House,' p. 55.

was found on the road by which the said gold-specimens had been trundled up a hill.

6. Though found in 1872, the discovery of this unique specimen—and which the finder and his friends must have known was unique—was not made public till August 1873.

7. The impression of the possessor of the Australian gold-specimens and of his friends—so far as I understood their own oral statements to myself in July 1877—was, and probably is still, that the Gemmell Quartzite was simply one of the Laidlaw Collection of Australian gold-quartzes, which had been lost (from the hand-barrow) in the process of flitting.

8. This also is the impression, I believe, of Dr Porteous,[1] who has had occasion, in lecturing on "Gold-finding in the Lowthers," to use some of these Australian gold-specimens in illustration, and who has recently compared with them the Gemmell Quartzite as now exhibited in the Museum of Science and Art, Edinburgh.

9. And the same gentleman, writing in the 'Scotsman' in January 1878, assures us that it is the "prevailing opinion" of the miners and other residents of the Wanlockhead district that the Gemmell Quartzite is of *foreign*—not of native—origin.

I have purposely omitted from the foregoing statement all detail—all quotations or references of an illustrative or corroborative kind. But these can readily be supplied should the Society consider the matter of sufficient interest to justify a future and more detailed paper or report.

The object of the foregoing paper was to give rise to a discussion of the subject to which it refers on the part of the *legal*, as well as of the scientific, Fellows of the Royal Society of Edinburgh, believing, as I do, that the question is one very much of common-sense evidence. Discussion duly occurred, as reported in the Edinburgh newspapers of March 5, 1878. But it was confined to scientific men, or to those who considered themselves qualified to decide such a matter off-hand, and on the most slender, and, I may add, sometimes absurd, grounds. The result of the discussion was disappointing, in so far as no new facts were elicited, and no new arguments of any weight brought forward. The character of the discussion may be sufficiently illustrated by the observations of Mr Maconochie Welwood of Meadowbank. According to one account, he "said it was now fifty years since

[1] *Vide* Dr Porteous's 'Treasure-House,' p. 55.

he went to Wanlockhead and saw a specimen of gold, and that was long before the Australian gold-fields were heard of. Even a relative of his had a bracelet made of gold found on the Leadhills. *Therefore* Dr Lauder Lindsay's views were preposterous (Laughter)."[1] Another account states that Mr Welwood "remarked that it was perfectly preposterous that there should be any question as to gold being found at Leadhills. (A laugh.)"[2] Considering all that I have published on the subject of gold at Leadhills and Wanlockhead since 1863, it was not, perhaps, inappropriate that the grave Fellows of the Royal Society of Edinburgh should have indulged themselves in "A laugh" at the beautiful irrelevancy of Mr Welwood's criticism.[3]

I have only to add that I paid another visit to the Wanlockhead district in August 1878; that I have since that date received several letters from residents in the district on the subject of its gold-yields; that I find those who first adopted the view that the Gemmell Quartzite is of *foreign* origin, continue to hold that opinion;[4] and that I have myself been confirmed in that opinion by all the later evidence that has been presented to me. That evidence includes, *inter alia*, the story of a bit of gold-quartz found near Wanlockhead, but which has been acknowledged to be *Australian;* and of another piece which I saw and examined, regarding whose appearance at Leadhills no intelligible account could be given. In all probability it too is Australian. And I have elsewhere shown[5] that a specimen of supposed Leadhills gold-quartz in the British Museum is regarded by the authorities that preside over the mineralogical department of the said museum also as Australian.

[1] 'Daily Review,' March 5, 1878.

[2] 'Scotsman" of same date.

[3] The other critics were Professors Geikie and Archer, with Mr Dudgeon. Their strictures have already been sufficiently answered in the 'Scottish Naturalist,' vol. iv. (1878), p. 356.

[4] Thus "a native" of the district, writing in the 'North British Daily Mail' of May 16, 1878, says,—"No other rational conclusion can be drawn than that it had been dropped from some hampers of gold-quartz specimens that were carried only a few hours previous to the find along the road on which it was found."

[5] In the 'Scottish Naturalist,' vol. iv. p. 358. "Australian Gold-quartz in Scotland" was also the subject of a paper read before the Geological Society of Glasgow on March 8 and 22, 1878, an abstract of which will appear in the Society's published Transactions for 1878. The consequent discussion was reported in the 'North British Daily Mail' of March 23, 1878.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

(*Continued from p.* 144.)

EDITED BY D. SHARP, M.B.

SALICINUS Gyll. Common in Dumfriesshire.
DISTRIBUTION—EAST. ♀ ♀ o o o o o o
WEST. Solway ♀ o o o

MAJALIS Payk. Rare. On sallows.
DISTRIBUTION—EAST. ♀ o o o o o o o
WEST. Solway o o o o

AGNATHUS Boh. Local.
DISTRIBUTION—EAST. ♀ o o o o o o o
WEST. Solway o o o o

PECTORALIS Panz. Local.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ Moray o o o
WEST. Solway Clyde o o o

TORTRIX L. On aspens and Lombardy poplars.
DISTRIBUTION—EAST. ♀ Forth ♀ Dee Moray o o o
WEST. Solway ♀ o o o

MECINUS Th.

PYRASTER Hbst. Common.
DISTRIBUTION—EAST. Tweed Forth Tay ♀ ♀ o o o
WEST. Solway ♀ o o o

HYDRONOMUS Th.

ALISMATIS Marsh. On Alisma plantago. Local.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway Clyde o o o

BAGOUS Th.

LUTULENTUS Gyll.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o
"Near Edinburgh. Rev. W. Little." Murray's Cat.

TANYSPHYRUS Th.

LEMNÆ Fab.
DISTRIBUTION—EAST. ꝏ Forth o o o o o o
WEST. ꝏ o o o o

I believe I found this species at Duddingstone Loch, but I do not know what has become of the specimens.

ANOPLUS Th.

PLANTARIS Nætz. Common on birch.
DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray o o o
WEST. Solway Clyde o o o

ROBORIS Suff. Very rare. On oak.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

BRACHONYX Th.

INDIGENA Hbst. Rare. On young Scots fir.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

BALANINUS Th.

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

BRASSICÆ Fab.
DISTRIBUTION—EAST. Tweed Forth Tay o o o o o
WEST. Solway Clyde o o o

ANTHONOMUS Th.

ULMI De G. Rare.
DISTRIBUTION—EAST. ꝏ Forth ꝏ ꝏ Moray o o o
WEST. Solway ꝏ o o o

PEDICULARIUS L. Common on hawthorn.
DISTRIBUTION—EAST. ꝏ ꝏ ꝏ ꝏ ꝏ o o o
WEST. Solway ꝏ o o o

CONSPERSUS Desb. Rare. On mountain-ash.
DISTRIBUTION—EAST. ♀ o o o o o o o
WEST. Solway o o o o

VARIANS Payk. Local. On Scots fir.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

RUBI Hbst. Common.
DISTRIBUTION—EAST. Tweed Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o
A. comari Crotch is a sub-species occurring in marshy places.

ORCHESTES Th.

QUERCUS L. Common.
DISTRIBUTION—EAST. Tweed Forth ♀ ♀ Moray o o o
WEST. Solway ♀ o o o

SCUTELLARIS Fab. Very rare.
DISTRIBUTION—EAST. o o o Dee o o o o
WEST. Solway o o o o

FERRUGINEUS Marsh. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o o
WEST. o o o o o
"Dalmeny Park. Mr R. N. Greville." Murray Cat.

ILICIS Fab. Rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. Solway o o o o

FAGI L. Common on beech.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

RUSCI Hbst. Scarce.
DISTRIBUTION—EAST. Tweed o o o Moray o o o
WEST. Solway o o o o

AVELLANÆ Don. Rare.
DISTRIBUTION—EAST. ♀ o o o o o o o
WEST. Solway o o o o

DECORATUS Germ. Very rare. On sallow.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

STIGMA Germ. Scarce.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway Clyde o o o

SALICETI Fab. Local. On sallows.
DISTRIBUTION—EAST. Tweed ♀ ♀ Dee ♀ o o o
WEST. Solway ♀ o o o

SALICIS L. Common.
DISTRIBUTION—EAST. Tweed Forth ♀ Dee ♀ o o
WEST. Solway o o o o

RAMPHUS Th.

FLAVICORNIS Clair. Local.
DISTRIBUTION—EAST. Tweed Forth o o Moray o o o
WEST. Solway ♀ o o o

ELLESCHUS Th.

BIPUNCTATUS L. On sallows. Local.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway o o o o

TYCHIUS Th.

VENUSTUS Fab. Very local.
DISTRIBUTION—EAST. o o o Dee Moray o o o
WEST. o o o o o

PICIROSTRIS Fab. Scarce.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ Moray o o o
WEST. Solway ♀ o o o

CIONUS Th.

SCROPHULARIÆ L. Common on Scrophularia nodosa.
DISTRIBUTION—EAST. ♀ Forth Tay ♀ ♀ o o o
WEST. Solway ♀ o o o

VERBASCI Fab. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o
"Dollar. Mr J. T. Syme." Murray Cat.

BLATTARIÆ Fab. Scarce.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. ♀ o o o o

PULCHELLUS Hbst. Rare.
DISTRIBUTION—EAST. ♀ o o o o o o
WEST. Solway o o o o

NANOPHYES Th.

LYTHRI Fab. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. o Clyde o o o
"Argyllshire. Rev. Geo. Little." Murray Cat.

GYMNETRON Th.

PASCUORUM Gyll. Very rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

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

VILLOSULUS Gyll. Very rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

LABILIS Hbst. Scarce.
DISTRIBUTION—EAST. Tweed Forth ♀ o o o o o
WEST. Solway Clyde o o o

ROSTELLUM Hbst. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o
"Near Edinburgh. Dr Lowe." Murray Cat.

LINARIÆ Panz. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o
"Dalmeny Park. Dr Greville." Murray Cat. Perhaps, however, this should have been referred to the following species.

CAMPANULÆ L. Rare.
DISTRIBUTION—EAST. o o o Dee o o o o
WEST. o o o o o

(*To be continued.*)

GEOLOGY.

CHANGES OF CLIMATE IN POST-GLACIAL TIMES.

By JAMES GEIKIE, LL.D., F.R.S.

ALTHOUGH much has been written about the character of our climate in post-glacial times, yet the subject is far from being exhausted. No little complication has arisen from the fact that many deposits which have been described as post-glacial, really appertain to the preceding glacial period, and are to be classed as of inter-glacial age. Such, for example, are the palæolithic and ossiferous accumulations in many English caves, as also those ancient "river-drifts" of southern England and the Continent which have yielded similar remains. In the present paper, I define as *post-glacial* only those deposits which can be proved to have been laid down at a period subsequent to the disappearance of the last great ice-sheet of northern and north-western Europe.

In common with other geologists, I have maintained that we have no evidence in these deposits for any great oscillations of climate—no mutations at all comparable in magnitude to those which took place during the preceding glacial or pleistocene period. My belief has been, that with minor fluctuations, such as might be caused by changes in the distribution of land and sea, the climate of our islands has passed gradually from an arctic to a temperate condition, and is now milder than it has ever been since the close of glacial times. I have come to think, however, that this is too broad a statement, and now incline to the opinion that the climate of the post-glacial period, although most probably never so warm as that of the last inter-glacial epoch, was yet for some time marked by a more genial temperature than we now enjoy, and that this milder epoch was followed by what appears to have been a relapse to colder conditions than the present.

One of the most notable of our post-glacial accumulations is the old "forest bed" which occurs at many different points along our coasts, and is nowhere better developed than in the lower reaches of the Tay and the Earn. It is now generally acknowledged that the submerged peat and "submarine forests" of the maritime regions of Scotland belong approximately to the same period as the similar vegetable accumulations which occur under like conditions along the shores of Ireland and England, and the opposite coasts of the Continent. They bear witness to a time when the British Islands were united to themselves and the mainland of Europe, and when the climate of our area no doubt differed to some extent from the present. But geologists are not quite agreed as to what the precise character of that climate may have been. Some think it was probably warmer than the present; others, however, have maintained an opposite view, and relying on the evidence of the large pines met with in certain English peat-beds, have been inclined to believe it was rather colder; while yet others have supposed that our summer and winter were then more strongly contrasted, and that the climate would be properly described as *continental.* I am afraid that the geographical botany of our ancient "buried forests" has not been so exhaustively analysed as to entitle us to say which of these views is the most probable. But looking at the question from a geological standpoint, the opinion grows upon me that there is truth in each, and that the apparent contradictions arise from our having considered all the "buried forests" as strictly contemporaneous,—as the relics of an arboreal vegetation which covered the whole British area at one and the same time. Now it is certain that in a geological classification, the accumulations in question must be regarded as synchronous; nevertheless, as the trees flourished during what must have been a protracted period, it is not necessary to suppose that the buried forests of one district grew at precisely the same time as those in some other part of the country. The climate may well have undergone many minor changes while Britain maintained its connection with the Continent, so that we are not forced to believe that the massive pines, with their thick bark, which occur in the peat of southern England, are precisely contemporaneous with the oaks which formerly flourished at high elevations in the Scottish Highlands. In short, the various buried forests which bespeak so many different climatic conditions may pertain to different stages of the same epoch—some indicating a colder, some a warmer, tempera-

ture than the present; while others may point simply to such a climate as might even now result, were Britain to become once more continental. The successions of buried trees, marking so many old land-surfaces, which the deeper peat of Britain and the Continent have yielded, is sufficient proof that the climate of post-glacial times did certainly undergo some changes.

During a recent visit to the Færöe Islands, in company with my friend Mr Amund Helland, I was much struck with the appearance in the peat of numerous roots and branches which, in the absence of the bark, we could not determine, although we thought they were most probably juniper. None that we noticed exceeded the thickness of one's wrist; but an intelligent merchant told me he had frequently seen them as thick as his arm, and sometimes even as thick as his leg. At present the only shrubs in the islands are the few which stand within the garden-walls at Thorshavn, where they are carefully tended and protected. Yet the evidence of the peat proves that in post-glacial times the climate was such as to permit of a plentiful growth of shrubs and small trees over all the less considerable slopes of the islands. A similar tale is told by the peat of northern Norway; and even in Spitzbergen, we are not without botanical testimony to the former prevalence of a milder climate than the present. When the Færöe Islands were plentifully clothed with shrubs and small trees, they could hardly have been subjected to the strong winds which now sweep over them, forbidding the growth of all arboreal vegetation. Now, as there can be no doubt that the "buried trees" of the Færöe Islands belong approximately to the same date as those of our own islands and north-western Europe, it seems impossible to resist the conclusion that the climate of those regions in the post-glacial period must have been, *for some time at least*, considerably more genial than it is now.

It is quite certain that a mere extension of the land-surface could not have been the cause of those genial conditions. We must look elsewhere for an explanation of the phenomena; nor is that far to seek. It is a well-known fact that in our northern seas there occur several Mediterranean molluscs which look strangely out of place: they have been dredged off the coast of the Outer Hebrides; and further north we meet with similar startling finds in Norwegian waters. Now if we cross the Atlantic to the Gulf of St Lawrence, we encounter the same phenomenon. Professor Verrill has shown that there are genuine colonies of southern species in that Gulf, and on the coast of Nova Scotia,

which are completely isolated from their co-species of the southern coast of New England, and surrounded on all sides by more northern forms. But more than this, when we examine the post-glacial marine beds, we find these marked by the presence of southern species in still greater numbers. Thus in the raised beaches of Scandinavia, southern species are not only individually abundant, but their shells are larger and better developed than those of their descendants that still linger in diminished numbers in the adjoining seas. Some of the southern species, indeed, no longer live in Norwegian waters. Again, in Spitzbergen, there occur considerable post-glacial deposits,[1] which are made up in large measure of shells of the common mussel —a mollusc which is rarely or never met with now so far north. In the same beds, again, there are found two species (*Cyprina islandica* and *Litorina litorea*) which no longer live round the coasts of Spitzbergen. The other shells with which these sub-fossils are associated in the Spitzbergen deposits are, indeed, all species still occupying the adjoining seas, but the evidence, nevertheless, is clearly in favour of a somewhat warmer sea than the present,— a conclusion which derives additional support from the fact that *Fucus canaliculatus*, which is very common in the mussel-beds, is not now found living in the Spitzbergen fiords. We are not without similar indications in the marine post-glacial beds of Scotland of a formerly more genial climate. Mr Crosskey has drawn special attention to the so-called *Pecten maximus* bed of the Clyde, which contains such shells as *Psammobia ferroënsis* and *Tellina incarnata*, of larger size and in greater numbers than they at present occur living in the neighbouring seas. These facts plainly show us that the temperature of our seas has been exceptionally high at some recent period. In no other way can we account for the northern immigration of the southern species. These species tell of a time when the Gulf Stream carried into the North Atlantic a much greater body of heated water than now reaches such high latitudes. I have hitherto been inclined to assign that latest immigration of southern forms to the last inter-glacial epoch, and have therefore looked upon the isolated colonies and individual species in our post-glacial deposits and present seas as

[1] There can be no doubt about these beds being post-glacial. I was informed by Mr Nathorst, a well-known Swedish naturalist, that he had seen a bank of mussel-shells resting upon a striated rock-surface, at the mouth of Dickson's Bay, on the north side of Ice Sound. The post-glacial deposits of Spitzbergen have been referred by Heer to an inter-glacial period.

the few survivors who were able to outlive the rigour of the latest glacial epoch. But when we come to consider the nature of the conditions which obtained during that latest phase of the Ice Age, it seems hardly possible that any southern species whatsoever could have survived them. Few geologists, save those who have specially worked at the subject, have realised the extent of the glaciation that took place toward the close of the glacial period. So far as Scotland and Scandinavia are concerned, the ice-sheet which then covered them seems to have been hardly, if at all, less thick than that which mantled them at the very climax of glacial cold, when the European ice had its greatest extension. Not only were the Scandinavian and Scottish ice-sheets coalescent, but they overflowed the Orkney and Shetland Islands, and the Outer Hebrides were buried in ice to as great a depth as they seem to have been at any previous stage of the glacial period. How far west the *mer de glace* extended seawards can, of course, only be conjectured, but it is most probable that it reached, at least, to what is now the 100-fathom line. Mr Helland and I found that the Færöe Islands have been in like manner encased in glacier ice. They supported an ice-sheet of their own, the upper surface of which rose to a height in the northern islands of 1600 feet, and in Suderöe of 1400 feet above what is now the sea-level. Not only so, but the ice was so thick that it filled up all the fiords and sounds between the various islands of the archipelago, thus forming one compact *mer de glace* which flowed outwards in all directions from the dominant points, and discharged its icebergs into the surrounding ocean. If such were the state of the Færöe Islands in the concluding cold period of the Ice Age, it is but reasonable to infer that similar extensive ice-sheets flowed outwards from Iceland, Greenland, and Spitzbergen into the Arctic Ocean—the temperature of which must have been depressed to a very low degree by icebergs and floe-ice, which, indeed, must have wellnigh choked it up. Is it possible that any one of the southern species which occur in the post-glacial beds and present seas of Scandinavia could have survived such conditions? The answer, I think, must be in the negative.

Thus we seem driven to the conclusion that the visitors from southern waters which are now living in the northern seas, and which were at one time more plentiful, both as regards species and individuals, must have immigrated long after the severity of the latest glacial period had passed away. Their history is entirely

post-glacial. If space permitted, I should like to examine the evidence, with a view to discover what were the geographical conditions of north-western Europe at the period of this latest immigration from the south. But I can do no more here than briefly state the conclusions to which my studies have led me. It seems most probable that the British area was little, if at all, more extensive at the commencement of the period in question than it is now, although it by-and-by became continental.[1] The late glacial deposits of Scotland show that after the melting of the last ice-sheet the sea gained upon the land to some trifling extent, when certain of those beds of clay with arctic shells, which are met with at low levels round our shores, were accumulated. Immediately upon those latest glacial deposits comes the "buried forest bed," and so-called "submarine peat;" and we seem to pass at once from an insular condition with cold climate to a continental condition with genial climate. The *Pecten maximus* bed of the Firth of Clyde also occupies a clearly marked post-glacial position, but it is almost certainly of older date than the "forest-bed" and "submarine peat." This, of course, is only an inference, for the two are never, so far as I know, found in juxta-position. But as the deposits which immediately overlie the "forest-bed" give us no indication of a milder climate than the present, but on the contrary afford evidence, as will be presently seen, of colder conditions, it seems to me that the *Pecten maximus* bed can hardly belong to those later deposits, but is with most probability to be relegated to a somewhat earlier date. I infer, therefore, that after the cold of the last glacial period had finally vanished, certain changes took place which resulted in a great augmentation of the Gulf Stream, and that these changes may have come about while the British Islands stood very much at the same level as now. At this period the Scandinavian peninsula was submerged, at least in its southern parts, to the extent of 300 feet or thereabout; and the mussel-beds of Spitzbergen prove a not much less amount of depression for that island. The immense quantities of shell *débris* in the post-glacial beds of Spitzbergen and Scandinavia show that this period of partial submerg-

[1] There are good grounds for inferring, however, that after the close of the glacial period—that is to say, after the youngest of the beds pertaining to that period had been accumulated, and before any of our post-glacial deposits had been laid down—the British Islands had some connection with the Continent. But to discuss this point here would lead me away from the subject more immediately under consideration.

ence must have endured for some considerable time. By-and-by, however, the British Islands became united to themselves and the continent, and the sea also retreated to a lower level upon the coasts of Scandinavia and Spitzbergen. It was at this stage that oaks grew at the higher elevations in the Scottish Highlands.[1] The climate, indeed, seems to have everywhere favoured a most abundant development of arboreal vegetation. Even in regions where trees will not now grow, such as many of the maritime districts of our country, the Outer Hebrides, Orkney, Shetland, Northern Norway, and the Færöe Islands, we find plentiful roots, trunks, and branches under the peat. In a recent number of this magazine[2] I have described the discovery of an ancient canoe in connection with the "buried forest" of the Tay valley, from which, as well as other evidence, it may reasonably be inferred that our area was occupied by Neolithic man before the final insulation of the land took place. I cannot doubt, indeed, that much of the buried timber in the deeper bogs and peat-mosses of our islands, with the associated shell-marls and their abundant remains of Irish deer, red deer, urus, and other cervine and bovine animals, belong to Neolithic times and the last continental condition of our islands.

What was the precise character of the climate during this post-glacial period? I think we may fairly conclude that the winter season must have been much milder than it is now in north-western Europe, while the temperature of summer, owing to the greater extent of land, may have been somewhat warmer. From the fact that a woody vegetation covered the Færöe Islands, we may likewise infer an absence of violent winds; for, as a writer in a recent number of the 'Quarterly Review' has remarked, it is to the long-continued cold winds and gales that the absence or scarcity of trees in the higher latitudes is probably due.

If now we turn to the deposits which in Scotland overlie the "forest-bed" and "submarine peat," we meet with strong evidence to show that the "age of forests" was succeeded by a period of colder conditions, when the climate was considerably severer than the present. In the valleys of the Earn and the Tay the "forest-bed" is overlaid by thick accumulations of finely-laminated clays which, although usually stoneless, do yet contain

[1] It was probably at this period also that the flora of southern England received its Iberian element, since it is difficult to believe that the plants in question could have outlived the rigorous climate of the last glacial epoch.

[2] 'Scottish Naturalist,' vol. v., p. 1.

occasionally stones and larger erratics. The clays themselves are often extremely tenacious, and have been worked for brick-making. The stones vary in size, from mere small pebbles up to fragments 6 and 8 inches in diameter. I have seen some, however, which measured more than 1 foot across; and one large one was even 4 feet in thickness. The clays have all the character of the well-known glacial clays, with arctic shells, but hitherto they have not yielded any molluscous remains. I have already explained the absence of organic remains in these clays,[1] and shown that this is sufficiently accounted for by the fact that at the time those clays were being laid down, the upper reaches of the estuary must have been nearly fresh, and greatly chilled by the influx of swollen glacial rivers. The beach deposits of the same age, which occur in less confined areas, and upon the sea-coast, contain an assemblage of species similar to those now living in our seas; but the presence of the large Greenland whale tells of a somewhat colder temperature, while the presence of ice-floated stones and occasional disturbed bedding in the carse-clays, are further testimony in the same direction. From these facts, and certain other considerations which I cannot enter upon at present, it may be concluded that the principal geographical and climatic changes which supervened upon the close of the genial post-glacial period were as follows: 1st, A gradual submergence took place, which brought the sea over some extent of country in the south of Sweden, and again called into existence the German Ocean and the English Channel, at the same time that the British Islands became separated from each other, and were reduced to a somewhat smaller extent than they now show. 2d, These geographical changes were accompanied by a gradual deterioration of the climate, the Gulf Stream becoming considerably reduced in volume, and the seas surrounding our islands acquiring in consequence a lower temperature. To this date may be attributed the demolition of many of the trees whose remains occur in the peat of our maritime and upland regions, and doubtless some of the buried forests in the deeper peat-bogs of the inland low-lying districts ought to be assigned to the same stage. Peat-mosses now began to increase, and to cover wide areas; and perhaps the great pine-trees in the peat of southern England flourished at this time. The rainfall was probably considerably in excess of the present,

[1] It is only in the upper reaches of the ancient estuary where organic remains appear to be wanting; in the lower part of the Carse of Gowrie *Scrobicularia piperata* occurs locally here and there.

and large snow-fields existed in our mountain districts, giving rise to local glaciers, some of which were of no mean size, but seem to have come down to the level of the sea at the heads of certain Highland sea-lochs. Now and again one may notice how those latest local glaciers have partially overridden the heaps of *débris* which had gathered in the valleys after the disappearance of the glaciers of the last cold stage of the true glacial period, while in other cases they have even been deflected by masses of rock which, falling in late glacial and early post-glacial times, had choked up the paths followed by the ice in the earlier periods. The rivers from the higher mountain valleys carried seaward much of the fine "flour of rocks" produced by the grinding of local glaciers; the Greenland whale frequented our friths, and was harpooned by the rude Neolithic inhabitants, whose canoes have been met with again and again in the estuarine flats and raised beaches of Scotland.

The later geographical and climatic changes, so far as the geologist can trace them, were simply these: 1st, the retreat of the sea to its present level; and, 2d, a diminished rainfall, the final disappearance of snowfields and glaciers, and a gradual amelioration of climate. That our climate, in times subsequent to the melting of the local glaciers, may have experienced minor fluctuations, is possible enough; and perhaps evidence of these may yet be forthcoming, when the botanical features of the peat-mosses are subjected to a more rigorous scrutiny than they have yet received. Meanwhile, I cannot help thinking that a closer examination of the geographical distribution of our present fauna and flora may yet throw much light upon the problem of post-glacial climate. The admirable researches of Mr Axel Blytt in Norway, and of Dr Buchanan White in this country, have shown how much yet remains to be done in the study of geographical botany and zoology, and what a promising harvest of discovery awaits the labours of the philosophical naturalist in this field of inquiry.

Such is a very brief and meagre outline of what appear to have been the principal geographical and climatic mutations of post-glacial times. Many interesting points I have been compelled to leave untouched; but I have entered fully into the whole question in a forthcoming work, which treats specially of the physical changes which have taken place in pre-historic ages. Before concluding this short outline sketch, I may refer to the striking support which the evidence lends to Dr Croll's theory.

If the views he has advanced with regard to the origin of secular changes of climate be well founded, we might have expected that the alternation of cold and warm epochs which prevailed during the pleistocene or glacial period could hardly have ceased with such an extreme glacial phase as that which characterised the last cold epoch of the Ice Age proper. We might have anticipated that proofs should be forthcoming of similar although minor alternations of genial and cold conditions having obtained in what is called the post-glacial period. As the eccentricity of the earth's orbit decreased, the alternation of climate resulting from the precession of the equinox would gradually become less marked, and to some extent would be modified by changes in the distribution of land and sea. It is to such minor mutations of climate that our post-glacial accumulations bear witness. I would also point out that the views advanced in the present paper afford a reasonable explanation of certain well-known facts which have hitherto appeared somewhat enigmatical. They account for the southern element in the fauna of our northern seas, as well as for the presence of trees in the peat of arctic lands; and they also give a good reason for the disappearance of arboreal vegetation from arctic regions, and for the diminished numbers of southern marine forms in the adjacent seas as contrasted with their greater abundance in certain post-glacial deposits. Again, they sufficiently account for the extreme freshness of the glacial appearances in many of our mountain-valleys, which, as we have seen, contained local glaciers at so recent a period as late post-glacial and Neolithic times.

The following short tabular abstract brings into one view what appear to have been the leading features of glacial and post-glacial times :—

THE GLACIAL PERIOD.—Great succession of alternate cold (glacial) and warm (inter-glacial) epochs. During glacial epochs *mers de glace* cover wide areas in northern and north-western Europe, enveloping British area, filling up adjoining seas, and extending from Scandinavia down into the plains of Germany, as Dr Torell was the first to point out. At same time, all the mountain-districts of middle and even southern Europe support considerable snow-fields and glaciers. Great migrations of fauna and flora in a southerly direction. During inter-glacial periods migration takes place in opposite directions; and when climate is most genial, African mammals, such as Hippopotamus, Elephant, and Hyæna occupy England. Palæolithic man also lived in Britain. When cold of last glacial epoch became most intense, Palæolithic man

occupied the south of France along with northern and arctic animals, such as Reindeer and Musk-sheep. The African forms disappeared finally at this time from the European fauna, and Palæolithic man seems in like manner to have vanished, for his relics have never yet been found in any post-glacial deposit in Europe.

THE POST-GLACIAL PERIOD.—In early post-glacial times British area seems to have stood pretty much at same level as now; but Spitzbergen and Southern Scandinavia were submerged to a depth of 200 and 300 feet or thereabout. Climate genial; augmentation of Gulf Stream, and immigration of southern species into northern seas. In middle post-glacial times Scandinavia was re-elevated, and the British islands became continental. Great forest-growth under genial climatic conditions. In late post-glacial times climate becomes deteriorated, and British area is insulated. Land of somewhat less extent than at present. Abundant growth of peat; increased rainfall; snow-fields and local glaciers; coast and river ice transporting stones and larger blocks. Many southern forms disappear from northern seas; and the few that live on are usually of less size, and occur in diminished numbers. Neolithic man occupied Britain in middle post-glacial times—perhaps earlier.

THE RECENT PERIOD.—Characterised by re-elevation of the land to its present position, and by gradual amelioration of climate.

NOTE.—The Palæolithic age was probably co-extensive with the Glacial Period. The Neolithic age commenced with the Post-glacial Period, and seems to have lasted in Britain down to the dawn of the Recent Period. The Bronze Age probably began in Britain with the Recent Period, as defined above.

Iceland Falcon in Mid-Lothian.—A fine young bird of this species was captured in the Queen's Park, Edinburgh, about the end of August last by Mr R. B. Gilroy, Bonnington Grove, Leith, when walking there with some friends. It appeared to be either exhausted from a long flight or otherwise ill, as it made no attempt to fly away, and was captured and taken home alive with little difficulty. Its plumage was clean and beautiful when taken; and it had evidently never been in captivity. Its markings correspond in almost every respect with Yarrell's description of the young bird. The plumage has a bluish cast. Head dull white, with narrow brownish-black streaks. Back brownish-black; each feather with a lighter border. Breast feathers, each with a dark streak down the centre about one-third of its width. Bill and cere bluish-grey, with a darker tip, much curved, and distinctly toothed. Tarsi feathered to about an inch from the toes, the latter about the same colour as the bill, with dark claws. Tail feathers and inner web of wing feathers with narrow transverse bars. Tips of closed wings about one inch short of the tail. Stretch, when expanded, three feet. The bird is still alive, and is now so tame as to feed out of the hand. So far as I am aware, there is no record of this species having been previously captured or shot near Edinburgh. —DAVID DOUGLAS, Leith, *September* 1879.

ZOOLOGY.

COLLEMBOLA AND THYSANURA,

FOUND IN SCOTLAND IN THE SUMMER OF 1876.

By LINA AND O. M. REUTER.

DURING the tour I made with my wife in Scotland, we turned our attention partly to the *Collembola* and *Thysanura* of the country. An account of our findings may perhaps not be without interest, the localities visited by us not having been previously investigated regarding these animals. Besides, the distribution of this order in Britain is as yet very little known.

Our excursions comprehended the Shetland and Orkney Islands (in the month of July), Morayshire (Forres, Dava, and other localities during the end of July and August), and Perth. The collections from the last place have unfortunately been so much destroyed, that only one species could be surely determined. This species seems to me to be new.

From Shetland we brought home seven species of Collembola and one of Thysanura. If we examine the Collembolas, we will find that only one of them (*Degeeria cincta*) is not as yet found in Scandinavia; while not less than four (*Sminthurus lineatus*, *Macrotoma vulgaris*, *Isotoma crassicauda*, and *Achorutes viaticus*) have not been previously recorded as British. Of the seven species, *Sminthurus lineatus* was found in peaty places, wherefrom the peat was scaled, and where it was very difficult to find because of its likeness in colour to the ground; the *Macrotoma* and *Isotoma palustris* were more or less common and numerous under rotting wrack (*Fucus*) on the sea-shore; *Degeeria cincta* was found under stones; *Isotoma crassicauda* and *Achorutes viaticus* in large numbers in wet places.

In Orkney we found thirteen species, of which one seems not to have been described before. With the exception of the *Macrotomæ* and *Isotoma crassicauda*, here were met all those

found in Shetland. Except *Degeeria cincta*, *D. lanuginosa*,[1] and *Isotoma cæca*, n. sp., they are all found in Scandinavia, and are rather common there.

From Morayshire we have only eight species, which perhaps arises from our attention during our stay there being more exclusively turned to other orders of insects. The only remarkable species from this district is one new to Britain (found also in Shetland and Orkney), *Sminthurus lineatus*, which occurred at Dava.

In following list I have given short descriptions of the species which are not mentioned in Lubbock's 'Monograph of the Collembola and Thysanura,' as well as of some more critical forms.

COLLEMBOLA Lubb.

SMINTHURUS Latr.

1. S. FUSCUS Linn., Tullberg Sveriges Podurider 29, 1, tab. i., figg. 1-27, ii., figg. 1-15. Lubb., Monogr., 101, tab. ii.

Morayshire, not uncommon.

2. S. VIRIDIS Linn., Tullb. l. c. 30, 2, tab. ii., figg. 16-20, iii. figg. 1-4. Lubb. l. c. 100, tabb. i. et lxiii., fig. 1.

The green variety was rather common among grass in Morayshire.

3. S. LUTEUS Lubb., Tullb. l. c. 32, 8, tab. iii. fig. 17. Lubb. l. c. 108, tabb. iii. et lxiii., fig. 7.

Orkney, among grass in the neighbourhood of Stromness, rather frequently; also in Morayshire.

4. S. LINEATUS Reut. Meddelanden från Soc. pro Fauna et Flora Fenn., i. 84, 4.

Nigro-cyaneus, opacus, pruina nonnihil virescente saepe vestitus, praesertim posterius pilis brevibus albis pubescens; capitis parte superiore, ventre, cicatriculis et guttulis segmenti majoris abdominis, linea dorsali longitudinali postice saepe abbreviata, lineis tribus transversalibus partis anterioris hanc lineam utrinque sub-attingentibus, prima saepe obsoleta, demum utrinque ad apicem lineolis tribus obliqvis apice connexis et lituram W *fere formantibus, ut etiam saepe magna parte segmenti abdominalis minoris lividis; maculis ocularibus in parte capitis livida positis nigris; antennis cyaneis sat longis, articulo ultimo penultimo* $\frac{4}{5}$*—fere duplo longiore, distincte annulato; pedibus pallidioribus, tibiis pilis* 2-3 *clavatis, unguiculis simplicibus, superiore nudo et inferiore saltem duplo longiore; mucronibus furculae apice leviter acuminatis dentibus circiter triplo brevioribus. Long.* $\frac{3}{4}$-$1\frac{1}{3}$ *mm.*

Variat obscurior linea longitudinali dorsi fere obsoleta capiteque superne angustius livido.

[1] This species is found by me in South Finland.

Rather common in peaty places in Shetland (near Lerwick, Bressay, &c.), Orkney, and also at Dava in Morayshire.

5. Sm. NIGER Lubb., Tullb. l. c. 33, tab. iii., figg. 21, 23. Lubb. l. c. 111, tab. vi.

Varietas apice summo capitis, pedibus, antennis et furca albidis.

One specimen found in Orkney.

MACROTOMA Bourl.

(*Tomocerus* Nic., Lubb.)

6. M. VULGARIS Tullb. l. c. 36, 1, tab. iv., figg. 1-24.

Grisea, post mortem nonnihil pallescens, antennis corpore haud longioribus; furculae dentibus spinis 12-16 *armatis, his spinis simplicibus; unguiculo superiore denticulis* 4-6 *armato, inferiore mutico, tantum pila brevi instructo, lanceolato. Long.* 4 *mm.*

Shetland; only one specimen.

7. M. PLUMBEA Lubb. (non Tullb.) *Tomocerus* id. Lubb. l. c. 138. An *M. tridentifera* Tullb. 37, 24, tab. v., figg. 17, 18 (?).

Grisea, post mortem nonnihil pallescens, antennis, tibiis tarsisque violaceis; antennis corpore haud longioribus; furculae dentibus spinis 9-10 *armatis, his spinis basi lata utrinque dente instructis, ut trifidae videntur, spina apicali et penultima vel antepenultima maximis, illa interdum vix trifida; unguiculo superiore denticulis* 4-6 *instructo, inferiore quam in praecedente latiore, saltem pedum anteriorum denticulo armato. Long.* 4 *mm.*

Not uncommon in Shetland under rotting *Fucus* on the seashore.

LEPIDOCYRTUS Bourl.

8. L. CYANEUS Tullb. l. c. 39, 27, tab. vi., figg. 8-11 (1872). *L. purpureus* Lubb. l. c. 155, tab. xxx. (1873).

Squamis detritis obscure cyanea, antennarum basi, pedibus coxis exceptis furcaque pallide flaventibus; antennis corpore pallidioribus, articulo tertio secundo sat multo breviore, ultimo duobus praecedentibus simul sumtis fere aeque longo; metanoto segmento abdominis primo sat multo longiore. Long. 1 *mm.*

Only one specimen from Orkney. Lubbock has not (l. c.) given the locality where this species is found; I am therefore not sure that it has been observed in Britain before.

9. L. LANUGINOSUS (Gmel.) Tullb. l. c. 38, 26, tab. vi., figg. 1-7. *L. aeneus* Nic., Lubb. l. c. 154, tab. xxix. (verisimiliter).

Pallide argenteo-aeneus, versicolor; squamis detritis flavus; articulo tertio antennarum secundo distincte breviore, quarto secundo longiore, sed duobus praecedentibus conjunctis paullo breviore; metanoto segmento abdominali primo longiore; furculae manubrio et dentibus fere aeque longis. Long. 2 *mm.*

Some specimens found in Orkney.

DEGEERIA Nic.

10. D. NIVALIS De Geer, Tullb. l. c. 39, 28, tab. vii., fig. 5. *D. annulata* Lubb. l. c. 159, tab. xxxii.

Morayshire, not uncommon.

11. D. MUSCORUM Nic. *var.* Tullb. l. c. 40, 29, tab. vii., fig. 2. *D. Nicoleti* Lubb. l. c. 161, tab. xxxiv.

Orkney, among grass.

12. D. MULTIFASCIATA Tullb. l. c. 40, 31, tab. vii., fig. 6. *D. nivalis* Nic., Lubb. l. c. 158, tab. xxxi.

Orkney, Morayshire (near Forres).

13. D. CINCTA Lubb. l. c. 162, tab. xxxv.

Shetland and Orkney under stones, &c.; rather common.

14. D. LANUGINOSA Nic., Lubb. l. c. 161, tab. xxxiii.

Three specimens from Orkney.

ORCHESELLA Templ.

15. O. CINCTA Linn., Tullb. l. c. 42, 36, tab. vii., figg. 8-17. Lubb. l. c. 129, tabb. xii.-xiv.

Many specimens from Forres of the varieties figured by Lubbock in plates xii. and xiii.

ISOTOMA (Bourl.)

16. I. PALUSTRIS (Gmel.) Tullb. l. c. 45, 41, tab. ix., figg. 1-8. *I. aquatica* Lubb. l. c. 170, tab. xxxvii.

All the varieties, described by Lubbock, in Shetland and Orkney under rotting *Fucus* on the seashore; very common and numerous.

17. I. CŒCA, n. sp.

Tota pallide flavens; antennis capite fere duplo longioribus, articulo tertio secundo longiore, quarto duobus praecedentibus simul sumtis fere aeque longo; maculis ocularibus ocellisque nullis; segmento abdominali tertio quarto ⅓ breviore; furcula usque ad tubum ventralem pertinente, gracili, mucronibus bidentatis. (*Pilositas in exemplis detrita.*) *Long.* 1⅓-2¼ *mm.*

Four specimens from Orkney.

18. I. CRASSICAUDA Tullb. l. c. 48, 50, tab. ix., figg. 14-20.

Nigro-violacea, pilosa, antennis capite non longioribus, articulis sub-aequalibus; ocellis octo in utroque latere capitis omnibus aeque magnis; furcula usque ad tubum ventralem pertinente, dentibus obtusis crassis, usque ad apicem tibiis haud gracilioribus mucroribus superne visis utrinque dente basali; unguiculo inferiore basi superne lamellula rotundata praedita. Long. 1-2 *mm.*

Variat junior griescens linea dorsali nigra.

Shetland; very numerous on the surface of a pool of stagnant water at Bressay.

ACHORUTES (Templ.)

19. A. VIATICUS Tullb. l. c. 50, 52, tab. x., figg. 7-20.

Obscure nigro-cyaneus, pilis albis rigidis; ocellis in maculis obscurioribus; furculae manubrio dentibus fere breviore, dentibus apicem versus parum acuminatis et mucronibus circiter triplo longioribus, his gracilibus, leviter excurvatis; spinis analibus papillis conicis, quibus affixae sunt, paullo longioribus. Long. 1-2 *mm.*

Bressay, Shetland; very numerous with the preceding species. Kirkwall, Orkney; creeping on the bark of ash-trees.

ANUROPHORUS (Nic.)

20. A. LARICIS Nic., Tullb. l. c. 53, 62, tab. xii., figg. 1, 2. *Lipura corticina* Bourl., Lubb. l. c. 191, tab. xlv.

Kirkwall, Orkney; in large quantity on the bark of elm and ash trees in the garden of the Queen's Hotel.

ANURIDA Laboulb.

21. A. CRASSICORNIS, n. sp.

Obscure nigro-cyanea, dense longius albo-pilosa; ocellis quinque nigris; antennis brevibus et crassis, capitis latitudine magis quam duplo brevioribus, articulis praesertim primis fortiter transversis; capite subtus marginibus et apice nec non unguiculis tarsorum albicantibus. Long. 1⅔-2⅓ *mm.*

Many specimens under stones in the river Tay, near Perth, June 29.

Very like and allied to *Anurida maritima* Guér., Laboulb. in Ann. Soc. ent. de France, Sér. iv., Tome iv., pag. 708, Tab. ii., but differing by its much shorter and thicker antennæ, by the structure of the head (the inter-antennal lobe is pentagonal with almost straight sides, and is very well separated from the rest of the head, and projecting), and lastly also by the more robust body.

THYSANURA.

22. MACHILIS MARITIMA Leach, Lubb. l. c. p. 237.

Very common among *Fucus*, &c., on the sea-shores of Shetland and Orkney.

HELSINGFORS, FINLAND, *November* 1, 1879.

PHYTOLOGY.

THE CLUB-ROOT FUNGUS.[1]

By A. STEPHEN WILSON.

THERE can, I think, be little doubt that the fungus or vegetable parasite, discovered by M. Woronin, and by him named *Plasmodiophora brassicæ*, is the true cause of what is called club-root and finger-and-toe in turnips, cabbage, charlock, and other cruciferous plants. The great importance of the turnip crop in the husbandry of this country gives the investigation of this fungus an interest of a highly practical and economic character. We are here in the presence of an enemy the strength of which is certainly on the increase; and which threatens, if no countervailing strategy can be devised, to render the turnip crop as uncertain and precarious as the potato crop has been rendered by another parasitic fungus, the *Peronospora infestans*.

The observations of Woronin were made chiefly on the cabbage, and in reference to the great destruction caused in recent years to the cabbage crop in Russia, and more particularly in the market-gardens around St Petersburg. My own repetition of these observations has hitherto been chiefly confined to the turnip, including only such comparisons with cabbage, charlock, and mustard, as showed that the parasite was the same in all cases. That it is so, however, is an assumption based only on the optical data patent to the microscope. The plasmodic masses ramifying through the cell tissues of the roots have the same appearance in all these plants; while the ripe spores which form the final stage of the plasmodium, and which are globular in shape and very uniform in size, have also in all cases the same dimensions: thirty-four millions of them can lie upon a square inch.

It would be impossible to go into the whole subject at present. I shall therefore select one branch. Considerable interest has

[1] Read before the Cryptogamic Society of Scotland, at Forres, Sept. 1879.

recently been awakened in the salmon disease. That disease is supposed by some to be produced by a fungus, the *Saprolegnia ferax*. By others it is supposed that the fungus is consequent on the disease. And hence arises in this and in other cases the need of a clear conception of *parasitism*, which may be defined as the state of a living organism living upon the life of a living organism. In any given case in which a fungus is found locally associated with an organised body in a state of vitality, or in a state of disintegration, the question may be raised, Is the fungus a parasite? Is it a fungus which requires a living host for its growth and development? Is the club-root fungus a parasite? Does the club-root fungus demand a living and healthy plant in the tissues of which to work out the cycle of its life?

The true answer to this question, if it can be given, is highly important to agriculture. For, if it shall appear that a weak, or sickly, or decaying plant is required as the proper soil of the club-root fungus, then this fungus is not a parasite, and its presence merely indicates antecedent disease arising from some failure of practical husbandry. Something has been done, or something has been neglected, in consequence of which the turnip plant and other plants fall into a state of disease, and then become the prey of the club-root fungus.

But, on the other hand, if it shall appear that the club-root fungus is a true parasite—a plant living upon the living substance of another plant—then this fungus assumes a different attitude towards agriculture. Conditions calculated to secure, in its absence, a healthy crop of turnips, are of no preventive value. If the fungus is a parasite, the proper nidus which it requires is a living and healthy turnip. That there are numerous fungoid parasites waging perpetual war upon living plants is well known, but is not popularly accepted in its full significance. We cannot suppose from any facts known to us that all the potato crops in the country must be in a state of disease and decay before becoming the prey of the potato fungus. The grasses do not require to be in an unhealthy condition before being attacked by ergot and smut and rust. And there seems little doubt that the *Hemileia vastatrix*, the fungus which destroys the coffee crops, is also a true parasite, attacking the healthy leaves.

Now, what is the nature of the evidence that the club-root fungus belongs to the class of true parasitic fungi?

The root of the turnip is frequently attacked at a very early stage. Turnip seeds may be sown, and the plants matured, in a

saucer in water. I have found seeds thus sown, and with the water mixed with the pulverised turnip clubs of the previous year, to have their roots attacked when only about the thickness of one-hundredth of an inch. But in such circumstances the tap-root itself, even where no cause of disease has been introduced, never attains to any kind of bulb, or to a thickness beyond two or three hundredths of an inch; so that when attacked by the fungus in water, the portion of the root affected, not growing so rapidly as to afford room for the disrupting plasmodia of the fungus, is speedily killed, and goes into disintegration. But the club ceases to enlarge whenever the root dies. Could the granular plasma of the fungus grow upon decaying matter, there seems no reason why the club should not go on enlarging after the death of the root. But if it is a parasite the reason is plain; it cannot live on dead matter.

It is, however, when the seeds of the turnip are planted in earth that some of the phenomena can be best observed. I find that the ripe spores of the fungus exist as spores from one season to another. During the intense frosts of last winter (1878-79) they remained as bright and clear as when newly matured. They are not to be killed by being turned up to the frost. I mixed a quantity of the rotten clubs of crop 1878 containing these spores with garden mould in which no disease existed, and with the mixture filled a number of pots, some having drainage and some having close bottoms. Good turnip seeds, not known to be in any way defective, were sown in the pots. All the resulting plants became at an early stage excessively and fatally clubbed. The two largest pots, having the ordinary flower-pot drainage, and standing in the open air, had each between thirty and forty plants all clubbed, while the turnips in the same garden mould beside them were quite free of disease. The plants in the pots which had no drainage, and which from the wetness of the season were frequently soaking in water, had a large development of lateral roots: they did not grow so rapidly as the plants in the drained pots, and the clubs did not attain to so large a size.

Now there seems to be no reason whatever for assuming that all these plants were first in a state of disease before being attacked by the *Plasmodiophora*. Indeed, it was quite evident that the strongest and healthiest plants were the most favourable to the full development of the fungus. The tissues of a small and feeble plant are speedily disrupted, the cells are choked

with granular fungoid matter, and the plant dies. In stronger plants the contest goes on a little longer. The attack is frequently made at two or three centres; and in many cases even upon a slender root, the club is chiefly developed on one side. Where there are lateral roots coming into the tap-root above the clubs, the plant goes on growing for an indefinite length of time, for the matter of the fungus does not appear to be carried by the motion of the sap, but extends by growth from particle to particle. Where the attack is early and of a severe character, the plants are killed when young. Where it is less severe a slow and local process of clubbing goes on during the whole season, and the bulb arrives at fair dimensions. But it is remarkable that, while turnips and cabbages are very often killed outright, charlock and mustard usually go on to flower and seed in defiance of considerable clubbing. But in all cases, whenever the plant dies the club ceases to increase in size, and in all probability the fungus, which is the cause of the club, is not the direct cause of the subsequent rotting at all. A club taken and dried will preserve for any length of time. But the clubs are an easy prey to atmospheric disintegration, and to fungi and infusoria which revel in dead matter.

The evidence seems to me to show that the healthier plants are not the least liable to the attack of this fungus. In going along a drill of turnips in which nearly every plant is affected, there seems nothing to imply that the few which escape were in any respect healthier than the many which are destroyed. Certainly the balance of probability is in favour of regarding the *Plasmodiophora brassicæ* as a pure parasite, demanding a healthy living host for working out its career, from a spore to an amœba, from an amœba to a plasmodium, and from a plasmodium back to spores again. I am not perfectly convinced that this is the exact course, but Woronin's conclusions are not to be modified without mature consideration.

It would thus appear that the turnip husbandry of this country is in presence of a destructive parasite. Hitherto the grower of potatoes has stood helpless before the forests of *Peronospora infestans*, with stems small enough to come out in half-dozens from the stoma of a leaf. And here is a fungus of an altogether different and less palpable type, devouring the turnip crop with perfect impunity. Can anything be done to stop its ravages? A reduction in the frequency of the turnip crop by permitting the destruction of the germinating power of a greater number of spores,

would undoubtedly restrict the virulence of the disease; but this is not properly to cure it, but to give way before it by withdrawing the crop and foregoing the profits to be derived from it. Experiment shows that the disease is not a mere result of peculiar modes of tillage, or of characteristics of the season, though these may promote or retard its growth, but that it is a plant, one crop of which arises from the seeds of a previous crop. Probably under existing systems of rotation, wherever the club-root fungus has got a firm hold, extermination is impossible. Other questions then arise not belonging to the purpose of our meeting. Who knows whether it may not be good for agriculture that such fungi as those which partially destroy the potato and turnip crops cannot be exterminated? Thanks are undoubtedly due in certain parts of our country to the *Peronospora infestans*, for destroying a means of subsistence which was over-abundant without enterprise and energy, and left the better resources of the cultivators to waste themselves in idleness. And who knows but the prevalence of *Plasmodiophora brassicæ* may divert the course of agriculture into a new and more fertile direction?

North Kinmundy, Aberdeen, *September* 1879.

SCOTTISH GALLS.

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

SINCE my last contributions to this subject in the 'Scottish Naturalist' (vol. iv.), I have met with a few kinds of galls not previously found by myself in Scotland, though one or two of them have already been recorded by others. The past season seems to have been very unproductive in galls, as far as my observations in the district around Aberdeen go, though a few common species were very abundant.

Cakile maritima, L.—On the root of a plant of this species, gathered near the mouth of the Don in July, were several galls like those so common on cabbages—*i.e.*, hemispherical swellings about ¼ inch in diameter, each inclosing a rather small cavity in which lay a white larva of a beetle, probably *Ceuthorhynchus sp.* Unfortunately, no more galls could be found, though search was frequently made subsequently, hence I was unable to rear the maker of the gall.

Stellaria holostea, L.—I formerly ('Scot. Nat.,' iv. 13) noted the occurrence on this plant of false galls, the work of Aphides,

the name of which I had not discovered. This autumn I have found the same species of Aphis on *Holcus lanatus*, L. in several localities near Aberdeen. The effects produced on the grass are similar to those produced on the Stitchwort. The shoots remain short, with the leaves short, concave, slightly thickened, and crowded, and overlapping one another. Between the leaves live numerous Aphides; but I have not seen winged insects among them. Mr Hardy has described this insect under the name *Aphis stellariæ* ('North British Agriculturist,' ii. 788), and has described the galls formed by it on *S. holostea*, *S. graminea*, *Cerastium triviale*, and *Holcus mollis*.

The insects, of which only the wingless forms are yet known, are also described and figured under the name *Brachycolus stellariæ* in Buckton's 'British Aphides,' ii. 147-149, Pl. 85, figs. 1-3.

TILIA EUROPÆA, L.—(*b*) On one or two trees in Old Aberdeen, in the month of July, occurred galls of a *Cecidomyia* (?). The margins of the leaves are rolled up so as to form a tube, and become thickened, fleshy, and of a red colour. Each is tenanted by one or more reddish-orange larvæ, which leave the gall when full fed. These galls are most common on young shoots from the root or from the trunk of the tree.

(*c*) *Erineum tiliaceum*, Persoon.—Leaves (apparently of *T. grandifolia*) sent me from Perthshire by Dr Buchanan White bear on their lower surface patches of this gall, the work of a *Phytoptus*. These patches are scattered over the surface of the leaf, are irregularly rounded in outline, are usually about ½ inch across, and are nearly white in colour. On examination through the microscope, they are found to be made up of a multitude of rather slender and nearly colourless filaments, often somewhat twisted: among these live the four-footed mites. The upper surface of the leaf, opposite the patch, usually becomes reddish in colour. These galls have frequently been described by French and German writers.

ACER PSEUDOPLATANUS, L.—(*a*) Nail-galls of *Phytoptus* = *Ceratoneon vulgare*, Bremi ('Scot. Nat.,' iv. 14)

(*b*) *Erineum acerinum*, D. C.—Another mite-gall found scattered over the leaf in irregularly-rounded patches ¼-½ inch across—several such patches often occurring on a leaf. The patches consist, as on *Tilia*, of elongated clubbed hairs, usually twisted or incurved, at first probably pale coloured, but soon the patch becomes dark rusty brown. Among the hairs live the

mites (*Phytoptus*). The hairs seem always to occur only on the lower surface of the leaf, sunk in a rather deep hollow, corresponding to which the upper surface is convex, and usually becomes yellowish-red in colour. These galls seem frequently to occur on the same leaves with the well-known *Rhytisma acerinum*. Their occurrence in Scotland has already been noted by Greville ('Edin. Phil. Journ.,' vi. 73, Pl. ii., fig. 6), and Hooker ('Fl. Scot.,' ii. 34). I have found them at Inverurie and at Stonehaven.

Prunus avium, L.—The leaves at the tips of young branches are frequently attacked near Aberdeen by *Aphides* (*Myzus cerasi*, Fab.), which, by their suction, alter the leaves so greatly that they may almost be regarded as gall makers. The leaves do not attain their full size, but become curled up and distorted; while, apparently owing to excessive development of cellular tissue, resulting from the constant stimulus, swellings project from the upper surface corresponding to recesses on the lower surface in which the insects live.

Ribes rubrum, L., and R. nigrum, L., are subject to attacks similar in their effects to those just described, but more noticeable, as the raised parts on the upper surface generally become bright red in colour. The leaves seem but little retarded in their growth as a rule, but can hardly be of much service to the plant. Probably the pseudo-galls are familiar to all who take an interest in gardening. The insects agree well with the descriptions and figures of *Rhopalosiphum ribis* (Buckton's 'Brit. Aph.,' ii. p. 9, Pl. 39). Another species—viz., *Myzus ribis* (Buckton's 'Brit. Aph.,' i. pp. 180-182, Pl. 34, figs. 1-4), is also abundant at Aberdeen throughout the summer on *R. rubrum* and on *R. grossularia;* but I have not noticed that it produces effects like those described, though said to do so by Mr Buckton.

Lonicera Periclymenum, L.—The leaves are attacked by a species of *Phytoptus*, which forms a pseudo-gall (= *Legnon crispum*, Bremi). Round the whole or part of the leaf runs a furrow, separated from the margin by a border of unaltered tissue, usually extremely narrow, but occasionally about ¼ inch in breadth. The furrow is open along the upper surface, and corresponds to a ridge on the lower surface about $\frac{1}{12}$ inch deep and broad. The surface of the gall is marked with fine wrinkles, rendering its outline wavy; but otherwise it differs little in aspect from the leaf, and hence the galls are by no means conspicuous. Where they occur, almost every leaf on a branch is often attacked.

The mites live in the furrow—usually a number in each gall. They are pale orange in colour, and are large relatively to other species of *Phytoptus*. I have found these galls in the woods of Darnaway and of Cawdor, near Forres, in the end of September.

Senecio aquaticus, Huds., and S. Jacobæa, L.—On these plants occur very commonly flower-heads that appear fleshy, and remain green, and do not flower, though reaching about twice the normal size of flowering capitula. These effects result from the presence of numerous larvæ of *Diplosis Jacobææ*, Loew, one of the gall-midges. I have found these galls abundant wherever I have looked for them, in the months of August and September. On *S. aquaticus* I also found, near Ellon, the peduncles here and there a good deal swollen and bent. In each swelling was one larva of a *Cecidomyia* (?). Unfortunately I did not succeed in rearing the insects.

Ulmus montana, Sm.—(*a*) Galls of *Tetraneura ulmi*, L., on the leaves. These galls are more like true galls in appearance than are those of most Aphides. When fully formed, they project from the upper surface of the leaf, usually on its apical half, as oval bodies, ½ × ¼ inch, attached to the leaf by a narrow neck. The outer surface is naked, marked with shallow wrinkles longitudinally, and yellowish green in colour. The leaf round the base of the gall shows numerous yellowish-red spots, and below bears patches of hairs, much like some *Erineum* galls of *Phytoptus*. The galls generally show an irregular opening on one side near the base when mature, and through this the young Aphides escape. I have found this gall in Scotland only once, on a tree in the woods of Cawdor, last September.

Investigation into the development of the gall shows that it is due to the irritation produced by the attacks of the parent Aphis, which, while the leaf is quite young, fixes on a spot on the lower surface. Excessive development of tissue ensues, forming a pouch, into which the insect is received, and the orifice of which is entirely closed by a growth of hairs.

(*b*) Pseudo-galls of *Schizoneura ulmi*, L.—These are similar to the Aphis galls on geans and currants described above, and must be familiar to many persons. Each consists of a leaf that is usually spirally and unsymmetrically rolled backwards, one side being less affected than the other. The upper surface becomes irregular, as in the currant leaves, but remains green or yellowish-green in colour. In texture the leaf becomes fleshy and rigid. In the space enclosed by it live numerous Aphides,

among which we may usually find all stages of development represented. There is also usually a quantity of a white powdery secretion mixed with clear drops of fluid.

Populus nigra, L.—At the manse of Birnie, near Elgin, I picked up under the trees, in September, two examples of the gall of another species of Aphis—viz., *Pemphigus bursarius*, L. They occur singly on the petioles of the leaves as green, irregularly conical outgrowths (⅓-½ × $^{1}/_{5}$-⅓ inch), with naked surface, wrinkled longitudinally. The walls are fleshy or leathery, and enclose a single cavity, which opens by an irregular fissure at the apex of the cone.

On the same leaves were patches of *Erineum populinum*, Pers., galls of Phytoptus already indicated ('Scot. Nat.,' ii. 254 (*d*)), as found on *Populus tremula*.

NEW AND RARE SCOTTISH LICHENS.

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

THIS year's excursions to our Highland mountains have revealed many interesting lichens, and notably that to Rannoch, in company of the Rev. J. Stevenson, Dr Buchanan White, and Dr Carrington. Besides those of which descriptions are given below, many others were found in Rannoch, as—

Bæomyces roseus (Pers.)
Parmelia Mougeotii (Schær.)
Normandina lætevirens (Turn.)
Lecidea lugubris (Smrf.)
Lecidea leucophæa (Flk.)
Lecidea Pilati (Hepp.)
Lecidea auriculata (Th. Fr.) =
Lecidea sarcogyniza (Nyl.), &c. &c.

By the way, I find *L. auriculata* very common on all our mountains, ascending however to no great elevation.

Parmelia placorodia (Ach.), 'Nyl. Scand.,' p. 106; = *Cetraria aleurites* (Ach.), 'Fr. Scand.,' p. 109; near Inveroran: barren.

Lecanora exomila, sp. n.

Thallus obscure cinerascens, vel etiam nigrescens, hinc inde squamulosus rugulosus (an proprius?); apothecia adpressa, fusca vel fusco-nigra, plana (latit. ·5 – 1 mm.), margine prominulo crenato vel, in junioribus, striatim rugosulo, cærulescente vel pallide cærulescente cincta; sporæ 8næ incolores ellipsoideæ, sim-

plices sæpe binucleatæ, .009—.011 × .0065—.008 mm.; paraphyses graciles, non bene discretæ apicibus fuscescentibus conglutinatis; hypothecium incolor. Iodo gel. hym. cærulescens (saltem leviter) dein fulvescens.

Saxicola (Glas Miel).

It is questionable whether the thallus is proper to this curious and singular *Lecanora*, as *Lecidea aromatica* is seen (in juxtaposition) on the same fragment of stone, and having a thallus of a corresponding character. In every instance the margin is truly cærulescent.

LECIDEA PROSTRATULA, sp. n.

Thallus pallidus vel pallide cinereus, tenuis, squamulosus, squamulis adpressis planis dispersis vel contiguis margine interdum crenulatis, hypothallo nigro insitis (K—C erythrinosis); apothecia nigra sessilia (latit. circiter .6 mm.), plana marginata dein convexula et fere immarginata; sporæ incolores, ellipsoideæ simplices, .009—.012 × .005—.006 mm.; paraphyses nonnihil irregulares, mediocres, distinctæ apicibus nigris clavatis conglutinatis; hypothecium fusco-nigrum. Iodo gel. hym. leviter cærulescens dein vinose rubens.

Saxicola apud Craig Var (Kinloch-Rannoch).

LECIDEA FILAMENTOSA, sp. n.

Thallus albidus vel pallidus rugosulus, interdum dispersim areolatus; apothecia parva (latit. .2—.4 mm.), fusco-nigra, plana acute marginata, demum convexula et vix marginatula; sporæ 8næ incolores simplices, oblongæ vel oblongo-ellipsoideæ, .011—.016 × .005—.006 mm.; paraphyses graciles irregulares non bene discretæ, apicibus sordide fuscescentibus; hypothecium incolor. Iodo gel. hym. cærulescens dein lutescens.

Ad lignum cæsum vel fabrefactum prope Killin.

K renders the paraphyses distinct as divaricato-ramose threads.

LECIDEA SANGUINARIA (L.), * SUBSANGUINARIA.

Similis L. sanguinariæ *sed thallo intus toto continue vel hinc inde segregatim rubricoso. Thecæ monosporæ vel interdum 2-sporæ, .07—.12 × .032—.054 mm.*

Corticola prope Kinloch-Rannoch. Thallus extus K—C—.

LECIDEA HYPOCYANEA, sp. n.

Thallus pallidus vel pallide cinereus rugulosus, squamuloso-congestus; apothecia fusca vel fusco-nigra parva (latit. .2—4 mm.), convexa immarginata, sæpissime aggregata vel congesta (12—30 in quovis glomerulo); sporæ 8næ in thecis saccatis, ellipsoideæ simplices, .009—.012 × .006—.007 mm.; paraphyses non discretæ conglutinatæ apicibus concoloribus non clavatis non inspersis, hypothecium rufum; stratum subhymeniale cærulescens vel intense cærulescens crassiusculum.

Ad terram basi Ben Lawers.

The blue stratum above the hypothecium disappears here and there, and nitric acid applied gives at first a violaceous tint, which ultimately vanishes. The hymeneal gelatine is rendered blue, then opaque, by Iodine.

LECIDEA RECENSA, sp. n.

Thallus albus vel albidus convexo-areolatus (*areolis appositis vel dispersis*); *apothecia sessilia nigra plana nigro-marginata* (*margine plerumque undulato*) *parva, sæpissime aggregata; sporæ* 8*næ incolores simplices oblongæ cvrvatæ vel arcuatæ*, .01 – .014 × .0035 – .0045 *mm.; paraphyses nonnihil irregulares crassiusculæ apicibus clavatulis fuscis; hypothecium incolor. Iodo gel. hym. cærulescens* (*saltem leviter*).

Saxicola (Craig Var).

This may be a form of *L. rivulosa*, but the spores are thinner and more curved, the apothecia black, and thallus white, &c.

LECIDEA AMPHIPLECTA, sp. nov.

Similis L. furvellæ (Nyl.), *sed hypothæcio incolore et iodo gel. hym. obsolete cærulescente dein vinose rubente vel interdum vinose rubescente. Paraphyses confertæ et quasi reticulatæ, epithecium crassum fusco-nigrum conglutinatum.*

Saxicola (Ben Lawers).

K renders the paraphyses more distinct, when they are seen as irregular, disjointed, or nearly moniliform threads.

LECIDEA MERSATA, sp. n.

Thallus pallidus vel pallide glaucescens interdum rufo-ferrugineus, tenuis fere continuus lævigatus, hinc inde rimuloso-areolatus (*K – C –*); *apothecia adnata nigra majuscula plana anguste marginata, demum convexula et fere immarginata, intus cærulescentia præsertim supra; sporæ incolores, simplices, ellipsoideæ vel sæpius fusiformi-ellipsoideæ*, .022 – .036 × .008 – .011 *mm.; paraphyses distinctæ filiformes, crassæ* (*crasit.* .0025 – .003 *mm.*), *apicibus late cærulescentibus, vix clavatulis, discretis; hypothecium crassum fusco-nigrum. Iodo gel. hym. intense cærulescens, thecæ interdum fulvescentes.*

Ad saxa submersa lacus Rannoch.

Affinis *L. cyanophthalmæ* (Nyl.)

LECIDEA DASÆA, sp. n.

Thallus fuscus vel fusco-niger, laxe adhærens, mollis, granulato-furfuraceus vel isidioideus, diffracto-areolatus fere sicut in L. furvella (Nyl.), *sed nonnihil tenuior et magis dispersus; apothecia fusco-nigra vel nigra parva* (*latit.* .2 – .3 *mm.*), *concaviuscula, acute marginata demum planiuscula margine depressulo, intus rufo-fuscescentia; sporæ* 8*næ incolores sphæricæ simplices sæpe nucleatæ, diam.* .0035 – .0045 *mm.; paraphyses irregulares non distinctæ apicibus concoloribus non clavatis; hypothecium obscurius vel rufo-fuscum. Iodo gel. hym. non mutata.*

Ad lignum cæsum prope Ben Lawers.

Affinis *L. antilogæ* (Strn.)

LÈCIDEA ILYOPHORA, sp. n.

Thallus niger nonnihil gelatinosus tenuis; apothecia nigra parva (latit. .2–.4 mm.), convexa immarginata demum hemisphærica, rugosula, intus tota violacea sicut in Lecanora atra, K cærulescenti-virescentia; sporæ 8næ incolores obovatæ—i.e., *uno apice acutiores, interdum curvulæ,* 1–3—*septatæ,* .014—.02 × .004–.005 *mm.; paraphyses non distinctæ nonnihil irregulares; hypothecium concolor. Iodo gel. hym. sordide cærulescens.*

Ad lignum putrescens (Kinloch-Rannoch).

Affinis *L. melænæ* (Nyl.), sed distincta præsertim hypothecio, colore interno, &c.

LECIDEA ARCEUTINA f. DEMINUTA (Fr.), v. 'Fr. Scand.,' p. 353.

Sporæ vix septatæ, .045—.06 × .001—0015 *mm.*

Ad corticem quercus prope Forres.

VERRUCARIA EXPLICATA, sp. n.

Thallus pallidus vel pallide cinereus, tenuis, sæpe dispersus; apothecia nigra prominula (latit. .2–.35 mm.), perithecio integre nigro; sporæ (4-8)*næ incolores, ellipsoideæ vel oblongo-ellipsoideæ, interdum gibbosulæ,* 1-*septatæ,* .024–.034 × .01–.013 *mm.; paraphyses nullæ. Iodo gel. hym. vinose rubens.*

Supra saxa schistosa summo cacumine Ben Lawers.

This may be *V. subrimulata* (Nyl.), but the description given in 'Flora,' 1874, p. 316, is defective, inasmuch as no mention is made as to whether paraphyses are present or not, and the reactions by Iodine on the hymeneal gelatine are not stated.

VERRUCARIA ADDUBITANS, sp. n.

Thallus albidus, vix ullus visibilis; apothecia nigra majuscula (latit. .8–1.4 mm.), prominula rotundata vel sæpius oblonga, perithecio dimidiatim nigro; sporæ (4-8)*næ incolores ellipsoideæ dein fuscæ,* 3-5 *septatæ (septis transversis, aliis irregularibus vel longitudinalibus junctis), interdum grosse granulosæ,* .019–.025 × .009–.012 *mm.; paraphyses longæ confertæ granuloso-inspersæ, tubulares et protoplasmate interruptim disposito repletæ. Iodo gel. hym. non tincta.*

Ad lignum decorticatum prope Kinloch-Rannoch.

ENDOCOCCUS EXORIENS, sp. n.

Parasiticus in thallo cujusdam Pannariæ *verisimiliter* P. brunneæ. *Apothecia semi-immersa parva fusco vel fusco-nigra perithecio integro vel fere integro; sporæ 8næ fuscæ ellipsoideæ,* 3-*septatæ,* .009–.011 × .006 *mm.; paraphyses nullæ. Iodo gel. hym. vinose rubescens.*

Craig Var prope Kinloch-Rannoch.

I am not quite certain whether the perithecium is entire, and I hesitate to dissect one of the two apothecia left for the purpose of determining this point.

EFFECTS OF THE PAST WINTER AND PRESENT SUMMER ON HARD-WOODED PLANTS.

By Colonel H. M. DRUMMOND HAY, C.M.Z.S.

(*Continued from p.* 167.)

Caucasus and Eastern Parts of the Black Sea.

58. *Abies orientalis*, . . Uninjured.

59. *Cerasus angustifolia*, . } Some of the leaves on the unripened shoots slightly browned, but proved quite as hardy, if not more so, than the common laurel.
„ *caucasica*, . }

60. *Picea Nordmanniana*, . Uninjured.

Canada and North Atlantic American States, including *Virginia and †Carolina.

61. *Acer negundo variegata*, . }
62. *Æsculus rubicunda*, . }
63. *Amelanchier botryapium*, }
64. *Amygdalus nanus*, . . }
65. *Andromeda angustifolia*, . }
„ *axillaris*, . } Uninjured.
„ *calyculata*, . }
„ *dealbata*, . }
„ *floribunda*, . }
„ *rosmarinifolia* }
66. †*Calycanthus floridus*, . }

67. *Catalpa syringæfolia*, . { Unripened shoots killed, and much retarded.

68. *Ceanothus americanus*, . { Top shoots killed, and slightly injured; has stood previous seasons well.

69. *Cotoneaster canadensis*, . }
70. *Gaultheria procumbens*, . } Uninjured.
„ *shallon*, . }

71. *Gleditschia triacanthus*, . { A good deal retarded, otherwise uninjured; has made good growth.

72. †*Hydrangea alba*, . .
73. *Kalmia angustifolia*, .
,, *latifolia*, . .
,, *nana*, . .
,, *pumila*, . .
74. *Ledum buxifolium*, . .
75. *Liriodendron tulipifera*, . } Uninjured.

76. *Maclura tricuspidata*, . { End shoots killed, and much retarded, but has made good growth.

77. *Mahonia glumacea*, .
78. *Menziesia empetrifolia*, .
79. *Mespilus canadensis*, .
80. *Philadelphus Gordonianus*
,, *grandiflorus*, } Uninjured.
81. † *Populus canadensis*,
aurea Van Geerti, .
82. *Ptelea trifoliata*, . .
83. *Rhus glabra*, . . .
* ,, *typhina*, . .

84. *Rhamnus frangula*, . { Killed down to where protected by snow; coming away well.

85. *Robinia hispida*, . .
,, *viscosa*, . .
,, *inermis*, . .
86. *Spiræa ariæfolia*, . .
,, *corymbosa*, . .
,, *Douglasii*, . .
,, *hypericifolia*, .
,, *opulæfolia*, . . } Uninjured.
,, ,, *lutea*, .
,, *tomentosa*, . .
,, *ulmifolia*, . .
87. *Symphoricarpus glomerata*
,, *aurea variegata*,
,, *racemosus*, .
88. *Viburnum acerifolium*, .
89. *Virgilea lutea*, . .

90. *Xanthoriza apiifolia*, . { Killed down to where protected by snow; coming away well.

UPPER CALIFORNIA, * BRITISH COLUMBIA, AND VANCOUVER'S ISLAND.

91. *Abies Albertiana*, . .
,, *Hookeriana*, . . } Uninjured.
,, *Menziesia*, . .
,, *Douglasii*, . .

92. *Ceanothus dentatus*, . — Entirely killed, as well as an old established plant that has stood many winters against a wall.

„ *divaricatus*, . — Entirely killed; has stood the last few winters well as a standard in the open border.

93. *Cupressus Lawsoniana*, . — Uninjured.

„ „ *stricta* (*erecta*) — Uninjured.

„ „ „ *viride*, — Browned, and some of the shoots killed; seemingly not so hardy as the type plant, or the variety *stricta* (*erecta*).

„ *macrocarpa*, . — Uninjured.

* „ *nootkaensis* (*Thujopsis borealis*), — Uninjured.

94. *Garrya elliptica*, . . — Slightly injured, and leaves browned, but quite recovered. It has frequently been asked whether the *Garrya* will stand our winters without the protection of a wall; all ours are standards, having been planted out fourteen or fifteen years ago, and have generally stood the winters perfectly, being usually covered with their catkin-like flowers.

95. *Lonicera Ledebourii*, . — Uninjured.

96.**Mahonia aquifolia*, . — Uninjured.

97. *Picea Lowi*, . . — Uninjured.

„ *magnifica*, . — Uninjured.

„ *nobilis*, . — Uninjured.

„ *Parsonsii*, . — Uninjured.

* „ *vancouveri* (*grandis* of Douglas), . — Uninjured.

98. **Pinus Benthamiana*, . — Uninjured.

„ *macrocarpa*, . — Uninjured.

„ *Jeffreyi*, . — Uninjured.

„ *monticola*, . — Uninjured.

„ *ponderosa*, . — Uninjured.

„ *radiata*, . . — Browned, and slightly injured; generally considered to be a hardy substitute for *insignis*, which does not in general stand our northern winters.

99. **Rubus nutkianus*, . .
* ,, *spectabilis*, . .
100. *Sequoia sempervirens*, .
101. *Spiræa californica*, . } Uninjured.
102. *Thuja gigantea*, . .
,, *Lobii*, . .
103. *Wellingtonia gigantea*, .

MOUNTAINS OF CHILI AND || PERU, * STRAITS OF MAGELLAN, AND † FALKLAND ISLANDS.

104. *Berberis Darwinii*, . { Killed to the roots, but coming away well; in some cases entirely killed.

* ,, *dulcis*, . . { Uninjured. The latter, from its habit of throwing up suckers, would make a good cover plant if not apt to be injured by rabbits.
* ,, *empetrifolia*, .
,, *Jamesonii*, .

105. *Buddlea globosa*, . . { All killed, with one or two exceptions, to the roots, and these protected by deep snow; in some other parts in the county and neighbourhood, the *Buddlea*, where long established, did not suffer materially.

106. || *Desfontiana spinosa*, . Utterly killed.

107. *Fabiana imbricata*, . { Utterly killed; has withstood, with slight protection, several winters in the open border.

108. †*Veronica Traversi* (*decussata ?*), . . . } Perfectly uninjured, and flowered freely.

JAPAN.

109. *Aucuba viridis*, . . Uninjured.
,, *bicolor*, . . } Browned, and slightly injured.
,, *lanceolata*, . }
110. *Biota gracilis*, . . Perfectly uninjured.
111. *Cephalotaxus drupacea*, . } Uninjured.
,, *Fortunii*, . }
112. *Chimonanthus fragrans*, Uninjured; was slightly protected.
113. *Cryptomeria elegans*, . .
,, *japonica*, . .
114. *Cydonia japonica* and varieties, . . . } Uninjured.
115. *Deutzia Fortunii*, . .
,, *gracilis*, . .

116. *Euonymus japonica*, . Utterly destroyed.
" *ovata picta*, . Top shoots killed, and a good deal injured; recovering.
" *radicans*, . Perfectly uninjured.
117. *Forsythia Fortunii*, . Uninjured.
" *suspensa*, . Uninjured.
118. *Griselinea littoralis*, . Utterly destroyed.
119. *Juniperus japonica variegata*, . . . Uninjured.
120. *Kerria japonica variegata*, . . . Uninjured.
121. *Ligustrum japonicum*, . A good deal retarded, otherwise uninjured, and coming well into flower.
" *coriaceum*, . A good deal injured and retarded, with loss of leaves, but coming away well again.
122. *Mahonia japonica aurea-variegata*, . . . Uninjured.
123. *Osmanthus ilicifolius*, . Entirely uninjured.
" *argentea*, . Entirely uninjured.
" *aurea*, . Entirely uninjured.
124. *Othera japonica*, . . A good deal retarded, with unripened shoots killed, but well recovered.
125. *Podocarpus japonicus*, . Uninjured.
126. *Quercus glabra*, . . Very much retarded, but seems otherwise uninjured, the leaves retaining a healthy green all winter. This is a very ornamental and distinct species.
127. *Raphiolepis glabra*, . Retarded, but not otherwise injured; was slightly protected.
" *ovata*, . A good deal retarded and slightly injured; had slight protection.
128. *Retinospora pisifera*, . Uninjured.
" *squarrosa*, . Uninjured.
128*a*. *Rhodotypus kerrioides*, . Top shoots killed, otherwise uninjured.
129. *Skimmia fragrans*, . Uninjured.
" *japonica*, . Uninjured.
" *oblata*, . . Uninjured.
130. *Sophora japonica*, . . Uninjured.
131. *Taxus adpressus*, . . Uninjured.
132. *Thujopsis dolabrata*, . Uninjured.
133. *Weigelia amabilis*, . Uninjured.

NORTHERN CHINA—† CHINESE AND * RUSSIAN TARTARY.

134. *Ailanthus glandulosus*, .	Retarded, but otherwise not injured.
135. *Biota orientalis*, . .	Browned, and, in some instances, a good deal injured, but recovering.
136. **Caragana arborescens*, .	Uninjured.
137. *Deutzia crenata* (*flor. plen.*), . . .	
138. **Dimorphanthus mandchuricus*, . . .	
139. *Exochordia grandiflora*,	
140. *Forsythia viridissimus*, .	
141. *Jasminum nudiflorum*, .	A good deal injured, and retarded where not protected by a wall.
142. *Juniperus sinensis*, .	Uninjured.
143. *Kolreuteria paniculata*, .	
144. † *Lonicera tartarica*, .	
145. *Prunus triloba* (*fl. pl.*)	Uninjured, and flowered profusely, but has since, especially where grafted as standards, suffered considerably from the cold wet summer coming immediately after the long protracted winter.
„ *sinensis alba* (*flor. plen.*), . .	Slightly retarded, but uninjured.
„ *sinensis rosea* (*flor. plen.*), .	A good deal retarded, and top shoots killed.
146. *Spiræa prunifolia* (*flor. plen.*), . .	Uninjured, though a very early flowerer.
„ *Reevsii* (*flor. plen.*), . .	Upper shoots all killed and much retarded, with loss of leaves, but quite recovered.
147. *Weigelia rosea*, . .	Though seemingly uninjured from frost, has, in some instances, after flowering profusely, succumbed to the cold wet summer.

HIMALAYAS AND * MOUNTAINS OF NEPAUL.

148. *Abies morinda*, . .	Uninjured.
149. *Aucuba himalaica*, .	
150. *Cedrus deodara*, . .	
151. **Cotoneaster frigida*, .	
* „ *Simonsii*, .	
152. *Deutzia corymbosa*, .	

153. **Hypericum patulum*, . } Killed to the roots, but since
154. *Leycesteria formosa*, . } made good growth.
155. *Pinus excelsa*, . . Uninjured.
156. *Piptanthus nepaulensis*, . Perfectly hardy and uninjured, keeping its beautiful bright-green foliage all winter.
157. *Rhododendron ciliatum*, . In some instances a good deal injured and flower buds destroyed; requires protection.
158. *Spiræa argentea*, . . } Uninjured.
„ *bella*, . . }

New Zealand—* Tasmania—† Cape of Good Hope.

159. *Eurybia ilicifolia* . . Killed down to where protected by snow.
* „ *alpina* (*Gunni?*) Utterly destroyed, though it has withstood the last two or three winters without any protection; the beautiful aster-like flowers of this species are much more lasting, profuse, and brilliant white than the above, and quite deserving of a wall.
160. **Hartogia capensis*, . Perfectly hardy and uninjured.
161. *Pittospermum undulatum* A good deal injured and retarded, and being weakened, has eventually succumbed to the cold wet summer, but uninjured on ordinary winters. Though said to be an Australian plant, it was raised from seed brought home from the southern part of New Zealand.
162. *Spiræa kamoon*, . . Uninjured.

Hybrids.

163. *Spiræa Thunbergii*, . Uninjured, though flowering very early.
164. *Veronica Hendersonii*, . Utterly destroyed.

CORRECTION.

In looking over the list, I observe that I have inadvertently written *Cistus cyprius* (No. 54) instead of *Cistus ladaniferus*—a native of Spain. I have also omitted to mention *Genista ætnensis*—a native of Sicily—which was quite uninjured, and is well worth growing.

ALPHABETICAL LIST OF GENERA NOTED IN THE ABOVE.

Abies, 58, 91, 148.
Acer, 61.
Æsculus, 62.
Ailanthus, 134.
Amelanchier, 63.
Amygdalus, 64.
Andromeda, 10, 65.
Arbutus, 31.
Aucuba, 109, 149.
Azalea, 53.
Berberis, 104.
Biota, 110, 135.
Buddlea, 105.
Buxus, 32.
Calluna, 1.
Calycanthus, 66.
Caragana, 136.
Catalpa, 67.
Ceanothus, 68, 92.
Cedrus, 29, 150.
Cephalotaxus, 111.
Cerasus, 21, 33, 55, 59.
Chimonanthus, 112.
Circis, 35.
Cistus, 22, 34, 54.
Colutea, 36.
Cornus, 16.
Cotoneaster, 69, 151.
Cryptomeria, 113.
Cupressus, 93.
Cydonia, 114.
Cytisus, 2, 24*a*.
Daphne, 3, 11, 37.
Desfontiana, 106.
Deutzia, 115, 137, 152.
Dimorphanthus, 138.
Erica, 1, 17, 23, 38.
Euonymus, 17*a*, 116.
Eurybia, 159.
Exochordia, 139.
Fabiana, 107.
Forsythia, 117, 140.
Gaultheria, 70.
Garrya, 94.
Genista, 4, 18, 24.
Gleditschia, 71.
Griselinea, 118.
Hartogia, 160.
Hippophäe, 5.
Hydrangea, 72.
Hypericum, 153.
Ilex, 30, 40.
Jasminum, 141.
Juniperus, 39, 119, 142.
Kalmia, 73.
Kerria, 120.
Kolreuteria, 143.
Laurus, 41.
Ledum, 12, 74.
Leycesteria, 154.
Ligustrum, 121.
Liriodendron, 75.
Lonicera, 42, 95, 144.
Maclura, 76.
Mahonia, 77, 96, 122.
Menziesia, 1, 78.
Mespilus, 79.
Osmanthus, 123.
Othera, 124.
Philadelphus, 43, 80.
Phillyrea, 44.
Picea, 25, 60, 97.
Pinus, 26, 45, 56, 98, 155.
Piptanthus, 156.
Pittospermum, 161.
Podocarpus, 125.
Polygala, 19.
Populus, 46, 81.
Potentilla, 6.
Prunus, 145.
Ptelea, 82.
Quercus, 126.
Raphiolepis, 127.
Retinospora, 128,
Rhamnus, 7, 47, 84.
Rhododendron, 13, 20, 28, 157.
Rhodotypus, 128*c*.
Rhus, 48, 83.
Robinia, 85.
Rosa, 27.
Rosmarinus, 49.
Rubus, 99.
Ruscus, 8, 50.
Sequoia, 100.
Skimmia, 129.
Sophora, 130.
Spiræa, 14, 86, 101, 146, 158, 162, 163.
Symphoricarpus, 87.
Syringa, 15, 57.
Tamarix, 51.
Taxus, 131.
Thuja, 102.
Thujopsis, 132.
Ulex, 9.
Veronica, 108, 164.
Viburnum, 52, 88.
Virgilea, 89.
Weigelia, 133, 147.
Wellingtonia, 103.
Xanthoriza, 90.

THE GAELIC NAMES OF PLANTS.

BY JOHN CAMERON.

(*Continued from p.* 173.)

VINIFERÆ.

Vitis (from the Celtic *gwyd*, a tree, a shrub. Spanish: *vid*. French: *vigne*).

Vitis vinifera—Vine. Gaelic: *crann fiona*, *fionan*. Irish: *fion*, wine. Greek: Φοι-νι. Latin: *vin-um*. *Fion dearc*, a grape.

Geraniaceæ.

(From Greek γέρανος, *geranos*, a crane. The long beak that terminates the carpel resembles the bill of a crane; English: cranebill. Gaelic: *crob priachain* (Armstrong), the claw of any rapacious bird.) *Lŭs-gnà-ghorm.* (M'Kenzie.) Evergreen plant.

Geranium Robertianum—Herb Robert. Gaelic and Irish: *righeal cuil* (from *righe*, reproof, and *cuil*, fly, gnat, insect), the fly reprover. *Riaghal cuil*, also *rial chuil*, that which rules insects; *Earbull righ* (*earbull*, a tail).

"Insects are said to avoid it."—Don.

Ruidel, the red-haired. *Lus an Eallan*, the cancer weed. *Righeal righ.* Irish: *righean righ*, that which reproves a king (*righ*, a king), on account of its strong disagreeable smell. Welsh: *troedrydd*, redfoot. *Llysie Robert*, herb Robert.

G. sanguineum—Bloody cranesbill. Gaelic: *creachlach dearg*, the red wound-healer (*creach*, a wound). *Geranium Robertianum* and *Geranium sanguineum* have been held, and are, in great repute by the Highlanders, on account of their astringent and vulnerary properties.

Oxalidaceæ.

(From Greek ὀξύς, *oxys*, acid, from the acid taste of the leaves.)

Oxalis acetosella—Wood-sorrel. Gaelic: *samh*, shelter. It grows in sheltered spots. Also the name given to its capsules. Also summer. It may simply be the summer flower.

"Aig itheach *saimh*," eating sorrel.

Seamrag. Irish: *seamrog* (shamrock) (*seam*, mild and gentle), little gentle one. Referring to its appearance.

"Le-*seamragan* 's le neonainean,
'S'gach lus a dh'fheudain ainmeachadh
Cuir anbharra dhreach boidhchead air."—M'Intyre.

With wood-sorrel and with daisies,
And plants that I could name,
Giving the place a most beautiful appearance.

Surag, the sour one; Scotch: *sourock* (from the Armoric *sur*, Teutonic *suer*, sour). Welsh: *suran y gog*, cuckoo's sorrel. Gaelic: *biadh nan eoinean*, birds' food. Irish: *billeog nan eun*, the leaf of the birds.

"Timcheall thulmanan diàmhair
Ma 'm bi'm *biadh-ionain* fàs."—M'Donald.
Around sheltered hillocks
Where the wood-sorrel grows.

Feada coillé, candle of the woods, name given to the flower; *feadh*, a candle or rush.

"Mar sin is leasachan soilleir,
Do dh' *fheada-coille* na'n còs."—M'Donald.
Like the flaming light
Of the wood-sorrel of the caverns.

Celastraceæ.

Euonymus europæus — Common spindle-tree. Gaelic and Irish: *oir*, *feoras*,—*oir*, the east point, east. "*A tir an oir*," from the land of the East (*Oirip*, Europe), being rare in Scotland and Ireland, but common on the Continent. *Oir* and *feoir* also mean a border, edge, limit, it being commonly planted in hedges. Whether the name has any reference to these significations it is very difficult to determine with certainty. *Oir*, the name of the thirteenth letter, O, of the Gaelic and Irish alphabet. It is worthy of notice that all the letters were called after trees or plants :—

	Gaelic.	English.		Gaelic.	English.
A . .	Ailm.	Elm.	L . .	Luis.	Quicken.
B . .	Beite.	Birch.	M . .	Muir.	Vine.
C . .	Coll.	Hazel.	N . .	Nuin.	Ash.
D . .	Dur.	Oak.	O . .	Oir.	Spindle-tree.
E . .	Eagh.	Aspen.	P . .	Peith.	Pine.
F . .	Fearn.	Alder.	R . .	Ruis.	Elder.
G . .	Gath.	Ivy.	S . .	Suil.	Willow.
H . .	Huath.	White-thorn.	T . .	Tin.	Heath.
I . .	Iogh.	Yew.	U . .	Uir.	Whitethorn.

Rhamnaceæ.

Rhamnus (from Gaelic *ramh*, Celtic *ram*, a branch, wood).

"Talamh nan *ramh*."—Ossian.
The country of woods.

The Greeks changed the word to ῥάμνος and the Latins to *ramus*.

R. catharticus—Prickly buckthorn. Gaelic: *ramh droighionn*, prickly wood. Welsh: *rhafnwydden*,—*rhaf*, to spread; *wydd*, tree.

Juglans regia—The Walnut. Gaelic: *craobh-ghallchno*—*gall*, a foreigner, a stranger; *cno*, a nut.

LEGUMINIFERÆ.

Gaelic: *luis feidhleagach*, pod-bearing plants. *Bar guc*, papilionaceous flowers (Armstrong). *Por-cochullach*, leguminous.

"*Bar guc* air mheuraibh nosara."—M'INTYRE.
Blossoms on sappy branches.

Sarothamnus scoparius—Broom. Gaelic: *bealaidh* or *bealuidh* (probably from *beal*, Baal, and *uidh*, favour), the plant that Belus favoured, it being yellow-flowered (see *Caltha palustris*). Yellow was the favourite colour of the Druids (who were worshippers of Belus), and also of the bards. Ossian describes the sun "*grian bhuidhe*," the yellow sun; M'Intyre, his Isabel, as

"Iseabel og
An òr fhuilt *bhuidh*."
Young Isabel with the golden-yellow hair.

Irish: *brum;* and Welsh: *ysgub*. Gaelic: *squab*, a brush made from the broom. Latin: *scoparius*. *Giolcach sleibhe* (*giolc*, a reed, a cane, a leafless twig; *sleibhe*, of the hill).

The badge of the Clan Forbes.

Cytisus laburnum—Laburnum. Gaelic: *bealuidh frangach* (in Breadalbane), in some parts *sasunach*, French or English broom (Ferguson). *Frangach* is very often affixed to names of plants of foreign origin. This tree was introduced from Switzerland in 1596. *Craobh obrun*, a corruption of laburnum.

Ulex—Name from the Celtic *ec* or *ac*, a prickle (Jones).

U. europæus—Furze, whin, gorse. Gaelic and Irish: *conasg*, from Irish *conas*, war, because of its armed or prickly appearance. Welsh: *cithin*, prickles.

"Lan *conasg* is phreasaibh."—OLD SONG.
Full of furze and bushes.

Not common in the Highlands, but plentiful about Fortingall, Perthshire.

Ononis arvensis—Rest-harrow. Gaelic and Irish: *sreang bogha*, bowstring. Welsh: *tagadr*, stop the plough; *cithin yr eir*, ground prickles. Scotch: *cammock*, from Gaelic *cam*, crooked.

Trigonella ornithopodioides—Fenugreek, Greek hay. Gaelic: *ionntag-greugach* (Armstrong), Greek nettle; *crubh-coin*, Birds' shoe. Welsh: *y grog-wryan*.

Trifolium repens—White or Dutch clover. Gaelic and Irish: *seamar bhàn*, the fair gentle one (see *Oxalis*); written also *sameir*, *siomrag*, *seamrag*, *seamrog*. Wood-sorrel and clover are often con-

founded, but *seamar bhàn* is invariable for white clover, and for Trifolium procumbens, hop trefoil, *samhrag bhuidhe*, yellow clover.

> "Gach *saimeir* neonean 's masag."—M'Donald.
> Every clover, daisy, and berry.
>
> "An t-*seamrag* uine 's barr-gheal gruag,
> A's buidheann chuachach neoinein."—M'Lachuinn.
> The green white-headed clover.
> The yellow-cupped daisy.

The badge of Clan Sinclair.

T. pratense—Red clover. Gaelic: *seamar chapuill*, the mare's clover. *Capull*, from Greek καβάλλης, a work-horse. Latin: *caballus*, a horse. *Tri-bilean*, trefoil, three-leaved. Welsh: *tairdalen*, the same meaning. *Meillonem*, honeywort, from *mêl*, honey. Gaelic: *sùgag*, Scotch *sookie*, the bloom of clover, so called because it contains honey, and children suck it.

T. minus — Small yellow clover. Gaelic: *seangan*, small, slender.

T. arvense—Hare's-foot clover. Gaelic: *cas maidhiche* (Armstrong), hare's foot.

Lotus corniculata—Bird's-foot trefoil. Gaelic: *barra mhislean,—barra*, top or flower; *mislean*, anything that springs or grows.

> "Glacag *misleanach*."—Macfarlane.
> A grassy dell.

Anthyllis vulneraria — Kidney vetch, or Lady's Fingers. Gaelic: *meoir Mhuire*, Mary's fingers; *cas an uain*, lamb's foot.

Vicia[1] **sativa**—Vetch. Gaelic and Irish: *fiatghal*, nutritious (from Irish *fiadh*, now written *biadh*, food); *peasair fiadhain*, wild pease; *peasair chapuill*, mares' pease. Welsh: *idhys*, edible pease. Irish: *pis feadhain*, wild pease; *pis dubh*, black peas.

V. cracca — Tufted vetch. Gaelic: *pesair nan luch*, mice pease; *pesair* (Latin, *pisum*; Welsh, *pys*; French, *pois*, pease), are all from the Celtic root *pis*, a pea.

V. sepium—Bush vetch. Gaelic: *peasair nam preas*, the bush peas.

Lathyrus pratensis — Yellow vetchling. Gaelic: *peasair bhuidhe*, yellow peas. Irish: *pis bhúidhe*, yellow peas.

Ervum hirsutum—Hairy vetch or tare (from *erv*, Celtic—*arv*, Latin, tilled land). Gaelic: *peasair an arbhar*, corn peas. Welsh:

[1] *Vicia* (from *gwig*, Celtic, whence Greek βικιον, Latin *vicia*, French *vesce*, English *vetch*).—Loudon.

pysen y ceirch,—*ceirch*, oats. Gaelic: *gall pheasair*, a name for lentils or vetch. *Gall*, sometimes prefixed to names of plants having lowland habitats, or strangers.

> "Lan do *ghall pheasair*."—STUART, 2 Sam.
> Full of lentils.

Faba vulgaris—Bean. Gaelic: *ponair*. Irish: *poneir*. Cornish: *ponar* (from the Hebrew פּוּל, *pul*, a bean (Levi). Gaelic: *ponair frangach*, French beans; *ponair airneach*, kidney beans; *ponair chapuill*, buckbean (*Menyanthes trifoliata*).

"Gabh thugad fòs cruithneachd agus eorna, agus *pònair*, agus *peasair*, agus meanbh-pheasair, agus *peasair fhiadhain*, agus cuir iad ann an aon soitheach, agus dean duit fèin aran duibh."—STUART, Ezekiel iv. 9.

Take thou also unto thee wheat, and barley, and beans, and lentiles, and millet, and fitches, and put them in one vessel, and make thee bread thereof."

Orobus tuberosus—Tuberous bitter vetch (from Greek, ὄρω, *oro*, to excite, to strengthen, and βοῦς, an ox). Gaelic and Irish: *cairmeal* (Armstrong),—*cair*, dig; *meal*, enjoy; also *mall*; Welsh: *moel*, a knob, a tuber—*i.e.*, the tuberous root that is dug; *corra-meille* (M'Leod and Dewar).

> "Is clann bheag a trusa leolaicheann[1]
> Buain *corr* an co's nam bruachagan."—M'INTYRE.
> Little children gathering . . .
> And digging the bitter vetch from the holes in the bank.

Corra, a crane, and *meillg*, a pod, the crane's pod or peas. Welsh: *pys y garanod*, crane's peas; *garan*, a crane. "The Highlanders have a great esteem for the tubercles of the roots; they dry and chew them to give a better relish to their whisky. They also affirm that they are good against most diseases of the thorax, and that by the use of them they are enabled to repel hunger and thirst for a long time. In Breadalbane and Ross-shire they sometimes bruise and steep them in water, and make an agreeable fermented liquor with them, called *cairm*. They have a sweet taste, something like the roots of liquorice, and when boiled are well flavoured and nutritive, and in times of scarcity have served as a substitute for bread" (Lightfoot).

[1] *Leolaicheann*, probably *Trollius europæus* (the globe flower), from *Òl*, *òlachan*, drink, drinking. Children frequently use the globe flower as a drinking-cup. Scotch: *luggie gowan*. *Luggie*, a small wooden dish; or it may be a corruption from *trol* or *trollen*, an old German word signifying round, in allusion to the form of the flower, hence Trollius.

(*To be continued.*)

Unusual blooming of the Hawthorn.—I herewith enclose a sprig of hawthorn, pulled this morning from the hedge between my house and Easter Moncreiffe. Upon the same plant there are about a dozen similar sprigs, all having the peculiarity of producing the flowers at the ends of young shoots, a circumstance never before observed by me.—WILLIAM BISSET, Moncreiffe, 29th September 1879.

New and rare British Fungi.—During a visit to Rannoch last September, I found some specimens of *Ustilago succisæ*, a species not hitherto found in Britain. It is parasitic on the anthers of *Scabiosa succisa*, which are filled with the white spores, rendering the parasite rather conspicuous. During the meeting of the Cryptogamic Society at Forres, I found some plants of *Polypodium vulgare* attacked by the parasitic *Milesia polypodii*, a species hitherto found only by myself in Perthshire. At Cawdor, a single specimen of *Physarum sinuosum* Bull., occurred to me. This species has not, I believe, been found in Scotland since recorded by Greville in the 'Scottish Cryptogamic Flora.'

In Rannoch, *Rhytisma empetri* was more abundant this year than I have yet seen it.—F. BUCHANAN WHITE.

New and rare Fungi found at the Meeting of the Cryptogamic Society at Forres.—Although the season was on the whole an unfavourable one, especially as regards the growth of the larger fungi, some interesting discoveries were made.

The following species, new to the British Flora, were discovered : *Hydnum scabrosum* Fr. ; *Hypomyces violaceus* Tul. ; and *Helvella infula* Schaeff.

The following are new to the Flora of Scotland : *Hypomyces chrysospermus* Tul., of which *Sepedonium chrysospermum* is the conidioid form, gathered in Britain previously only once, in England, where it was discovered last year by Mr Berkeley ; *Peziza echinophila* Bull. ; and *P. pulveracea* Lib.

Among species which are interesting on account of their infrequency or rarity, the following may be noted : *Agaricus* (*Amanita*) *mappa* Fr. ; *A.* (*Tricholoma*) *sejunctus* Sow. ; *A.* (*Omphalia*) *demissus* Fr. (*A. rufulus* B. and Br.) ; *A.* (*Pleurotus*) *porrigens* Pers. ; *A.* (*Pholiota*) *erebius* Fr. ; *A.* (*Flammula*) *carbonarius* Fr. ; *Cortinarius* (*Inoloma*) *traganus* Fr. ; *Russula Quelctii* Fr. ; *Marasmius Hudsoni* Fr. ; *Polyporus Schweinitzii* Fr. ; *P. sulphureus* Bull. ; *P. reticulatus* Pers., found in Britain previously only once ; *Trametes pini* Brot. ; *Hydnum compactum* Pers. ; *H. auraniiacum* A. and S. ; *H. ferrugineum* Fr. ; *H. fragile* Fr. ; *H. gravcolens* Delast. ; *Sistostrema confluens* Pers. ; *Cyphella muscigena* Fr. ; *Exidia recisa* Ditten. ; *Lindbladia effusa* Ehr. ; *Anthina flammea* Fr. ; *Stilbum orbiculare* B. and Br., growing abundantly on *Lindbladia effusa* ; *Peziza pygmæa* Fr. ; *P. strobilina* Fr. ; *Patellaria discolor* Mont. ; and *Gnomonia* (*Sphæria*) *coryli* Batsch.

I have since found *Peziza strobilina* at Glamis, growing abundantly on fallen fir-cones. The plant, which may be easily overlooked, is perhaps not uncommon.—J. STEVENSON, Glamis, November 1879.

NEW BOOKS.

The Capercaillie in Scotland. By J. A. Harvie-Brown, F.Z.S. Edinburgh: D. Douglas, 1879. 8vo, pp. ix. and 155. Map and two Plates.

In this well-printed and got-up book Mr Harvie-Brown has brought together a host of information about the largest of our Scottish game birds. Commencing with a discussion of the origin and orthography of the word "capercaillie," the author proceeds to give in detail all that is known of the history of the bird in Scotland prior to its extinction in or about 1760; its reintroduction at Taymouth in 1837-38, and its subsequent spread over part of the country. The details of the extension of the capercaillie's range is treated in great detail, and is well shown in the illustrative map. It is worthy of notice that in almost every instance where the bird has of itself founded a new colony, that the first arrivals noticed were females, who generally precede the males by one or two years, the colonies being established in from two to four years after the appearance of the hen birds. From this prior arrival of the females, it happens that in districts where black-game are common, hybrids between the black-cock and female capercaillie are not unfrequent, as might be anticipated from the great resemblance between the hen capercaillie and grey hen. Finally, Mr Harvie-Brown brings his very interesting work to a conclusion by a consideration of the damage done to pine-forests by the capercaillie, and shows that while undoubtedly damage is done, yet that there is great lack of information as to the *summer* food of the bird in Scotland.

Mycologia Scotica: the Fungi of Scotland, and their Geographical Distribution. By the Rev. J. Stevenson. Edinburgh: printed for the Cryptogamic Society of Scotland. 1879. 8vo, pp. xx. and 443. With Map.

Of late years the fungi have received a greater amount of attention than had hitherto been bestowed on them. One result of this attention was the foundation of the Cryptogamic Society of Scotland, to various meetings of which the contents of this very creditable volume were presented in the form of reports. For the purpose of indicating the distribution of the species in Scotland, the natural divisions by river-basins, as first set forth in the 'Insecta Scotica,' have been adopted by the author, and, in addition, information is given regarding the British and exotic distribution, &c., of each species. Every Scottish species added to the British list since the publication of Dr M. C. Cooke's Handbook has a description appended, and this adds very greatly to the value of the work. No less than upwards of 2150 species are enumerated as Scottish by Mr Stevenson; but some polymorphic species are mentioned twice, and others—whose claims are equally great—only once, so that it is difficult to form an estimate of what the actual number of known Scottish fungi is. We notice, also, that in the case of some of the parasitic fungi, the host-plant is not always correctly given. This, and a few typographical errors, are the chief faults of a work which marks an era in Scottish mycology. We must not omit to notice that there is a good index to the book, which enhances its value as a work of reference.

Dundee Naturalists' Society: Fifth and Sixth Annual Reports, being for the years 1877-79. Dundee. 1879. 8vo, pp. 20.

We are glad to be able to congratulate this Society on its flourishing condition, as evidenced by these rather brief reports. In regard to the Society's museum, the Council "would like to urge upon members the claims of the museum for a share of their attention and help. The desire is to make it thoroughly local and educational in character; to contain, not a heterogeneous collection gathered from all parts of the earth, but rather a number of representative specimens of the natural products of the district."

This sentence assures us that the Dundee Naturalists understand what a local museum should be,—a subject regarding which much ignorance exists, even amongst those who should know better. We observe that the Council has also brought before the Society the desirability of having premises of its own. This is also a good suggestion, and ought to be quite feasible in such a wealthy town as Dundee.

History of the Berwickshire Naturalists' Club, 1876-78. 8vo. Alnwick: 1879.

The concluding part of the volume for 1876-78 of the proceedings of this long-established club has come to hand, and contains the usual number of interesting papers and notes on the various branches of natural science, as well as archæological communications and reports of the excursions. Sir Walter Elliot's 'Account of the Plague of Field-mice, in the Border Farms, in 1876-77,' is specially worth noting.

VARIOUS NOTES.

The Fifth Annual Conference of the Cryptogamic Society of Scotland was held at Forres in September last, and was in every way successful. In another place will be found a note of some of the rarer species of fungi found during the excursions. The next Conference is to be held in Glasgow towards the end of next September, under the presidency of the well-known lichenologist, Dr James Stirton, and promises to be highly interesting. There will be a show of fungi and other cryptogamic plants.

The announcement of the death of Mr Thomas Chapman will have caused much regret to his numerous friends in Scotland and England. An Englishman by birth, he was yet so long settled in Glasgow, that he was to all purposes a Scottish Naturalist, and long and deservedly occupied a prominent position as such. No one, we believe, had a more intimate acquaintance with the lepidoptera of Clydesdale, and other districts of the west of Scotland; and to him is due much of the information relating to these districts, incorporated in "The Lepidoptera of Scotland," at present being published in this magazine. Of late years Mr Chapman had turned his attention more to exotic insects, especially African and Australian lepidoptera, and with equal success. In other ways Mr Chapman did much to promote the study of natural science in the west of Scotland. He died on August 27th, in his sixty-third year.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

(*Continued from p.* 192.)

EDITED BY D. SHARP, M.B.

OROBITES Th.

CYANEUS L. Scarce.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀♀ o o o

ACALLES Th.

ROBORIS Curt. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Roslin. Dr Greville and Rev. W. Little."—Murray Cat.

PTINOIDES Marsh. Rare.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

CRYPTORHYNCHUS Th.

LAPATHI L. Rare. In old sallows.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. Solway o o o o

CŒLIODES Th.

QUERCUS Fab. Common on oaks.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

RUBER Marsh. Scarce.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

SUBRUFUS Hbst. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. Solway o o o o

RUBICUNDUS Payk. On birch.
DISTRIBUTION—EAST. Tweed Forth ♀♀ Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

QUADRIMACULATUS L. Abundant on nettles.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ ♀♀ ♀♀ o o
WEST. Solway ♀♀ ♀♀ o o

FULIGINOSUS Marsh. Scarce.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. o o o o o

GERANII Payk. On Geranium sylvaticum.
DISTRIBUTION—EAST. Tweed Forth ♀♀ Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

CEUTHORHYNCHUS Th.

ASSIMILIS Payk. Common.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ ♀♀ ♀♀ o o
WEST. Solway ♀♀ ♀♀ o o

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

CONTRACTUS Marsh. Abundant.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ ♀♀ Sutherland
WEST. o o o o o Orkney Shetland

COCHLEARIÆ Gyll. Not common.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

CONSTRICTUS Marsh. Rare.
DISTRIBUTION—EAST. o Forth o o Moray o o o
WEST. o o o o o

ERICÆ Gyll. On heather.
DISTRIBUTION—EAST. Tweed ♀♀ Tay ♀♀ Moray Sutherland Orkney Shetland
WEST. Solway Clyde ♀♀ o o

ECHII Fab. Very rare.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. o o o o o

VIDUATUS Gyll. Rare.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway Clyde o o o

LITURA Fab. On thistles. Local.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

RUGULOSUS Hbst. Rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

EUPHORBIÆ Bris. Rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

QUADRIDENS Panz. Common.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ Moray ♀♀ o o
WEST. Solway ♀♀ ♀♀ o o

PUNCTIGER Gyll. Rare.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

POLLINARIUS Forst. Abundant.
DISTRIBUTION—EAST. ♀♀ ♀♀ Tay ♀♀ Moray ♀♀ ♀♀ Shetland
WEST. Solway ♀♀ ♀♀ o o

ANGULOSUS Boh. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

SULCICOLLIS Gyll. Common.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ ♀♀ o o

HIRSUTUS Gyll. Very local.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. o o o o o

CYANIPENNIS Germ. Scarce.
DISTRIBUTION—EAST. Tweed ♀♀ ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

CHALYBÆUS Germ. Rare.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. o o o o o

FLORALIS Payk. Common.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

PYRHORHYNCHUS Marsh. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

TERMINATUS Hbst. Very rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

TROGLODYTES Fab. Common.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

DAWSONI Bris. Rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

VERSICOLOR Bris. Rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

AMALUS Th.

SCORTILLUM L. Rare.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway o o o o

POOPHAGUS Schon.

SISYMBRII Fab. Local.
DISTRIBUTION—EAST. Tweed Forth o o o ♂ o o
WEST. Solway o o o o

(*To be continued.*)

ZOOLOGY.

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 p.* 115.)

53. Motacilla Yarrelli, Gould. (Pied Wagtail.)

COMMON throughout the whole district. Some years, however, it is much more abundant than others. The partial migration of these birds seems a puzzle: many remain all winter, except in very severe weather, notwithstanding that a very extensive migration takes place every autumn, when large bodies leave this country and cross over to the Continent, with a corresponding return in the spring, as is well authenticated. On our own shores, at the mouth of the Tay, at the end of August or beginning of September, large numbers may be seen all day long steadily moving along the coast southwards, in small trips and companies, along with the Wheatear. It is difficult, therefore, to explain why some should remain behind. Even in the unusual, severe winter of 1878-79, when the Tay was frozen over, and the feeding-grounds on its banks one mass of ice, the Wagtails were seen as late as the 10th of December, and so starved that they greedily devoured bread when offered (a most unnatural food). Could these birds have been caught, as it were, by the sudden arrival of winter, and become so enervated and weakened as to be unable to proceed further south? It would be difficult otherwise to account for their late stay. Mr Cordeaux remarks, in his 'Birds of the Humber District,' "that the gradual increased area placed under turnip cultivation of late years, has supplied for these birds, and kindred species, a source of winter food previously unattainable, and offers inducements to them to brave even the severest winters;" and further adds, "that owing to the almost

complete failure of the turnip crop in North Lincolnshire in 1868, not a Wagtail remained." This, however, seems not to apply so much to this district, as the Wagtail almost exclusively confines itself in winter to the margin of the river, and I have scarcely ever noticed them at that season in the turnip-fields, and not even during the severe weather above mentioned, when frozen out elsewhere.

54. Calobates sulphurea, Kaup. (Grey Wagtail.)

The Grey Wagtail is well represented throughout, and is generally resident with us during the whole year, excepting in very severe seasons; and on all our rivers and burns they may be continually seen coursing along the shingles, or balancing themselves with their long graceful tails on some boulder in mid-stream, the companion of the Water-Ousel. They are much attached to the same locality, and I have known them keep to the same spot for many years. They seem to be early breeders, as I have noticed the young birds flying by the middle of May. In England, during the summer months, it is comparatively a rare bird, being there chiefly a winter visitant, arriving in large numbers in September, and leaving in March. In this district—especially in the lower part of it—large accessions arrive every autumn, chiefly young birds, which, after a short stay, move further south. Before concluding with the Wagtails, I may mention that the true Yellow Wagtail (*Budytes Rayi*, Bonap.), so common in England and some other parts of Scotland, has never been noticed by me as yet in this district, though constantly searched for; nor have I been able to ascertain that it has been observed anywhere in Perthshire.

55. Anthus pratensis, Bechst. (Meadow-Pipit.)

Abundant throughout the whole district, generally remaining in winter, excepting in very severe weather, when it retires to the coast.

56. Anthus arboreus, Bechst. (Tree-Pipit.)

The Tree-Pipit I first noticed some years ago in the Faskally woods, and since then I have frequently met with it in the lower part of the district, and believe it will be found to breed regularly at Moncreiffe, Methven, and elsewhere. It may, however, be considered as rare, and rather local in its habits.

57. Alauda arvensis, Linn. (Sky-Lark.)

The Sky-Lark confines itself more to the arable part of the district, and is consequently more abundant in the lower than the higher parts; but nowhere are they so numerous as formerly. Many have the idea that this is owing to the great abundance in late years of Starlings, which destroy their eggs. This I have never proved to be the case; and it may, I think, be attributed much more probably to other causes, especially as for the last year or two they seem to be again on the increase, while the Starlings certainly have not diminished.

58. Emberiza citrinella, Linn. (Yellowhammer.)

Of all our native birds, with the exception of the Chaffinch, the Yellowhammer is perhaps the most abundant, braving our very severest winters. In spring he graces our hedges and roadsides in his bright yellow livery, and during the whole summer through may be heard his rather monotonous song of *ching, ching, ching, chee-e*, from many a roadside tree, where he sits perched on some prominent twig, with his full yellow breast glistening brightly in the sun.

59. Crithophaga miliaria, Gould. (Corn-Bunting.)

The next on our list, the Corn-Bunting, is as sombre in its plumage as the above is brilliant, but nevertheless makes itself, like its congener, conspicuous by sitting solitary on some exposed branch, or telegraph-wire (of which latter they seem peculiarly fond), emitting from time to time its few short notes, and then, suddenly darting off, settles in the middle of some neighbouring field. Formerly this was a very common bird in all arable parts, but has now become rare, and in many places entirely disappeared, for which the Starling, as with the Lark, gets the credit. The reason is much more likely to be found in the extensive drainage, and the filling up of all the old ditches, which formed its special nesting-places. These have all disappeared, and along with them the Buntings, except in a few localities in some of the broader parts of the Carse of Gowrie, and the neighbourhood of some of the extensive flats at the mouth of the Tay, such as Barry and Tent's Muir. Though a solitary bird for the most part of the year, in winter they are gregarious, associating themselves with Greenfinches, Sparrows, and Chaffinches, frequenting barn-yards and such places. Many of these, however,

may be accessions from the Continent, from whence they are known to visit many parts of this country every season.

60. Schœnicola arundinacea, Bonap. (Reed-Bunting.)

The Reed-Bunting—or, as it is more commonly known in the district, the Coal-Head or Coaly—is resident with us throughout the year, but chiefly confines itself to the lower parts, especially about the Carse of Gowrie and lower Strathearn, where it was once much more numerous than it is at present; for, like the Corn-Bunting, it has suffered greatly from drainage, and the filling in of the ditches in the fields and roadsides, where formerly the male bird in spring might continually be seen, conspicuous in his jet-black cap and snow-white collar. Though now, however, much reduced, it is still to be found in considerable numbers among the great reed-brakes in the tidal parts of the river, where the passer-by, attracted by its somewhat feeble and monotonous chirp, may frequently notice a small group of them among the tall reeds, clinging to the pensile tufts with which they are surmounted, and busily extracting the seeds, and so occupied in the employment as to allow of his close approach, until, becoming alarmed, they fly off and take up a position a little further on.

61. Plectrophanes nivalis, Meyer. (Snow-Bunting.)

As far as my observations have gone, over a long extent of years, the Snow-Bunting I have invariably considered to be a winter visitant only, and not a resident, found more or less throughout the district according to the state of the weather, being in severe winters more frequent. On the coast-line, at the mouth of the Tay, in the months of October and November, I have seen these birds, in certain winds, arriving flock after flock. None of these, however, remain there, but, after settling for a short while, move on further inland. Quoting Mr Horn, in a paper of his on the birds of the north-west of Perthshire, published in the 'Proceedings of the Natural Society of Glasgow,' "The Snow-Bunting breeds on most of the high mountains in this district, especially Ben Lawers and Schiehallion." I am sorry to say I have never had the good fortune of seeing the Snow-Bunting in the breeding-dress on either of these, or any other mountain in Perthshire, though both these mountains and many others have been frequently traversed and thoroughly investigated by me, in the search for botanical specimens during

the season they might be expected to be found; and I think, had the bird been on the mountain at the time, I should more than likely have fallen in with it. The only spot I have ever myself noticed the Snow-Bunting in the breeding-dress, was near the top of Ben Muic-Dhu, in Aberdeenshire, on the 21st of June, when I saw a pair at the edge of the snow at an altitude of 3900 feet, in full summer plumage, but no nest was found. I have also had a notice from Mr J. T. Carrington, an observing naturalist, who for some time resided in Rannoch, and who had traversed most of the hills in that vicinity, as well as in other parts adjoining, and he tells me that on the high mountains on Loch Laggan-side, in Inverness-shire, they were to be found in the breeding dress, but that the nests had not been discovered, and the bird had not been noticed by him elsewhere.

62. Passer domesticus, Ray. (House-Sparrow.)

The House-Sparrow, everywhere common, has much increased of late years in many places, especially in the upper parts of Athole, where the Sparrow, which now abounds, I can recollect, was considered to be rather a scarce bird than otherwise.

63. Fringilla cœlebs, Linn. (Chaffinch.)

Of all our birds, this is the most abundant: nothing seems to thin their ranks. In winter assembling in large flocks, the sexes generally separate (hence the name *cœlebs*), and when driven from the fields by stress of weather, by visiting stack-yards and out-houses, they generally manage to pull through. Hardy by nature, even through the long-protracted winter of 1878-79, their ranks were not perceptibly diminished, being apparently as numerous next spring as ever, though many other species suffered severely.

64. Fringilla montifringilla, Linn. (Bramble-Finch.)

During the winter months the Brambling is pretty generally diffused, though rather local in its habits, preferring, for the sake of beech-mast, their natural food, those places in which there is a preponderance of beech-trees. In the lower part of the district they are especially common about Moncreiffe, Methven, Dupplin, &c. When the mast fails, they resort to the barn-yard, in company with chaffinches, from which, in their winter plumage, at a little distance, they are not easily to be distinguished. Mr Horn mentions that Mr E. T. Booth has taken a nest of the

Brambling in Glen Lyon. This is highly interesting, being the first notice I have had of its breeding in the district, and especially as their nesting in this country is not common.

65. Carduelis elegans, Steph. (Goldfinch.)

I am glad to see that Mr Horn has found lately the Goldfinch to be tolerably numerous, in the summer months, about Aberfeldy. This is highly gratifying, as fears were entertained that this beautiful little bird was gradually becoming extinct in the district. With the exception of a pair seen by me at Moncreiffe two or three years ago, I had not noticed it for very many years. When a boy, the Goldspink, or Goldie, by which name it was generally known, was quite a common bird in the Carse of Gowrie, where it is now entirely extinct: it bred regularly every year at Megginch, and other places in the neighbourhood. It has of late, I am glad to say, been frequently observed by Mr Malloch, Perth, about Methven; and it is to be hoped it may now be on the increase, and that wherever met with, it will be spared. Fortunately, the trade of bird-catching is not now so prevalent as it used to be, at least in this district, so that the Goldfinch has the more chance in its favour.

66. Chrysomitris spinus, Boie. (Siskin.)

During the winter months this beautiful little bird, which is frequently confounded by the people with the Goldfinch, and called by them the Goldie, abounds in many parts of the district, especially when the catkins of the alder are ripe and it is a good season for them. Last year, there being few or no catkins on the alders in this immediate neighbourhood, the Siskin never made its appearance, though in ordinary years, during the winter, they may be seen day after day, on the river-banks, busily extracting the seeds; and so occupied are they, as to admit of a stranger walking up to the very foot of the tree without being alarmed: if fired at they will go to a neighbouring tree, and perhaps shortly return. They have been known to breed about Pitlochrie, Rannoch,[1] Strathtay opposite Dalguise,[2] and no doubt do so in many other of the more Highland parts of the district; for owing to the extreme cunning of the bird, it may easily be overlooked.

[1] Zoologist, 1877, p. 2656.
[2] Horn, Proceedings Nat. Hist. of Glasgow, Feb. 1879, p. 59.

67. Ligurinus chloris, Koch. (Greenfinch.)

This is another of our hardy birds, braving the severest winters; and it is numerous throughout the whole district, more especially in places where shrubberies and evergreens abound, to which they are very partial for roosting purposes, where they may be seen trooping in from every part of the neighbourhood shortly before sunset. Resting first on some bare tree-top, they suddenly dart down into the dense bushes, coming night after night to the same spot.

Coccothraustes vulgaris, Flem. (Hawfinch.)

Two of these birds were shot near Murray's Asylum, Perth, in the severe winter of 1860-61, and came into the possession of Dr M'Intosh, who kindly presented one of them to the Perthshire Society of Natural Science. I have not been able to ascertain whether the Hawfinch has ever been, before or since, noticed in the district, or in any part of Perthshire or adjoining counties, comprising the basin of the Tay. Being more a denizen of the south of England than of Scotland, these birds may possibly have been foreigners driven over by the severity of that winter.

68. Pyrrhula vulgaris, Temminck. (Bullfinch.)

The Bullfinch, though formerly pretty generally distributed throughout, has of late years become much scarcer in the lower parts than formerly. In the Carse of Gowrie and on the Braes, it used to be pretty numerous: few now are ever seen, and in this particular neighbourhood (the west end of the Carse), where they used to be common, breeding every year, they are now nearly extinct, partly owing to the Perth bird-catchers, and partly owing to the raids made against them in every direction by gardeners and others, supposing them to do much injury to the fruit-buds. Against this theory I may repeat what I stated to Mr Horn, and which he has transcribed in the paper before mentioned: "In its defence, however, I may say that I have known an apple-tree, in the neighbourhood of Pitlochrie, under which the whole ground was positively strewed with buds; and yet, when the autumn came round, this very tree, which in spring had all the appearance of having been destroyed by Bullfinches, bore a heavier and finer crop than any other tree in the garden. This may have been from the fact of being partially disbudded, or the buds that were

destroyed having been affected with caterpillars, and so prevented their spreading, leaving the buds that remained to perfect their fruit in security." In corroboration of this, I quote the following from a correspondent in the 'Journal of Horticulture,' vol. iii. p. 15: "In the spring of 1857, living in a part of the country where Bullfinches abounded, on looking over some dwarf standard apple-trees on a certain Monday morning, I found the ground strewed with their buds, the Bullies having taken advantage of the previous Sunday, when all was quiet, to commit their work of havoc; one tree in particular was so divested of its buds, that I considered it ruined for the season. Business called me away for some time, and I did not return till the autumn of the same year, when, on examining my little trees, to my amazement I discovered that those which had been attacked by the Bullfinches were loaded with fruit, especially the one which was apparently stripped of all its buds,—so much so, that the branches had to be propped, and nearly three dozen fine fruit were gathered off it." Another article of the same nature appears in the 'Cottage Gardener Magazine' for January 21, 1860, p. 277, by Mr P. B. Brent; but the trees operated upon on this occasion by the Bullfinches, and disbudded, were plums, cherries, and gooseberries, which appeared completely destroyed by them, to the great despair of the owner; but in the following summer they bore large crops of fruit. I have thought it right to bring these instances prominently forward, there being in the present day so inveterate a prejudice in many parts against these beautiful birds, that if the war of extermination goes on much longer, they will be shortly lost to us altogether. In some of the upper parts of the district, in the larch forests about Dunkeld, I am glad to say the Bullfinch still holds its own; and long may it do so.

PINICOLA ENUCLEATOR, Gould. (Pine-Grosbeak.)

I should not have mentioned this bird here had not Mr Horn, in his paper referred to, given me as an authority for its appearance at Dunkeld, and my mentioning it at all was by way of throwing out a mere suspicion that certain birds I had seen were possibly the Pine-Grosbeak. Not having been able to obtain a specimen, the mere fact of seeing what appeared to me to be the bird would be of no value. However, having since become well acquainted with it, or the closely allied species, in Nova Scotia, I have little doubt but that the birds in question were

really Pine-Grosbeaks. It is now a great many years ago, some time in early winter, that I observed at Butterstone Loch, near Dunkeld, not far from the road, several birds (about five or six in number), most of them of a bright red colour, feeding on some young larch-trees. They were so very much larger than either the Bullfinch or the Crossbill, that my attention was at once attracted to them; but as there is no record of their having been observed, either before or since, even if right in my conjectures, their appearance must be held to be purely accidental.

69. Loxia curvirostra, Linn. (Crossbill.)

The Crossbill, I believe, is to be found more or less every year somewhere in the district. Some years it has been known to visit us in countless numbers—a remarkable instance of which occurred in my own recollection in the year 1838, which was a wonderful year for the superabundance of cones on the spruce-trees: "We were visited in the Carse of Gowrie by hundreds of Crossbills, and many were seen in the following year, but not in such numbers. I have never seen them in the same locality since, or have I ever again noticed the cones to be anything like in the same quantity as they were that year."[1] As mentioned by Mr Horn, I have frequently noticed these birds in the Dumfallinday fir-woods, near Pitlochrie, in the months of February and March, at which time, being an early breeder, they were no doubt nesting.

Loxia leucoptera, Gmel. (American White-winged Crossbill.)

Some few years ago, what I took to be the American White-winged Crossbill was seen by me in the Kinfauns woods, near Perth, in a small party of six or seven; but I was unable to obtain a specimen. Knowing the bird well in Nova Scotia, I hardly think I could be mistaken.

70. Linota cannabina, Bonap. (Linnet.)

This bird is particularly abundant throughout the district at all seasons. Not only do we see them in pairs on our roadsides and moorlands in the summer months, but also are they common in winter, congregated in large flocks in many of our fields, industriously searching for their food, small seeds, of which they find a bountiful supply in that of the Sheep's Sorrel (*Rumex*

[1] Scottish Naturalist, vol. iv. p. 97.

acetosella), Creeping Persicaria (*Polygonum aviculare*), and other vegetable pests of the farmer. On fine winter evenings, when not so employed, they may be seen densely crowded on the top of some solitary tree, twittering out their songs in a full chorus of voices. This same sociable habit of singing in chorus is also peculiar to the Redwing (see Scot. Nat., v. p. 110).

71. Linota montium, Bonap. (Mountain-Linnet.)

During the autumn and winter months, these birds assemble in small flocks on the braes of the Carse and other high grounds, but are mostly composed of young birds. I have no notice of their breeding in the district, and suspect that their nesting-places are much farther north, as I have found them abundant in Orkney in the summer months. Mr Horn does not mention having seen the Mountain-Linnet in Strathtay. Though much resembling the Common Linnet, it is easily to be distinguished by its yellow bill, its difference of note, and being rather more lengthy, as it were, in appearance.

Ægiothus linaria, Baird. (The Mealy Redpole.)

Though alluded to by Mr Horn as mentioned in the new 'Statistical Account of Scotland,' I do not think there is sufficient evidence to warrant its insertion here as a bird of the district. I have obtained it in Shetland, but have never heard of it in Perthshire, or had any notice of its being found in any part of the adjoining counties which may be considered as falling within the limits of the basin of the Tay.

72. Ægiothus rufescens, Gould. (Lesser Redpole.)

This is not a common bird in this district. They are occasionally seen in winter, either singly or in small parties of three or four individuals, feeding on the ground. The only notice I have of them in summer is from Mr Malloch, Perth, who has observed them breeding about Methven nearly every season.

73. Sturnus vulgaris, Linn. (Starling.)

The Starling, like the Missel-Thrush, everywhere so numerous, was, within my own recollection, unknown to the district; and Sir John Ogilvy of Baldovan has mentioned to me having noticed the same fact in Forfarshire. Now, in the present day, on some fine autumn evening, should you be enjoying a pull upon the river, many thousands of Starlings may be seen, united in one

gigantic body, wheeling about over the great reed-brakes on Mugdrum Island, and other tidal parts of the Tay (their great roosting-places), into which, after performing a series of most eccentric evolutions, they suddenly, as it were, at a given signal, precipitate themselves, in one vast mass—buried out of sight, but joining in one universal chatter and confusion of voices, which, after a while, subsiding, they settle down for the night; and at early dawn, separating into small parties, they wing their way to their several haunts. And it is most amusing to hear them, on their return, perched on some high tree-top, giving out to each other the lessons they have evidently learned during their sojourn in the abode of the Curlew and the Sandpiper,—representing the several cries of these birds, and a host of others, such as Golden-Plover, Peewits, Redshanks, &c.—imitated so perfectly that it would take a nice ear to detect the deception; and many a time have I been quite startled on hearing the loud, trilling notes of the Curlew proceeding from the tree straight above me.

PASTOR ROSEUS, Temm. (Rose-coloured Pastor.)

Though there are several instances, but not of late years, of the Rose-coloured Pastor being noticed in the district, it can only be considered as an accidental visitant. Mr Horn makes mention of one obtained at Dunkeld on the 29th of September 1831; and a very fine specimen, in the full rose-coloured plumage, was shot, in August of 1832, sitting on some pea-stakes in the garden at Megginch; and another specimen, also in full plumage, was obtained, just ten years afterwards, in 1842, at the same time, and at the same spot, and exactly under similar circumstances. Another was obtained at the same place a year or two afterwards; and early in September, seven or eight years ago, I observed a strange bird, which flew close past me, from out of the reeds on Mugdrum Island, which I feel confident to have been a Pastor, in the young plumage,—in which state it was well known to me in the Mediterranean. Besides these authenticated specimens, there may have been possibly other instances in the district not recorded.

74. CORVUS CORAX, Linn. (Raven.)

Common in many of the deer-forests and higher grounds in the upper part of the district, where they are still to be found in considerable numbers.

75. Corvus corone, Linn. (Carrion-Crow.)

76. Corvus cornix, Linn. (Hooded-Crow.)

After the very elaborate and carefully-worked-out argument for the Carrion and the Hooded Crow being of one and the same species, by Professor Newton, in his new edition of Yarrell, I feel scarcely justified in placing them under separate heads as distinct species, but, for convenience' sake, do so in the present instance. In olden days, the *Huddies*—as both the Carrion and Hooded Crow are indiscriminately denominated in this part of the country, the name more especially, however, pertaining to the former, as being the more common of the two, in distinction to the Rook, which is invariably known, in these parts, as the *Crow*—were more numerous than they are at present, and I have distinct recollection of frequently getting them, as it were, in an intermediate state; and in those days we always considered the ones with the greyish back to indicate age, and, though of this greyish colour, to be perfectly distinct from what I may call the real Hooded-Crow, which was a much scarcer bird, and generally only an autumn visitor, confining itself to the open moors and tidal banks of the river. The Carrion-Crow is, of the two, by far the more generally spread throughout the district, and the one, I believe, that more regularly breeds with us. The pure hooded variety I still occasionally see in the autumn months, on the mud-banks on the lower parts of the Tay; and I have a fine specimen, in full plumage, that was trapped at Dunkeld on the 17th December 1872.

77. Corvus frugilegus, Linn. (Rook.)

Abundant throughout the whole district, which contains many large and populous rookeries, many of them in some parts not being much above a mile or two distant from each other. Though farmers may complain of a few potatoes destroyed, or of some young wheat grubbed up, still the enormous amount of good that is effected by these birds, in the wholesale destruction of grubs, wireworm, and other pests highly injurious to the crops, can hardly be estimated. The wonderful instinct by which the Rook will detect even a particular part of a field infected by wireworm, and cluster round the spot in hundreds till every one is eradicated, is something quite extraordinary, and well compensates the farmer for the slight mischief he may do.

78. Corvus monedula, Linn. (Jackdaw.)

Abounds throughout the whole district. The Jackdaw has a bad name, both as a pilferer of fruit and a purloiner of eggs; but what is worse, it has a strong propensity for young chickens and pheasants, which he will boldly carry off, in defiance of an enraged mother, with drooping wings and ruffled plumage.

79. Pica caudata, Linn. (Magpie.)

The Magpie, once most common, is now so reduced in the district, that, with the exception of a few outlying places, it is scarcely ever seen.

80. Garrulus glandarius, Linn. (Jay.)

This beautiful bird, like the Magpie, is also greatly reduced in numbers, both in the upper and lower parts, but especially in the latter. I am glad to find, however, that Mr Horn reports its rapid increase in Strathtay.

81. Cuculus canorus, Linn. (Cuckoo.)

The Cuckoo is still common in Strathtay, and many other localities in the upper part of the district. I regret to say, however, that the bird is not nearly so abundant as formerly in the Carse of Gowrie and the lower part of Strathearn; and this, I fear, is greatly owing to that abominable invention the pole-trap, already alluded to. I have been told that an admission has been made of *one hundred* Cuckoos having been taken in a single season, in one neighbourhood alone, by this means,—not to say that the traps were set intentionally for the destruction of the Cuckoo, for I have no doubt the parties who did it were sorry for it; but of course, if any bird sufficiently heavy to fly the spring perches on a pole set up on some tempting spot, it must be caught—and not only birds, but other bipeds too. An amusing story was once told me, happening not half a century ago, and certainly not fifty miles from Perth, of how two English tourists, bent on seeing the country, made an early start one morning, and the better to view the surrounding district, ascended a wooded hill in the vicinity. On approaching the summit, they beheld in an open space what they believed to be a bear-pole, with cross steps leading up, suggestive of the "Zoo." What else could it be? "Oh," says No. 1, "it must be the better to view the country over the tree-tops; I will go up

and see,"—and nimbly ascending, and placing his hand on the top to get a firmer hold, an ominous click is heard, accompanied by a violent scream. Up jumps No. 2, to discover that his friend is firmly fixed in a trap, which, try ever so hard, obstinately refuses to open, being double-springed. There is nothing for it but to wait patiently and holloa for assistance. To be heard, however, at some hundreds of feet above civilisation, is no easy matter. The head-keeper, a good couple of miles distant, starts on his morning rounds. Suddenly his attention is arrested by a distant scream. Gazing upwards from whence the sound proceeds, a large object is seen upon the pole, and he at once jumps to the conclusion he has caught a gigantic eagle, and rushing homewards for the glass, attentively scans the rock, and soon discovers how matters stand. A good half-hour's climb at last enables him to reach the spot and liberate his quarry. This, it is to be hoped, will be a caution to all tourists as well as Cuckoos.

82. Picus major, Linn. (Great Spotted-Woodpecker.)

So many instances have occurred of this bird having been noticed in different parts of the district, that it seems quite entitled to be included in this list. I have no notice of its breeding,[1] and these may only be foreigners which have reached us from the Continent. The late Dr Saxby makes mention of several large flights frequently reaching Shetland in the autumn months, and many of these may strike different parts of the coast, and so diffuse themselves through the country where best suited to them.

Gecinus viridis, Boie. (Green Woodpecker.)

Mr Thomas Marshall, Stanley, in a recent letter to me, informs me that he saw two of these birds in the woods opposite Stanley some few years ago, and that they allowed him to approach quite near, so that he could not mistake the species, and that he watched their movements for some time with great interest. They

[1] Since writing the above, Mr Harvie-Brown has kindly sent me a notice of his in the 'Zoologist' for March 1880, with regard to the decrease of the Greater Spotted-Woodpecker in Scotland, in which he states "that there are many accounts to be found of its former occurrence as a nesting species in Scotland—more especially in the ancient forest of Rothiemurchus." This being so adjacent to the Tay district (should the Grampian range not have been an insuperable bar), might not possibly the black wood of Rannoch (of similar character to that of Rothiemurchus) have been also a nesting-place in former days?

flew from tree to tree, generally alighting near the ground, and rapidly making their way to the top, sometimes in cork-screw fashion, and other times in a zigzag manner. This is highly interesting, as being the first notice I have ever had of these birds being found in Perthshire. There having been no further occurrence of their visits, however, to the district, they can only be considered as purely accidental.

83. YUNX TORQUILLA, Linn. (Wryneck.)

For observations on this bird, see 'Scot. Nat.,' Oct. 1878, p. 332.

(*To be continued*).

NOTES ON BIRDS THAT HAVE OCCURRED NEAR STANLEY, IN PERTHSHIRE.

BY THOMAS MARSHALL.

IN drawing up the present list of birds, I have not confined myself strictly to Stanley, but have included those found within three or four miles of the village. I may also state that a few, although rare in the district, are by no means uncommon on the sea-coast, and come inland at rare intervals.

Business keeps me pretty much indoors, so that I have not the opportunity of devoting so much time to the study of ornithology as I should like; but I have no doubt that, with more observers, a good many birds, rarely seen, or entirely unknown, in the neighbourhood, might be observed and recorded.

1. GREAT GREY SHRIKE (*Lanius excubitor*, L.)—This bird is not common anywhere in this country. It has been observed in all the English counties—in some of them several times; it is also reported from a good many of the Scottish counties; and it has occurred, in a few instances, in Ireland. With us it is a winter visitor, but in no well-authenticated instance is it known to have bred in Britain.

The Great Grey Shrike feeds on small birds, mice, frogs, and insects. After killing its prey, it has a curious habit of hanging up the body in a forked branch, or impaling it on a sharp thorn: it is named the Butcher-bird from this strange habit of hanging up its food. In January 1877 a male was shot in Colon wood; and a month later, a female was got near the Stormontfield ponds.

2. The Goldfinch (*Carduelis elegans*, Stephens).—This fine cage-bird was common in Perthshire fifty or sixty years ago; but now it is rarely, if ever, seen in a wild state. The disappearance of this species is accounted for by the scarcity of its favourite food,—such as thistles, burdock, knapweed, plantain, &c. With the reclamation of so much waste land, the various weeds on which it feeds have got scarcer every year. It is also very easily caught,—a large number are netted every year in the southern counties of England.

The Goldfinch still breeds in various parts of England, and probably in the south of Scotland. In Great Britain it is a partial migrant: a few remain in England during the winter, but the greater part gradually make their way to the south coast, and then disappear across the Channel. About twenty years ago I caught a male Goldfinch with a limed twig: that was the only one I ever saw flying wild. It is too well known to require description.

3. Greater Spotted Woodpecker (*Picus major*, L.)—This species is found over the whole of Europe, and also on the American continent. In this country it is nowhere common, generally being found in wooded districts, and sometimes in gardens, where it is said to do considerable damage to the fruit, being very partial to cherries and plums. Its food consists principally of insects and larvæ: it alarms the insects from the crevices in the bark by vigorously tapping the trees with its bill, the noise of which can be heard for a considerable distance. The male is about ten inches in length; the bill is of a dark horn colour, the irides purple-red; the forehead is of a yellowish-white colour, the crown black; at the back of the head is a bright scarlet stripe; on each side of the head there is a white patch; lower down, on the neck, is a smaller white patch, and over the wings is a long white stripe; the back is black; three white bars run across the wings; throat and breast buff white; under-tail coverts red; the legs and toes black. The female is without the red on the back of the head. One—a male—was shot at Strathord saw-mill some years since, and another in the Five-mile Wood, near Stanley.

4. Green Woodpecker (*Gecinus viridis*, L.)—This is a very rare bird with us. It is plentiful in some of the English counties, but is nowhere common in Scotland. Ten or twelve years ago I saw a pair of these pretty birds in the Cottage Wood, across the river from Stanley. My attention was drawn to them by the

loud tapping noise made by their bills on the trees. They were by no means shy, allowing me to get within thirty yards of them without appearing to be in the least disturbed. They flew from tree to tree, generally alighting near the base, but quickly made their way to the top of the trunk. They sometimes ascended in a spiral form; at other times went straight up for a few yards, then all at once would start off in a zigzag direction. The strong wedge-shaped bill of this bird enables it to bore into decayed wood without difficulty.

The tongue of the Woodpecker is a remarkable organ: it is very long, and almost transparent. It has the power of extending it a good way beyond the bill, and withdrawing it in a very rapid manner. From the point it exudes a sticky substance resembling liquid glue; and thus it is eminently fitted for extracting the insects and their eggs, and caterpillars and spiders, on which it feeds, from the fissures in the bark.

5. Wryneck (*Yunx torquilla*, L.)—This is a very handsome though plain-coloured bird. It seems to be nearly allied to the Woodpeckers. The toes are long, and placed two before and two behind. Its tongue is also similar, being long and hard at the point: it projects it considerably beyond the mouth in catching its prey, which consists of insects. Its actions are also similar to those of the Woodpeckers,—often seeking its food in the stems of old trees. It is very fond of ants and their pupæ, and larvæ, which are captured by means of its long projectile tongue, to the glutinous substance on which they adhere. It places its nest in holes and crevices of trees,—the soft fragments of rotten wood being its only lining. The eggs are white.

This bird is rarely found in Scotland, though it is not uncommon in the south-eastern counties of England, where it arrives in April, and departs again in September. A specimen was captured by a lad on the bank of the Caledonian Railway at Stanley on the 6th September 1878.

6. Dunlin (*Tringa alpina*, L.)—On the 6th January 1871 a Dunlin was shot on the Tay, near the Stormontfield ponds. This is the only one I have heard of having been got in the neighbourhood; but it is common on the sea-coast. There it is nothing unusual to see a flock of over one hundred at a time. They are active little birds, and may be seen every now and again running along the beach in a very rapid manner, when, all at once, they stop and nod the head and toss up the tail: this movement is generally repeated two or three times, and off

they run again. They often sweep out to sea, generally flying in a semicircle; but sometimes they return to the spot from which they set out, after flying about for a time.

7. Ringed Plover (*Ægialitis hiaticula*, L.)—This is a pretty little bird, and not unlike the Dunlin in its habits. It is very common on the coast, but may be considered rare inland. It occasionally makes its appearance near Stanley, and breeds in Perthshire. The nest, which scarcely deserves the name, is a slight hollow, scooped out generally in the sand or gravel. The eggs are four in number, and of a greenish-grey colour, spotted and streaked.

8. Razor-bill (*Alca torda*, L.)—This is a common sea-bird, but is seldom seen far inland. In February 1873 an adult, in winter plumage, was killed with a stone in a small burn that runs into the Tay at Burnmouth Ferry.

The Razor-bill is a migratory species, and makes its appearance from the north in September, returning thither again in March and April. Of course a great many breed on the rocky parts of our coasts, but their number is largely increased by the arrival of the migrants from the north.

9. Red-throated Diver (*Colymbus septentrionalis*, Latham). —The Red-throated Diver has, so far as I know, been twice got on the Tay, near Stanley. One was shot four years since, and in the spring of 1878 one, a wounded bird, was killed with a stone, and offered to me for sale. This bird has a very awkward appearance when on land—its legs are placed so far back on its body that it can only walk with difficulty; but in the water it is very active, and, as its name indicates, is an expert at diving. It feeds principally on small fish. It is a very pretty bird. The throat, in summer, is of a bright reddish-brown colour; the breast is white, and the upper part of the head and neck and the back are of a bluish-black or lead colour. In winter the back is of a black ground, speckled with white, and the throat and breast white.

10. Cormorant (*Phalacrocorax carbo*, L.)—This bird is rare in the district. In October 1878 one was seen on the Tay, near the Salmond ponds, almost daily for a fortnight. It frequented a croy at Benchill fishing-station very much. It sometimes sat on the croy preening and arranging its feathers; and now and again it was in the habit of shaking its wings vigorously, and spreading them out in a curious manner, as if to dry them. It occasionally sat for a considerable time so employed; then it would suddenly disappear under the water, and reappear, after perhaps half a

minute, bearing an eel or a trout in its long hooked bill. The Cormorant is a very voracious feeder, and has great powers of digestion. Mr St John relates that one shot on the Beauly river in January 1850 was found to have swallowed a kelt grilse weighing above 4 lb. and measuring 22 inches in length: the tail of the fish actually extended out of the mouth of the bird.

To see the Cormorant, or indeed any bird, aright, one must visit their native haunts, and see them at home. In the summer of 1874 I visited Shetland, where these birds are very plentiful. There it was quite a common occurrence to see from twelve to twenty, all in a row, on the top of some favourite rock, in the act of drying their wings as already described. I can well remember the first shot I had at the Cormorants. We sailed to within forty or fifty yards of the birds, and getting them in line, I expected to make great havoc amongst them. I fired, when in they plunged in a body. I thought that I would at least have had the pleasure of picking up two or three good specimens; but fancy my chagrin on finding that they had been too wide-awake for me, as I believe that, by the time the shot reached the rock on which they were sitting, they had either disappeared or were fast disappearing into the sea. Presently, near the spot where the Cormorants sank, as if into a watery grave, the head and a part of the arched neck of one cautiously appears above the sea, with a knowing look, as much as to say, I am all alive and kicking: another and another head and neck appear above the tide, again to be mysteriously withdrawn. This is repeated until the source of danger has disappeared. A young Cormorant was shot on the Tay, near Ballathie, last autumn.

11. Canada Goose (*Bernicla canadensis*, L.)—In February 1868 my father shot a fine specimen on the Tay, near the Stormontfield ponds; but whether a tame bird, escaped from an ornamental water, or a wild visitor, is uncertain. These birds are, however, so frequently obtained all over the country, without bearing any marks of captivity, that it is not improbable occasional flocks may visit us from Greenland or the American continent. This bird weighed 11 lb.; it was 3 feet 6 inches in length; and when the wings were extended, it measured nearly 7 feet from tip to tip. It is black on the head and neck; the back is dusky black; on the chin and throat is a white stripe, widest in the centre, and gradually running to a point on the sides of the neck, somewhat resembling a cravat. It is nearly white on the breast, and ash-coloured below.

During the last ten years passing flocks of from five to eight have been observed at intervals. It is found on the American continent as far south as Carolina.

12. Pintail (*Dafila acuta*, L.)—The Pintail, both in shape and plumage, is one of our most beautiful ducks. With us it is very rare. One—a young male—was shot on the Tay, at Taymount, a few years ago, this being the only one I have heard of being got in the district. The male Pintail assumes the female plumage in summer, as is the case with the Mallard and a few other ducks.

The female is of the same slender and elegant make as the male, but without the two long middle tail-feathers. In colour it resembles the common wild duck, but can be easily distinguished by its shape, and by the longer tail, which is slightly pointed.

The Pintail frequents the reedy borders of lakes, rivers, and ponds, and is seldom seen on the sea-coast.

13. Shoveller (*Spatula clypeata*, L.)—In spring last year a fine male Shoveller was shot at Ballathie, and brought to me to stuff. It is very rare with us. This is the only one, so far as I know, that has been got in the district. There was a female along with the male when it was shot; and Mr Sime (on whose farm it was got) informs me that, in a short time after, it returned to the same place accompanied by another male. I am inclined to think, however, that the same female would be very unlikely to return so soon to the spot where its mate was shot, and that very likely it was a different pair that returned. Had they been left undisturbed, they would very likely have bred with us.

14. Pochard (*Fuligula ferina*, L.)—The Pochard is not so scarce with us as the Shoveller, but still is far from common. I have only heard of three being got in the neighbourhood of Stanley.

This is a winter visitant to us, arriving with the first cold or stormy weather, and remaining till spring. They frequent fresh-water marshes and rivers, and also the coast. It is a very active bird in the water, and dives rapidly, remaining for a long time under the surface. It is a round plump bird, and is esteemed for the table. The eye is of a peculiar blood-red colour, which gives the bird a rather bold expression. It is very easily tamed.

The female resembles the male, but is of a less decided colour and a more dingy hue.

15. Tufted Duck (*Fuligula cristata*, Leach).—This is also a rare duck with us. I know of three having been got in the district: one—a male—was shot on the Tay, at Ballathie, in the spring of 1875; and in May 1877 a pair were killed with one shot on a mill-dam within a mile of Stanley. They would likely have bred with us had they not been killed. It is a plump, round-made bird, and is considered good eating. It is lively and active on the water, and a very expert diver.

The female is of a dull rufous-brown colour, except the under parts, which are white mixed with grey.

16. Scaup (*Fuligula marila*, L.)—The Scaup in its general character and habits resembles the Pochard very much, but it keeps to the sea more than the latter.

The Scaup is wholly a winter visitor to this country, arriving in autumn, and departing in spring for the far north to breed. It frequents the sea-coast and estuaries, especially where the water is shallow and muddy. Two years since, I observed many in the Tay near Dundee, where they were in flocks of ten or twelve. My father shot a female in the pond at Stormontfield eight years ago: this is the only one I have heard of being got in the district.

The male resembles the Pochard pretty much, but its head is of a greenish-black colour, and the eye is light-yellow, which in the Pochard is red, and the head is of a chestnut colour. The female is dark brown on the back, and the under parts are white, tinged with red, and it has a white patch on each cheek.

Stanley, by Perth, *January* 1880.

Water-Spider (*Argyroneta aquatica*, Clerck) **near Aberdeen.**—Among a handful of water-weeds gathered by me in a marsh on Scotston Moor, near Aberdeen, in October 1878, and examined for the usual microscopic organisms of such localities, I was surprised to discover a male Water-Spider. It lived in a jar in which some of the weeds were grown, apparently obtaining sufficient food from small crustacea and larvæ, which swarmed in the water. On the approach of the present winter it became torpid, and seemed to be dying; so, to make sure of the species, it was carefully examined, and thereafter put into spirits, after it had lived over fifteen months in the jar. This seems to be the first notice of the occurrence of this species in Scotland, as it is not noticed in Mr Cambridge's list of Scottish Spiders published in the 'Zoologist' in 1877. In England it seems to be best known in the midland counties. Probably it is much more widely distributed than is generally supposed, its habit of living under water rendering its discovery somewhat more difficult than with other spiders.—James W. H. Trail, Aberdeen, 26*th February* 1880.

PHYTOLOGY.

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 234.)

Rosaceæ.

(From the Celtic. Gaelic, *ròs;* Welsh, *rhos;* Armoric, *roscn;* Greek, *ῥοδον;* Latin, *rosa.*)

Prunus spinosa—Blackthorn, sloe. Gaelic: *preas nan airneag*, the sloe bush. Irish: *airne*, a sloe.

"Sùilean air lidh *airneag*."—Ross.
Eyes the colour of sloes.

Sgitheach dùbh,—the word *sgith* ordinarily means weary, but it means also (in Irish) fear; *dubh*, black, the fearful black one, but probably in this case it is a form of *sgeach*,[1] a haw (the fruit of the white thorn), the black haw. Welsh: *eirinen ddu*, the black plum; *eiryn*, a plum.

"Crùn *sgitheach* an aite crùn righ.—M'Ellar.
A crown of thorns instead of a royal crown.

Droighionn dùbh, the black penetrator (from *druid*, to penetrate, pierce, bore). Compare Gothic, *thruita;* Sanscrit, *trut;* Latin, *trit;* Welsh, *draen;* German, *dorn;* English, *thorn.*

"Croin *droignich* 'on ear's o'niar."—Old Poem.
Thorn-trees on either side.

P. damascena—Damson. Gaelic and Irish: *daimsin* (corruption).

P. insititia — Bullace. Gaelic and Irish: *bulastair.* Compare Breton, *bolos;* Welsh, *biolas*, sloes.

P. domestica—Wild plum. Gaelic: *plumbais fiadhainn*, wild plum; *plumbais seargta*, prunes. Latin: *prunum.*

P. armeniaca—Apricot. Gaelic: *apricoc.* Welsh: *bricyllen.* Regnier supposes from the Arabic *berkoch*, whence the Italian *albicocco*, and the English *apricot;* or, as Professor Martyn observes, a tree when first introduced might have been called

[1] *Sgeach*, also a bush.

a "præcox," or early fruit, and gardeners taking the article "a" for the first syllable of the word, might easily have corrupted it to apricots.

P. cerasus—Cherry-tree. Gaelic: *craobh shiris*, a corruption of Cerasus, a town in Pontus in Asia, from whence the tree was first brought.

"Do bheul mar t' *siris*."
Thy mouth like the cherry.

Welsh: *ceiriosen*.

P. padus—Bird cherry. Gaelic: *craobh fhiodhag*, from *fiodh*, wood, timber; *fiodhach*, a shrubbery.

P. avium—Wild cherry. Gaelic: *geanais*, the gean. French: *guigne*, from a German root.

Amydalus communis—Almond. Gaelic: *amon*, *cno ghreugach*, Greek nut.

A. persica—Peach. Gaelic: *peitseag*, from the English.

Spiræa ulmaria — Meadow-sweet, queen of the meadow. Gaelic: *crios* (or *cneas*) *Chu-chulainn*.[1] The plant called "My lady's belt" (M'Kenzie). "A flower mentioned by M'Donald in his poem '*Alt an t-siucair*,' with the English of which I am not acquainted" (Armstrong).

It is *not* mentioned in the poem referred to, but in "*Oran an't Samhraidh*"—The Summer Song.

"S'cùraidh faileadh do mhuineil
A chrios-Chù-Chulainn nan càrn!
Na d' chruinn bhabaidean riabhach,
Lòineach, fhad luirgneach, sgiamhach.
Na d' thuim ghiobagach, dreach mhìn,
Bharr-bhùidhe, chasurlaich, àird;
Timcheall thulmanan dìamhair
Ma'm bi 'm biadh-ionain a fàs."—M'Donald.

Sweetly scented thy wreath,
Meadow-sweet of the cairns!
In round brindled clusters,
And softly fringed tresses,
Beautiful, tall, and graceful,
Creamy flowered, ringleted, high;
Around sheltered hillocks
Where the wood-sorrel grows.

Welsh: *llysiu'r forwyn*, the maiden's flower.

[1] Cù chullin's belt. Cùchullin was the most famous champion of the Ulster militia in the old Milesian times. He lived at the dawn of the Christian era. He was so called from *Cu*, a hound, and *Ullin*, the name of the province. Many stories are still extant regarding him.

S. filipendula—Dropwort. Gaelic and Irish: *greaban*—probably from *greadh*, to prepare food.

> "A *gread* na cuilm."—OSSIAN.
> Preparing the feast.

Linnæus informs us that, "in a scarcity of corn the tubers have been eaten by men instead of food." Or from *greach*, a nut. Welsh: *crogedyf*,—*crogi*, to suspend. The tuberous roots are suspended on filaments; hence the names *filipendula* and *dropwort*.

Geum rivale—Water avens.[1] Gaelic: *machall uisge;* in Irish: *macha*, a head, and *all*, all—*i.e.*, allhead—the flower being large in proportion to the plant. *Uisge*, water. It grows in moist places only.

G. urbanum—Common avens. Gaelic: *machall coille*,—*coille*, wood, where it generally grows.

Dryas octopetala—White dryas. Gaelic: *machall monaidh*, the large-flowered mountain plant. (The name was given by an old man in Killin from a specimen from Ben Lawers in 1870.)

Potentilla anserina—Silverweed, white tansy. Gaelic: *brisgean* (written also *briosglan*, *brislean*), from *briosg* or *brisg*, brittle. *Brisgean milis*, sweet bread. "The *brisgean*, or wild skirret, is a succulent root not unfrequently used by the poorer people in some parts of the Highlands for bread" (Armstrong).

The skirret (*Sium sisarum*) is not native. The plant here alluded to is *Potentilla anserina*. *Bar bhrisgean*, the flower. Welsh: *torllwydd*, from *tori*, to break.

P. reptans — Cinquefoil. Gaelic: *meangach*, branched or twigged, — *meang*, a branch; because of its runners, its long leaf, and flower-stalks. *Cuig bhileach*, five-leaved. Irish: *cuig mhear Mhuire*, Mary's five fingers. Welsh: *blysiu'r pump*, same meaning.

P. tormentilla — Common potentil, or tormentil. Gaelic: *leanartach* (from *leanar*, passive of verb *lean*, to follow). So common on the hills that it seems to follow one everywhere. *Bàrr braonan-nan-con*, the dogs' briar bud. *Braonan fraoch* (*fraoch*, heather). *Braonan*, the bud of a briar (Armstrong). *Braonan bachlag*, the earth-nut (*Bunium flexuosum*) (M'Donald), from *braon*, a drop.

[1] *Avens*, a river, from the Celtic *an*. Welsh: *avon*. Gaelic: *abhainn*. Many river names in Europe and Asia are derived from this root—*e.g.*, Rhenus, the Rhine—*reidh-an*, the placid water. Garumnus, Garonne—*garbh-an*, the rough water. Marne—*marbh-an*, the dead water. Seine, a contraction of *seimh-an*, the smooth water, &c.

"Mìn-fheur chaorach is *bàrra-bhraonan*."—M'Intyre.
Soft sheep grass and the flower of the tormentil.

Irish: *neamhnaid*, a pearl (in Gaelic: *neònaid*). Welsh: *tresgl y moch.*

Comarum palustre—Marsh cinquefoil. Gaelic: *cuig bhileach uisge*, the water five-leaved plant.

Fragaria vesca—Wood strawberry. Gaelic: *subh* (or *sùth*) *thalmhain*, the earth's sap, the earth's delight (from *sùbh* or *sùgh*, sap, juice; also delight, pleasure, joy, mirth); *thalmhain*, of the earth.

"Theirig *subh-thalmhain* nam bruach."—M'Donald.
The wild strawberries of the bank are done.

Subhan laire, the ground sap; *tlachd subh*, pleasant fruit.

"*Subhain laire* s'faile ghroiseidean."—M'Intyre.
Wild strawberries and the odour of gooseberries.

Suthag, a strawberry or raspberry.

"Gur deirge n'ant *suthag* an ruthodh tha'd ghruidh."
Thy cheeks are ruddier than the strawberry.

Irish: *catog*, the strawberry bush. *Cath*, seeds (the seedy fruit). Welsh: *mefussen.*

Rubus (from *rub*, red in Celtic), in reference to the colour of the fruit in some species.

Rubus chamæmorus—Cloudberry. Gaelic: *oireag*, variously written,—*oighreag*, *foighreag*, *feireag*. Irish: *eireag* (from *eireachd*, beauty).

"Breac le *feireagan* is cruin dearg ceann."—M'Intyre.
Checkered with cloudberries with round red heads.

"The cloudberry is the most grateful fruit gathered by the Scotch Highlanders" (Neill).

The badge of Clan M'Farlane.

Cruban-na saona, "the dwarf mountain bramble." (O'Reilly, Armstrong, and others). Probably this is another name for the cloudberry, but its peculiar and untranslatable name furnishes no certain clue to what plant it was formerly applied.

R. saxatilis—Stone bramble. Gaelic: *caora bad miann*, the berry of the desirable cluster. *Ruiteaga*, redness, a slight tinge of red.

R. idæus—Raspberry. Gaelic: *preas sùbh chraobh* (*craobh*, a tree, a sprout, a bud), the bush with sappy sprouts.

"Fàile nan *sùth-chraobh*
A's nan ròsann."—M'Intyre.
The odour of rasps and roses.

Welsh: *mafon,—maf*, what is clustering. Gaelic: *preas shùidheag*, the sappy bush. *Sùghag*, the fruit (from *sùgh*, juice, sap).

R. fruticosus—Common bramble. Irish and Gaelic: *dreas*, plural *dris*. Welsh: *dyrys*,—the root *rys*, entangle, with prefix *dy*, force, irritation. In Gaelic and Welsh the words *dris* and *drysien* are applied to the bramble and briar indiscriminately.

> "An *dreas* a fàs gu h-urar."—OSSIAN.
> The bramble (or briar) freshly growing.
> "Am fear theid san *droighionn* domh
> Theid me san *dris* dà."—PROVERB.
> If one pass through thorns to me,
> I'll pass through brambles (or briars) to him.

Grian mhuine, the thorn (bush) that basks in the sun. *Dris muine,—muine*, a thorn, prickle, sting. *Smear phreas* (Irish: *smeur*), the bush that smears; *smearag*, that which smears (the fruit). Welsh: *miar*, the bramble. (*Miar* or *meur* in Gaelic means a finger.) *Smearachd*, fingering, greasing, smearing. (Compare Dutch, *smeeren;* German, *schmieren*, to smear or daub.) *Dris-smear*, another combination of the preceding names.

This plant is the badge of the Clan M'Lean.

R. cæsius—Blue bramble; dewberry bush. Gaelic: *preas-nan-gorm dhearc*, the blueberry bush.

> "Bar gach tolmain fo bhrat *gòrm dhearc*."—M'DONALD.
> Every knoll under a mantle of blueberries (dewberries).

The blue bramble is the badge of the Clan M'Nab.

Rosa canina—Dog-rose. Gaelic: *coin ròs*, dogs' rose (*coin*, gen. plural of *cù*, a dog). Greek: χυ-ων. Latin: *canis*. Sanscrit: *cunas*. Irish: *cù*. Welsh: *ki*.

Gaelic: *coìn droighionn*, dogs' thorn. *Earrdhreas* or *fearradhris, earrad*, armour; suggested by its being armed with prickles.

> "Mar *mhucaig* na *fearra-dhris*."—M'ELLAR.
> Like hips on the briar.

Preas-nam-mucaig, the hip-bush — from *muc* (Welsh: *moch*), a pig, from the fancied resemblance of the seeds to pigs, being bristly. Irish: *sgeach mhadra*, the dogs' haw or bush. Welsh: *merddrain*. Gaelic: *ròs*, rose; cultivated rose, *ròs gharaidh*.

> "Bé sid an sealladh eibhinn!
> Do bhruachan glè-*dhearg ròs*."
> That was a joyful sight!
> Thy banks so rosy red.

R. rubiginosa—Sweet-briar (*briar*, Gaelic: a bodkin or pin). Gaelic: *dris chubhraidh*, the fragrant bramble. Irish: *sgeach-chumhra*, the fragrant haw. *Cuirdris*, the twisting briar,—*cuir*, gen. sing. of *car*, to twist or wind.

Agrimonia eupatoria—Agrimony. Gaelic: *mur-dhraidhean*, —*mur*, sorrow, grief, affliction; *draidhean*, another form of *dhroighionn* (see *Prunus spinosa*). *Draidh*, or *druidh*, also means a magician, which may refer to its supposed magical effects on troubles as well as diseases. A noted plant in olden times for the cure of various complaints. Irish: *marbh dhroighionn*,—*marbh-dhruidh*, a necromancer, or magician. *Geur bhileach*,—*geur*, sharp, sour, rigid; *bhileach*, leaved;—on account of its leaves being sharply serrated, or because of its bitter taste. *Mirean nam magh*, the merry one of the field. Welsh: *y dorllwyd*, the way to good luck.

Sanguisorba—Burnet. *A bhileach losgain.* The leaves good for burns and inflammations (*losgadh*, burning).

Alchemilla vulgaris—Common Lady's Mantle. Gaelic: *copan an druichd*, the dew-cup; *falluing mhuire*, Mary's mantle. Irish: *dhearna mhuire*, Mary's palm. Gaelic: *crub leomhainn*, lion's paw; *cota preasach nighean an righ*, the princesses' plaited garment. Irish: *leathach bhuidhe* (*leathach*, divided).

Alchemilla alpina—Alpine Lady's Mantle. Gaelic: *trusgan*, mantle. The satiny under-side of the leaves of this and the other species has given rise to the names *trusgan*, *falluing*, *cota*, and the English name, Lady's Mantle.

> "Tha *trusgan* faoilidh air cruit an aonich."—M'Intyre.
> The mantle-grass on the ridge of the mountain.

The hills about Coire-cheathaich and Ben Doran (the district described by the poet) are covered with this beautiful plant. The word *trusgan*, mantle, may be used in this instance in its poetic sense.

Mespilus germanica—Medlar. Gaelic: *cran meidil* (M'Donald), said to be a corruption of Mespilus. Greek: μεσος, half, and πιλος, a bullet. The fruit resembles half a bullet.

Cratægus oxyacantha—Whitethorn, hawthorn. Gaelic: *sgitheach geal*, *drioghionn geal* (see *Prunus spinosa*), *geal*, white; *preas nan sgeachag; sgeach*, a haw. Welsh: *draenen wen*, white thorn.

> "Miòs bog nan ubhlan breac-mheallachd!
> Gu peurach plumbach *sgeachagach*,
> A' luisreadh sios le dearcagaibh,
> Cir, mhealach, beachach, groiseideach."—M'Lachuinn.

Soft month of the spotted bossy apples !
Producing pears, plums, and haws,
Abounding in berries, wax,
Honey, wasps, and gooseberries.

Uath or *huath* — the ancient Gaelic and Irish name — has several significations ; but the root seems to be *hu* (Celtic), that which pervades. Welsh : *huad*, that which smells or has a scent (*huadgu*, a hound that scents). "The name hawthorn is supposed to be a corruption of the Dutch *hoeg*, a hedge-thorn. Although the fruit is generally called a haw, that name is derived from the tree which produces it, and does not, as is frequently supposed, take its name from the fruit it bears."—Jones. Hawthorn may only be a corruption of *huad-draen*, scented thorns. The badge of the Clan Ogilvie.

Pyrus (from *peren*, Celtic for pear). Latin : *pyrum*. Armoric : *pêr*. Welsh : *peren*. French : *poire*.

Pyrus communis—Wild pear. Gaelic : *craobh pheurain fiadhain* (*peur*, the fruit), the wild pear-tree.

Pyrus malus—"*Mel* or *mal*, Celtic for the apple, which the Greeks have rendered μηλον, and the Latins *malus*."—Don. Welsh : *afal*. Anglo-Saxon : *æpl*. Norse : *apal*, apple. Gaelic : *ubhal; craobh ubhal fiadhain*, the wild apple-tree.

" Do mheasan milis cubhraidh
Nan *ubhlan* 's 'nam *peur*."—M'Donald.

Thy sweet and fragrant fruits,
Apples and pears.

The old form of the word was *adhul* or *abhul*. The culture of apples must have been largely carried on in the Highlands in olden times, as appears from lines by Merlin, who flourished in A.D. 470, of which the following is a translation :—

"Sweet apple-tree loaded with the sweetest fruit, growing in the lonely wilds of the woods of Celyddon (Dunkeld), all seek thee for the sake of thy produce, but in vain ; until Cadwaldr comes to the conference of the ford of Rheon, and Conan advances to oppose the Saxons in their career."

This poem is given under the name of *Afallanau*, or Orchard, by which Merlin perhaps means Athol—*i.e.*, *Abhal* or *Adhul*—which is believed by etymologists to acquire its name from its fruitfulness in apple-trees. *Goirteag* (from *goirt*, bitter), the sour or bitter one (the crab-apple). *Cuairtagan* (the fruit) ; *cuairt*, round, the roundies. Irish : *cucirt*.

" 'San m'an Ruadh-aisrigh ah'fhas na *cuairtagan*."—M'Intyre.
It was near the red path where the crab-apples grew.

This plant is the badge of the Clan Lamont.

Pyrus aucuparia—Mountain-ash, rowan-tree. Old Irish and Gaelic: *luis*, drink (*luisreog*, a charm). The Highlanders formerly used to distil the fruit into a very good spirit. They also believed "that any part of this tree carried about with them would prove a sovereign charm against all the dire effects of enchantment or witchcraft."—Lightfoot (1772). *Fuinseag coille*, the wood enchantress, or the wood-ash (see *Circœa*); *craobh chaoran*, the berry-tree (*caor*, a berry). Irish: *pairtainn dearg*, the red crab.

" Bu dh'eirge a ghruidh na *caoran*."—Ossian.
His cheeks were ruddier than the rowan.

" Sùil chorrach mar an dearcag,
Fo rosg a dh-iathas dlù,
Gruidhean mar na *caoran*
Fo n' aodann tha leam cùin
An cailin dileas donn.

Thine eyes are like the blaeberry,
Full and fresh upon the brae,
Thy cheeks shall blush like the rowans
On a mellow autumn day.
(Translated by Professor J. S. Blackie.)

This plant is the badge of the Clan M'Lachlan.

Pyrus cydonia—Quince-tree. Gaelic: *craobh chuinnse*, corruption of quince, from French *coignassa*, pear-quince. Originally from Cydon in Candia.

Aurantiaceæ.

Citrus aurantium—The orange. Gaelic: *òr ubhal*, golden apple; *òr mheas*, golden fruit; *òraisd*,[1] from Latin *aurum*. Irish: *or*. Welsh: *oyr*, gold.

" 'S Phœbus dàth na'n tonn
Air fiamh *òrensin*."—M'Donald.
And Phœbus colouring the waves
With an orange tint.

Citrus medica—Citron. Gaelic: *craobh shitroin*.

Citrus limonum—Lemon. Gaelic: *crann limoin*. French: *limon*. Italian: *limone*.

[1] Spelt by M'Donald properly *orainis*. His spelling generally is far from correct, and the same word often spelt different ways. He is also much given to translating a name from the English.—Fergusson.

(*To be continued.*)

PRELIMINARY LIST OF THE FUNGI OF PERTHSHIRE

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

(*Continued from page* 182.)

POLYPOREI.

XVI. BOLETUS, Dill.

319. Luteus, L. Common.
320. Elegans, Schum. Balinluig, Kenmore.
321. Flavus, With. Common.
322. Flavidus, Fr. Blackwood of Rannoch, September 1875.
323. Bovinus, L. Killin, Rannoch.
324. Badius, Fr. Kinnoull.
325. Piperatus, Bull. Not uncommon.
326. Chrysenteron, Fr. Common.
327. Subtomentosus, L. Common.
328. Pachypus, Fr. Keir, Balinluig, Kenmore, Glen Tilt.
329. Edulis, Bull. Common.
330. Luridus, Schæff. Common.
331. Laricinus, B. Kinnoull, Balinluig, Kenmore, Glen Tilt.
332. Versipellis, Fr. Scone, Killiecrankie, Rannoch, Balinluig.
333. Scaber, Fr. Common.
334. Cyanescens, Bull. Rannoch (several places), Glen Lochay.

XVII. FISTULINA, Bull.

335. Hepatica, Fr. Inver.

XVIII. POLYPORUS, Fr.

336. Brumalis, Fr. Moncreiffe, Pitroddie.
337. Schweinitzii, Fr. Blackwood of Rannoch.
338. Rufescens, Fr. Killiecrankie.
339. Perennis, Fr. Dunkeld, Balinluig, Rannoch, Glen Tilt, &c.
340. Squamosus, Fr. Frequent.
341. Varius, Fr. Moncreiffe, Rannoch.
342. Elegans, Fr. Var. *nummularius*, Fr. Moncreiffe.
343. Intybaceus, Fr. Keir, Dunkeld, Killin, Kilgraston, Inver.
344. Giganteus, Fr. Not uncommon.
345. Sulfureus, Fr. Moncreiffe, Fingask, Rossie Priory, Glen Tilt.
346. Epileucus, Fr. Dunkeld.
347. Chioneus, Fr. Balinluig, Glen Lochay.
348. Lacteus, Fr. Moncreiffe, November 1876.
349. Fragilis, Fr. Balinluig, Aberfeldy.
350. Cæsius, Fr. Moncreiffe.
351. Trabeus, Rost. Dunkeld.
352. Destructor, Fr. Scone, Moncreiffe.
353. Nidulans, Fr. Moncreiffe, Aberfeldy, Glen Tilt, Craighall.
354. Fumosus, Fr. Megginch, Rannoch.
355. Adustus, Fr. Not uncommon.
356. Amorphus, Fr. Kinnoull, Craighall, Rannoch.

357. Adiposus, B. and Br. Killiecrankie.
358. Hispidus, Fr. Not uncommon.
359. Betulinus, Fr. Not uncommon.
360. Applanatus, Fr. Frequent.
361. Fomentarius, Fr. Moncreiffe, Seggieden.
362. Nigricans, Fr. Rannoch, Glen Tilt.
363. Igniarius, Fr. Moncreiffe, Rannoch.
364. Ulmarius, Fr. Moncreiffe.
365. Fraxineus, Fr. Moncreiffe.
366. Annosus, Fr. Common.
367. Radiatus, Fr. Not uncommon.
368. Versicolor, Fr. Common.
369. Abietinus, Fr. Common.
370. Terrestris, Fr. Moncreiffe, Kinnoull.
371. Subgelatinosus, B. and Br. Blackwood of Rannoch, 1875.
372. Vulgaris, Fr. Balinluig, Kenmore, Struan.
373. Molluscus, Fr. Killin.
374. Sanguinolentus, Fr. Bonhard.
375. Vaporarius, Fr. Frequent.

XIX. TRAMETES, Fr.

376. Pini, Fr. Blackwood of Rannoch.
377. Mollis, Somm. Moncreiffe, Kinnoull, Birnam, Dunkeld.

XX. DÆDALEA, P.

378. Quercina, P. Frequent.
379. Unicolor, Fr. Moncreiffe.

XXI. MERULIUS, Fr.

380. Corium, Fr. Dupplin.
381. Himantioides, Fr. Dupplin.
382. Molluscus, Fr. Moncreiffe, Methven Bog, Killin.
383. Lacrymans, Fr. Probably too common.

XXII. POROTHELIUM, Fr.

384. Friesii, Mont. Moncreiffe.

HYDNEI.

XXIII. HYDNUM, L.

385. Imbricatum, L. Rannoch.
386. Lævigatum, Sw. Rannoch.
387. Fragile, Fr. Rannoch.
388. Repandum, L., and var. rufescens, Fr. Common.
389. Compactum, P. Rannoch.
390. Scrobiculatum, Fr. Specimens of a fungus sent from Rannoch to Rev. M. J. Berkeley were pronounced by him to be intermediate between this and the following species.
391. Zonatum, Batsch. Inver.
392. Cyathiforme, Schæff. Var. *tomentosum*, Fr. Rannoch.

393. Auriscalpium, L. Moncreiffe.
394. Udum, Fr. Killin.
395. Niveum, P. Dupplin.
396. Farinaceum, P. Killin.

XXIV. RADULUM, Fr.

397. Orbiculare, Fr. Moncreiffe, Annat Lodge, Rannoch.
398. Tomentosum, Fr. Moncreiffe.

XXV. GRANDINIA, Fr.

399. Granulosa, Fr. Not uncommon.

XXVI. ODONTIA, Fr.

400. Fimbriata, P. Moncreiffe, Killin.

THELEPHOREI.

XXVII. CRATERELLUS, Fr.

401. Lutescens, Fr. Rannoch.
402. Cornucopioides, P. Finlarig.
403. Sinuosus, Fr. Killiecrankie, Rannoch.

XXVIII. THELEPHORA, Elir.

404. Tuberosa, Grev. Moncreiffe, August 1877.
405. Palmata, Fr. Scone, Moncreiffe.
406. Intybacea, P. Rannoch.
407. Laciniata, P. Scone, Balinluig.
408. Mollissima, P. Balinluig.

XXIX. STEREUM, P.

i. *Stereum.*

409. Purpureum, P. Kinnoull, Rannoch.
410. Hirsutum, Fr. Common.
411. Sanguinolentum, Fr. Common.
412. Rugosum, Fr. Common.

ii. *Hymenochæte*, Lev.

413. Rubiginosum, Fr. Dunkeld.
414. Corrugatum, Fr. Moncreiffe.
415. Stevensoni, B. and Br. Dunkeld.

XXX. CORTICIUM, Fr.

i. *Corticium.*

416. Arachnoideum, B. Rannoch, Moncreiffe.
417. Læve, P. Dupplin, Moncreiffe, Kinnoull, Annat Lodge.
418. Roseum, P. Moncreiffe.
419. Lactescens, B. Moncreiffe, November 1876.
420. Sanguineum, Fr. Dunkeld.
421. Calceum, Fr. Moncreiffe, Kinnoull, Rannoch.
422. Incarnatum, Fr. Frequent.

423. Nudum, Fr. Var. *citrinum*, P. Moncreiffe.
424. Comedens, Fr. Frequent.

ii. *Peniophora*, Cke.

425. Velutinum, Fr. Rannoch.
426. Cinereum, Fr. Dunkeld, Killiecrankie, Kenmore.
427. Quercinum, Fr. Common.
428. Limitatum, Fr. Moncreiffe (on dead Laburnum).

iii. *Coniophora*, P.

429. Puteanum, Schum. Dupplin.
430. Laxum, Fr. Annat Lodge.

iv. *Hypochnus*, Fr.

431. Sambuci, Fr. Common.

v. ———— ?

432. Amorphum, Fr. Kinnoull (1875), Moncreiffe, Keir, Dunkeld. Always on dead Silver-Fir.

XXXI. PHLEBIA, Fr.

433. Merismoides, Fr. Craighall, Falls of Lochay.

XXXII. SOLENIA, Hoffm.

434. Ochracea, Hoffm. Moncreiffe, Parkfield, Dunkeld.

CLAVARIEI.

XXXIII. SPARASSIS, Fr.

435. Crispa, Fr. Ardargie, Scone, Blair-Athole.

XXXIV. CLAVARIA, L.

436. Amethystina, Bull. Rannoch, Killin, Killiecrankie.
437. Fastigiata, L. Not uncommon.
438. Cinerea, Bull. Not uncommon.
439. Umbrina, B. Blair-Athole.
440. Cristata, P. Frequent.
441. Rugosa, Bull. Common. Var. *fuliginea*. Moncreiffe, Nov. 1876.
442. Krombholzii, Fr. Moncreiffe.
443. Abietina, P. Kinnoull, Scone, Balinluig.
444. Grisea, P. Moncreiffe.
445. Stricta, P. Annat Lodge.
446. Rufa, Fl. Dan. Rannoch.
447. Rosea, Fr. Rannoch.
448. Fusiformis, Sow. Aberfeldy.
449. Inæqualis, Fl. Dan. Common.
450. Argillacea, Fr. Rannoch.
451. Vermicularis, Scop. Arnbathie.
452. Fragilis, Holms. Common.
453. Fumosa, P. Rannoch.
454. Pistillaris, L. Killin.
455. Juncea, Fr. Bonhard, Rannoch.

XXXV. CALOCERA, Fr.

456. Viscosa, Fr. Common.
457. Cornea, Fr. Rannoch.

XXXVI. TYPHULA, P.

458. Erythropus, Desm. Bonhard, Rannoch.
459. Gracillima, B. W. Rannoch. I am not sure that this is more than a variety of *gyrans*.

XXXVII. PISTILLARIA, Fr.

460. Puberula, B. Dunkeld, Killin, Rannoch.

TREMELLINEI.

XXXVIII. TREMELLA, Dill.

461. Foliacea, P. Frequent.
462. Mesenterica, Retz. Dron.
463. Albida, Huds. Balmanno, Dupplin.
464. Viscosa, B. Killin.
465. Indecorata, Somm. Balinluig.
466. Tubercularia, B. Rannoch.

XXXIX. EXIDIA, Fr.

467. Recisa, Fr. Dupplin.
468. Glandulosa, Fr. Moncreiffe, Rossie Priory.

XL. NÆMATELIA, Fr.

469. Encephala, Fr. Moncreiffe, Kinnoull, Dunkeld.

XLI. DACRYMYCES, Nees.

470. Deliquescens, Duby. Frequent.
471. Stillatus, Nees. Common.

XLII. APYRENIUM, Fr.

472. Lignatile, Fr. Moncreiffe.

GASTEROMYCETES.

HYPOGÆI.

XLIII. HYDNANGIUM, Wallr.

473. Carneum, Wallr. Moncreiffe.

XLIV. RHIZOPOGON, Tul.

474. Rubescens, Tul. Rannoch.

PHALLOIDEI.

XLV. PHALLUS, L.

475. Impudicus, L. Common.

XLVI. CYNOPHALLUS, Fr.

476. Caninus, Fr. Dunblane.

TRICHOGASTRES.

XLVII. GEASTER, Mich.

477. Rufescens, Fr. Moncreiffe.

XLVIII. BOVISTA, Dill.

478. Nigrescens, P. Rannoch.

XLIX. LYCOPERDON, Tourn.

479. Saccatum, Vahl. Keir, Dupplin, Murthly.
480. Giganteum, Batsch. Frequent.
481. Cælatum, Fr. Common.
482. Atropurpureum, Vitt. Scone.
483. Pusillum, Fr. Rannoch.
484. Gemmatum, Fr. Common.
485. Pyriforme, Schæff. Dupplin, Inver.

L. SCLERODERMA, P.

486. Vulgare, Fr. Common.
487. Vernicosum, P. Frequent.

NIDULARIACEI.

LI. CYATHUS, P.

488. Vernicosus, D. C. Dupplin.

LII. CRUCIBULUM, Tul.

489. Vulgare, Tul. Common.

LIII. SPHÆROBOLUS, Tode.

490. Stellatus, Tode. Dupplin, Parkfield, Rannoch.

CONIOMYCETES.

SPHÆRONEMEI.

LIV. PHOMA, Fr.

491. Lingam, Desm. Parkfield.
492. Samarorum, Desm. Rannoch.

LV. LEPTOTHYRIUM, Knze.

493. Juglandis, Lib. Moncreiffe, Kenmore.
494. Fragariæ, Lib. Annat Lodge, Glen Tilt, Kenmore.
495. Pictum, B. and Br. Annat Lodge, Inver, Killiecrankie.

LVI. ACTINOTHYRIUM, Knze.

496. Graminis, Knze. Rannoch.

LVII. SPHÆROPSIS, Lev.

497. Taxi, B. Dupplin.
498. Epitricha, B. and Br. Methven Bog, Arnbathie.

LVIII. DIPLODIA, Fr.

499. Herbarum, Lev. Parkfield.

LIX. VERMICULARIA, Tode.

500. Dematium, Fr. Parkfield.

LX. DISCOSIA, Lib.

501. Alnea, Lib. Dupplin.

LXI. PIGOTTIA, B. and Br.

502. Astroidea, B. and Br. Dunkeld.

LXII. SEPTORIA, Fr.

503. Ulmi, Knze. Glen Tilt, Kenmore, Killiecrankie.
504. Heraclei, Fckl. Perth, Dunkeld.
505. Ægopodii, Desm. Dupplin, Perth.
506. Polygonorum, Desm. Dupplin.
507. Stemmatea, B. Rannoch.
508. Hederæ, Desm. Dupplin, Dunkeld, &c.
509. Hydrocotyles, Desm. Rannoch.
510. Clematidis, Rob. Dunkeld.
511. Epilobii, West. Dupplin.
512. Sorbi, Lasch. Rannoch.
513. Fraxini, Desm. Perth.
514. Scabiosæcola, Desm. Common.
515. Gei, Desm. Balinluig, Kenmore, Killiecrankie, Glen Tilt.
516. Ribis, Desm. Dupplin.
517. Urticæ, Desm. Kenmore.
518. Hypcrici, Desm. Kenmore.
519. Stachydis, Desm. Dunkeld, Glen Tilt.
520. Loniceræ, Desm. Balinluig.

LXIII. PHYLLOSTICTA, P.

521. Violæ, Desm. Common.
522. Vulgaris, var. *loniceræ*, Desm. Rannoch.

LXIV. ASCOCHYTA, Lib.

523. Dianthi, B. Annat Lodge.

LXV. EXCIPULA, Fr.

524. Strigosa, Fr. Dupplin.

LXVI. ASTEROMA, D.C.

525. Prunellæ, Purt. Parkfield.
526. Padi, Grev. Rannoch.
527. Rosæ, D. C. Not uncommon.

LXVII. CEUTHOSPORA, Fr.

528. Lauri, Grev. Common.

MELANCONIEI.

LXVIII. NEMASPORA, P.

529. Rosæ, Desm. Dupplin.
530. Crocea, P. Dupplin.

LXIX. CYLINDROSPORIUM, Ung.

531. Senecionis, B. and Br. Kinloch-Rannoch, 1875.
532. Longipes, Preuss. Moncreiffe.

LXX. GLÆOSPORIUM, Mont.

533. Fructigenum, B. Perth.
534. Cytisi, B. and Br. Killiecrankie.

TORULACEI.

LXXI. TORULA, P.

535. Pulveracea, C. Dunkeld, Dupplin.
536. Herbarum, Lk. Parkfield, Dupplin.
537. Sporendonema, B. and Br. Perth.
538. Splendens, Cke. Rannoch.

LXXII. BACTRIDIUM, Kze.

539. Acutum, B. and B. W. Blair-Athole, August 14, 1877.

LXXIII. SEPTONEMA, C.

540. Elongatispora, Preuss. Glen Tilt.

LXXIV. SPOROCHISMA, B. and Br.

541. Mirabile, B. and Br. Moncreiffe.

LXXV. SPORIDESMIUM, Lk.

542. Triglochinidis, B. and Br. Arnbathie.

PUCCINIÆI

LXXVI. PHRAGMIDIUM, Lk.

543. Mucronatum, Lk. Common.
544. Bulbosum, Schl. Common.
545. Gracile, Grev. Frequent.
546. Obtusum, Lk. Common.

LXXVII. TRIPHRAGMIUM, Lk.

547. Ulmariæ, Lk. Frequent.

LXXVIII. PUCCINIA, P.

548. Graminis, P. Common.
549. Arundinacea, Hedw. Junction of the Earn and Tay.
550. Moliniæ, Tul. Rannoch, 1875.

551. Striola, Lk. Bonhard (on *Carex hirta*), Rannoch and Killin (*Carex stellulata*).
552. Amphibii, Fckl. North Muirton, Scone, Abernethy, Dupplin.
553. Bistortæ, D. C. Glen Tilt and Glen Shee (on *Polygonum viviparum*).
554. Veronicarum, D. C. Perth (on *Veronica montana*), Ben Aulder (on *V. alpina*).
555. Glechomatis, D. C. Moncreiffe.
556. Menthæ, P. Kinnoull and Pitroddie (on *Origanum*), Dunkeld and Killin (on *Mentha*).
557. Scorodoniæ, Lk. Frequent.
558. Compositarum, Sch. Common.
559. Syngenesiarum, Lk. Balinluig.
560. Andersoni, B. and Br. Rannoch, Glen Tilt.
561. Cirsii, Lasch. Rannoch 1875, Dupplin, Methven Bog.
562. Glomerata, Grev. Parkfield, Rannoch.
563. Variabilis, Grev. Dunkeld, Glen Tilt, Rannoch, &c.
564. Valantiæ, P. Perth, Craighall.
565. Galiorum, Lk. Scone, Glen Tilt, Bonhard.
566. Acuminata, Fckl. Rannoch.
567. Umbelliferarum, D. C. Frequent.
568. Ægopodii, Lk. Parkfield.
569. Saniculæ, Grev. Drimmie, near Craighall.
570. Conii, Fckl. (= *bullaria*, Lk.) Methven Bog.
571. Anemones, P. Glen Tilt and Killiecrankie (on *Anemone*), Rannoch (on *Thalictrum minus*).
572. Calthæ, Lk. Perth, Rannoch, Glen Tilt, Glen Shee.
573. Violarum, Lk. Common on *Viola sylvatica;* on *V. hirta*, at Pitroddie ; on *V. cornuta* and *V. amœna*, at Annat Lodge.
574. Fergussoni, B. and Br. Common in the Highlands, as in Rannoch, Glen Shee, and Glen Tilt ; rare in the Lowlands, as in Methven Wood.
575. Lychnidearum, Lk. Annat Lodge (*Dianthus*), Craighall (*Lychnis*), Ben Lawers (*Sagina*), Balinluig.
576. Mæhringiæ, Fckl. Moncreiffe, St. Martins, Craighall.
577. Saxifragarum, Schl. Rannoch and Dalnaspidal (*Saxifraga stellaris*).
578. Chrysosplenii, Grev. Bonhard, Craighill, Killin, Glen Tilt, on both surfaces of the leaves.
579. Epilobii, D. C. Dunkeld, Rannoch.
580. Pulverulenta, Grev. Scone (*Epilobium montanum*), Glen Tilt (*E. anagallidifolium*), Inver.
581. Circeæ, P. Methven Wood, Dunkeld, Dupplin, Killin, Craighall.
582. Fabæ, Lk. Not uncommon.
583. Buxi, D. C. Moncreiffe, Dunkeld.
584. Malvacearum, C. Moncreiffe, Perth.
585. Luzulæ, Lib. Uredo spores common. Brandspores, Glen Tilt.

LXXIX. PODISOMA, Lk.

586. Juniperi, Fr. Birnam.

(*To be continued.*)

GEOLOGY.

ON THE VALUE OF THE NAMES OF PLACES IN INDICATING THE ANCIENT SURFACE-FEATURES OF THE COUNTRY.

By the Rev. ADAM MILROY, D.D.

A VERY cursory glance at the names of the places around us suffices to disclose to us the fact that a rich store of information lies hidden in them. We see at once that many, and these the most recent, are Saxon; and such names show that they were given by a Saxon-speaking people. Others, and these the most ancient, are of Celtic origin; and these must have been given by a Celtic-speaking people. The Saxon names are quite intelligible to us. We require no explanation of such words as Mossend, Woodside, Burnfoot, Muirton. The older Celtic names, on the other hand, have long ceased to be significative to the people who use them. To them they are words without meaning—names, and nothing more. Being used by a people who did not understand them, they have frequently become so altered as to be hardly recognisable. They are liable also to another danger: frequently the unmeaning Celtic name is by a slight change converted into a significative Saxon term. The meaning thus forced upon the original is usually very absurd and quite erroneous, but still the word becomes significant. It would be an easy and instructive task to give instances of such forced meanings and derivations from names of places and parishes in our own neighbourhood, but neither space nor time allows us to enter upon the subject. To avoid the danger thus arising, the investigator should always obtain the oldest form of the word, and, if possible, the way in which the word was written by men to whom it was quite intelligible; and when this form of the word has been obtained, he will be surprised to see how often current derivations and meanings vanish in sheer absurdity. In the local Celtic names there is a rich and almost neglected

mine of information. Sometimes this information refers to historical events, sometimes to the physical features presented by the localities at the time when the names were given. It is with the latter class that this paper has to do. We pass over all names referring to artificial structures, such as names beginning with Dun or Car, denoting that a fort once existed there; names beginning with Bal, denoting that a town, not in the sense of a city, but a farm-town, was on that spot. Our business is with words containing Kin or Ken, a head or extremity; Mon, a bog; Aber or Inver, the mouth of a stream; Tully or Tulloch, a hillock; Drum, a ridge; Inis or Inch, an island; and others describing physical characteristics. In this paper it is only a few that I can take. My object is not to make an exhaustive research into the Celtic names of the localities around us, but to take a few instances to show the nature of the information afforded, and the wealth which is offered. I by no means say that the knowledge thus gained is in itself of scientific value, but it may be a valuable adjunct. Science has to do, not with names of objects, but with the objects themselves, and must be based on the data which they furnish. Now, these names in themselves will not furnish scientific facts, but they may serve to corroborate facts which have been otherwise ascertained. An investigation of the surface features of a district may lead a geologist to the conclusion that here a stream once flowed, and there was a peat-bog—that this field was once the site of a lake, and yonder eminence must have been an island in its midst. Now if the geologist, after having ascertained these facts, could rouse an ancient Celtic Rip Van Winkle from a slumber of some thousands of years, and get him to tell the features which in his day the country presented, he would gladly welcome the communications made; and it would add to his gratification if he found that the intelligence thus given corroborated the conclusions which he had quite independently arrived at—if he found that the ancient Celt had actually seen with his own eyes the waters of the stream flowing in the old channel, had often gazed on the moss, the lake, and the island. We cannot rouse the ancient Celt from his sleep, but a testimony such as I have indicated may be afforded by a careful and discriminate use of the names of places descriptive of the physical features presented at the time when the names were given. In places, now rich fields, where "loch" appears as part of the name; in words beginning with "Lun," or "Mon," or "Reisk"—appellations of places

where now all is dry and fertile soil; in the "Inches," which now are only slight eminences rising from the flat champaign,—we have evidences of a state of things which once existed, but now exist no longer. Cautiously employed, the old names often give strong and unexpected corroboration to conclusions based on grounds entirely different.

For illustration of these remarks we shall take first the district below Perth bordering on the Tay. We find there, on the one side, the Carse of Gowrie. The fact that the district is not called Gowrie, but the Carse of Gowrie, shows that we are to seek for Gowrie in some particular locality. We find it at Invergowrie, the mouth of a small stream of that name. But the name has not first of all been given to the stream; it has, like many river-names, belonged first to the land through which the stream flowed. Dr Joyce, whose published researches in Celtic nomenclature are of the highest character, shows, in his Irish names of places, that the word is originally Gabhran, pronounced Gowran, meaning goat-land, the place where the goats fed. We find Invergowrie written Gabriat in the legend about St Boniface and Nectan, King of the Picts. We find the same name applied to several places in Ireland — Gorey in Wexford, Gouree in Cork. Our Gowrie leads us up towards the Carse braes, and designates the place where the goats of the ancient Celtic inhabitants browsed. From this spot the name has been extended to the whole Carse, has given a title to earls, and appears as the designation of farms and localities, marking them as having been originally places for goats. In the Carse, and on the opposite side of the Tay, we find distinct evidence of the land having been at one time at a much lower level than the present. We find a sea-beach mark 45 feet, and another 30 feet, above the present sea-level. At that time much of the present land must have been an estuary of the sea. The upheaval of the land and the retreating of the sea must have been slow and gradual. In this process the estuary would gradually become less in extent and shallower in depth. The more that the sea retreated, the longer would be the course which the streams coming down from the hills would have to traverse before they reached the sea. Now we have evidence to show that the final retreating of the waters from the low lands in the Carse and on the opposite side of the Tay was witnessed by the early Celtic inhabitants. First, the old mouths of the stream are now at a considerable distance from the present mouths, and at a slightly higher level. The

words denoting the confluence of one stream with another, or of a stream with the sea, are "Aber" and "Inver." Among the many services which Dr William Skene has rendered to the early history and the early language of Scotland, there may be mentioned his clearing away from these words a great amount of rubbish which had gathered around them. He has shown that the view which represented Aber as being Pictish and showing where the Picts lived, Inver being Gaelic and showing where the Gaels lived—Aber being the confluence of a stream with the sea, and Inver being the confluence of one stream with another—has no foundation in fact. There is the old Celtic root "Ber," signifying water: with the prefixes *a*, *in*, and *com*, we get the words Aber, Inver, and Comber. The last has not been used in this district; at least no trace of its use now exists. Aber seems to have been the older form, or at least to have become obsolete while Inver was still a living word in the language. You will find Abers and Invers on the same stream, but the Invers lower down than the Abers.

We thus, at the outset, find that two races at least have lived in this locality—a Saxon-speaking race, now inhabiting it, and a previous Celtic-speaking race. There are some indications which suggest, on philological grounds, that when the Celtic wave of the Aryan immigration first reached these shores, the land was inhabited by a non-Aryan race, which the Celtic dispossessed or absorbed. The river-names of a country, especially the names of large rivers, maintain great vitality. Now, while most of our river-names can be traced to a Celtic root, there are some which refuse to submit to this process without a very considerable stretch of imagination, but rather point to an earlier non-Aryan language, spoken by men inhabiting the country before the first Celtic wave reached it. Philology points to the conclusions at which the geologist has on his own ground arrived with regard to the neolithic inhabitants.

When the Celtic inhabitants made a settlement on the banks of a stream, and called the place the mouth of that stream, it is surely only reasonable to infer that the place so designated was at any rate somewhat near the mouth. It would be absurd, and an abuse of language, to call a place the mouth of the stream if it was not near the mouth, but midway between that and its source. We have Abernyte so situated in our day. The place itself could never have been the exact spot where the earliest Celts witnessed the water of the rivulet entering the sea; for at the village the

stream is 400 feet above the present sea-level. If the sea ever reached that height, it was at a period far beyond the remotest antiquity that the most enthusiastic Gael, in his wildest moments, ever dreamed of assigning to his venerable language. But though it could not have been the exact spot, yet it was once nearer it than it is now. After leaving the village, the stream makes a rapid descent down Baledgarno den, and enters the 45-feet level of the Carse at the village of Baledgarno. From that point it winds its slow and tedious course for some miles through the flat lands of the Carse, till it enters the estuary of the Tay. When the name of Abernyte was given to the settlement, the stream must have entered the estuary much nearer the hills than it does at present—that is, in other words, the low-lying lands of the Carse must have been, not the rich fields of the present, but a lagoon or morass.

Let us now go to the other side of the river, where, a little above the junction of the Earn with the Tay, we find Abernethy. This case is especially instructive, for we have the receding of the waters, and the consequent gradual lengthening of the course of the Nethy, marked for us as plainly as if the old Celts had left inscribed pillars or written parchments behind them. We have Abernethy, the older settlement, at the 45-feet level; and about a mile farther down, at the 30-feet level, we have Invernethy, from which the stream pursues its sluggish course till it enters the Earn. Here we have the same phenomenon presented to us as we have in the Carse of Gowrie—the course of the stream becoming longer as the waters recede from the lowlands. It would be absurd to insist that Abernethy must have been the exact spot where the Nethy joined the estuary; but still the name leads us to the conclusion that it was then nearer the junction than it is now—that is, the flat low-lying land, now fertile fields, was then a shallow lagoon or morass. Then farther down we have Invernethy. The word denotes a later period in the language—the old Aber has become obsolete, and the more modern Inver takes its place. It denotes a later stage in the surface features of the ground. The shallow lagoon, into which the Nethy flowed when Abernethy got its name, has at this later stage become dry land; and the stream finds its exit farther on in its course. The Nethy does not now flow into the Earn at Invernethy—it continues its course for some distance; but were it not for the drains and cuttings, it would there lose itself in a bog. The bog has become dry land, and

as the waters recede, the mouth of the Nethy—*i.e.*, Aber or Invernethy—always finds itself farther down.

If we ascend the Earn, we find Aberdalgie also on the 45-feet level. The small stream comes down to the haughs on the Earn, and joins that river at a lower point than it once did.

The conclusion to which these names lead is, that at the time when they were given, the waters in the low levels of the Carse lands had not receded to the places where we now find them, and that the mouths of the streams were much nearer the places which bear the names of their mouths than they are at present.

We find the subsidence of waters, since the names were given, testified to by another appellation. The Carse of Gowrie is studded with Inches. We have Inchture, Inchmartin, Inchmichael, Inchcoonans, Megginch, Inchyra, and farther up the river we have the Inches of Perth. Inch represents very nearly the pronunciation of the Gaelic Inis. The word means an island. As it means an island, the place so designated must have been an island when the name was given. We shall look at three of these Inches. Inchture now stands about four miles from the Firth. Its highest part is 54 feet above the sea-level. Hence, when the sea rose to the height of the beach now found in the Carse at the 45-feet level, Inchture was an island. But when the sea had retreated to the 30-feet beach, Inchture would be an island no longer; it would be joined to the mainland at the back, and form a part of it. There is a very interesting question opened up here, which I merely indicate. If Inchture received its name from being an island, it must have got the name before the waters had fallen back to the 30-feet level; and as the name is Celtic, it would assign a very remote antiquity to the first Celtic immigration.

Inchmartin must have been a much more prominent island. Its summit level is 89 feet. The general level around it is 35 feet. It must thus have stood conspicuously out of the sea when the waters were at the 45-feet beach; and from the nature of the ground around, it would have been an island when the waters were at the 30-feet beach.

The Inches of the Carse lead, then, to the same conclusion as the Abers—viz., that the waters have greatly receded since the names were given.

(*To be continued.*)

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

(*Continued from p.* 240.)

EDITED BY D. SHARP, M.B.

PHYTOBIUS Schon.

LEUCOGASTER Marsh. Rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

NOTULA Germ. Scarce.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. Solway o o o o

QUADRITUBERCULATUS Fab. Local.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway o o o o

COMARI Hbst. Local.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

RHINONCUS Schon.

PERICARPIUS Fab.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ Shetland.
Solway ♀♀ ♀♀ o o

CASTOR Fab. Common.
DISTRIBUTION—EAST. Tweed Forth Tay ♀♀ Moray o o o
WEST. Solway Clyde ♀♀ o o o

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

BARIDIUS Th.

T-ALBUM L. Local.
DISTRIBUTION—EAST. Tweed ♀♀ o o o o o o o
WEST. Solway Clyde o o o

CALANDRA Th.

GRANARIA L. In granaries.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

ORYZÆ L. Occasional.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o
WEST. Solway o o o o

MESITES Schon.

TARDII Curt. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. o Clyde Argyle o o

RHYNCOLUS Th.

CYLINDIROSTRIS Ol. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

CHLOROPUS Fab. In stumps of Scots fir. Local.
DISTRIBUTION—EAST. o o Tay Dee ♀♀ o o o
WEST. o o o o o

MAGDALINUS Th.

PHLEGMATICUS. On Scots firs. Local.
DISTRIBUTION—EAST. o Forth Tay Dee Moray o o o
WEST. o o o o o

CARBONARIUS L. On birch and hazel. Rare.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. Solway o o o o

DUPLICATUS Germ. On Scots fir. Very rare.
DISTRIBUTION—EAST. o o o Dee Moray o o o
WEST. o o o o o

ATRAMENTARIUS Marsh. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o Clyde o o o

"Dollar. Mr J. T. Syme." Murray Cat.; Hamilton, Mr Hislop.

PRUNI L. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Dalmeny Park. Mr R. N. Greville." Murray Cat.

APION Th.[1]

POMONÆ Fab. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Dalmeny Park. Mr R. N. Greville and Rev. W. Little." Murray Cat.

CRACCÆ L. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Dalmeny Park. Mr R. N. Greville and Rev. W. Little." Murray Cat.

CERDO Gerst. On Vicia cracca. Very local.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

SUBULATUM Kirb. Rare.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway o o o o

CARDUORUM Kirb. Not uncommon.
DISTRIBUTION—EAST. Tweed Forth ○ ○ ○ o o o
WEST. Solway ○ o o o

ONOPORDI Kirb. Common.
DISTRIBUTION—EAST. Tweed Forth ○ ○ ○ o o o
WEST. Solway ○ o o o

STOLIDUM Germ. Rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

ULICIS Forst. On furze. Common.
DISTRIBUTION—EAST. ○ Forth ○ ○ Moray ○ o o
WEST. Solway ○ ○ o o

[1] The catalogue of the species of this genus I must still leave in a somewhat unsatisfactory state. I am sorry to say I have myself given very little attention to the Apions of Scotland, and a considerable proportion of the species here catalogued are included only on the authority of Murray's Catalogue, and some of them are probably not really to be found in Scotland.
D. S.

GENISTÆ Kirb. Rare.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. o o o o o

FUSCIROSTRE Fab. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Juniper Green, near Edinburgh. Mr R. N. Greville." Murray Cat.

PALLIPES Kirb. Very local. On Allium.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o
Abundant at Eskbank, May 18, 1865.

ÆNEUM Fab.
DISTRIBUTION—EAST. oo Forth o o o o o o
WEST. oo o o o o

RADIOLUS Kirb.
DISTRIBUTION—EAST. oo Forth o o o o o o
WEST. oo o o o o

ASTRAGALI Payk. Extremely rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o
"Queensferry. Dr Greville." Murray Cat.

STRIATUM Kirb.
DISTRIBUTION—EAST. oo oo oo oo Moray o o o
WEST. oo oo o o o

IMMUNE Kirb.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway o o o o

PUBESCENS Kirb.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o
"Kinross-shire. A. Murray." Murray Cat.

SENICULUM Kirb. Rare.
DISTRIBUTION—EAST. oo Forth o o o o o o
WEST. Solway o o o o

VICIÆ Payk.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway oo o o o

(To be continued.)

ZOOLOGY.

THE CAPERCAILLIE IN SCOTLAND.

By J. A. HARVIE BROWN, F.Z.S.

SINCE the publication of my little work on 'The Capercaillie in Scotland,'[1] various additional items of information have come to hand from my correspondents. As shortly as possible, I propose to collect these into a continuation of the Appendix to the original work.

Before doing so, however, I would wish to acknowledge and thank my reviewers for the very kind and favourable criticisms which have appeared from time to time.[2]

It has struck me that reviving the subject, by publishing this continuation of the Appendix, may induce some of your readers and purchasers of my book to keep up the annual records of the advance of the species, of new introductions, increase or decrease in different localities, and other items interesting in the connection; and also to keep similar notes upon such of our animals and birds which have been increasing or extending their range. Such notes I have been collecting for some time, and I would be glad to receive any materials from any of your contributors, whereby such facts can be preserved and made available from time to time, as may be thought desirable.[3]

[1] 'The Capercaillie in Scotland.' David Douglas, Edinburgh: 1879.

[2] Amongst the reviews which have reached me, I would mention those of 'The Athenæum,' 'Nature,' 'Zoologist,' 'Bulletin,' 'Nuttall Ornithological Club' (N. America), Bailey's 'Sporting Magazine,' 'Journal of Forestry,' 'Graphic,' and the daily Scottish papers.

[3] We would take this opportunity of suggesting to naturalists and others who reside on or near the present boundary lines of the districts inhabited by the Capercaillie (as shown in the map in Mr Harvie Brown's work), to keep records of any extension of the species, and to either forward them directly to the author, or publish them in the pages of this Magazine.—ED., 'Sc. Nat.'

Chap. iv. p. 15.—*Mention of Capercaillie in old grants, dated circa* 1343-1361.

In the review of my book in 'The Zoologist' for November 1879, the reviewer writes: "We have met with old grants (*circa* 1343-1361) of land in the county of Durham, held by the tenure, *inter alia*, of paying 'one wode-henne yerely' to the Bishop of Durham for the time being, indicating pretty clearly the 'Ceiliog Coed' or Capercaillie." The reviewer also remarks: "We would have wished that while he was about it, he had told us a little about the former existence of the Capercaillie in England," &c. I think this would be a very good subject for a paper, either in your pages or those of 'The Zoologist,' and I would be glad if English ornithologists would either assist me or the editor of 'The Zoologist' in bringing all the facts together.

Chap. iv. p. 15.—*Earlier notice of the bird than that of Hector Boetius in* 1526.

> "Quoth he, my kid, my capircalyeane,
> My bonny bab with the ruch brilyeane."
> DUNBAR'S Poems—*A Brash of Wowing.*

Here it is used as a term of endearment. In Mr David Laing's Edition, vol. ii. p. 29, Mr Laing says that William Dunbar was born about the middle of the fifteenth century, and died about the year 1520.

I am obliged to Dr Alexander Smith for this interesting note.

Chap. iv. p. 15.—*Monumental Stone at Sandwick.*

On the monumental stone at Sandwick, Ross-shire, there is a species of the Grouse family figured, if not two. The feathered feet are conspicuous, but the shape of the tail is rather against the bird being intended to represent a Capercaillie. There are two figures of the bird—apparently male and female—but whether of different species or of the same, it is difficult to determine. Had a Black-cock been intended in the figure of the male, the *recurved* outer tail feathers would surely have been most distinctly represented, which they are not; but then, on the other hand, the tail is square or slightly concave, not rounded like a Capercaillie's.

My object in noticing it here is to attract the attention of

antiquaries to it, so that perhaps, some day, we may obtain a correct reading of the hieroglyphics. An excellent representation of this obelisk is given in 'The Antiquities and Scenery of the North of Scotland,' by Rev. Charles Cordiner, 1780, p. 65.

Perhaps some Ross-shire antiquarian may be inclined to investigate this carefully, if it has not already been done. There are a number of other animals depicted, as men and horses, a bull, &c.

Chap. iv. p. 20.—*Former occurrence in Wales.*

My comment upon the passage referring to the Capercaillie in Wales, immediately following the said passage, may mislead. The fact of the Capercaillie being mentioned as "still an inhabitant of Norway and Sweden," *and also* "of some parts of Wales," is against my supposition that Red Grouse was meant, as the latter species, as is well known, is not indigenous to the Scandinavian peninsula. But, though formerly an inhabitant of Wales, it is extremely improbable that the Capercaillie was "still an inhabitant" in 1793—the date of the translation.

Chap. iv. p. 26.—*Occurrence prior to Extinction (?) in Kinross.*

From a correspondence I have had with my friend Mr Christopher Johnston, it would appear that a female Capercaillie was shot in Kinross by Mr Young—a member of the Cleish family, who was a keen sportsman—in the autumn of 1833. Mr Young fancied he saw another of the same species, and went after it for some days, but failed to secure it. Mr Johnston is assured that there can be no doubt whatever as to the species, for there was a great talk about it at the time in the district, and numbers came to see it, including an old schoolmaster still alive, who, Mr Johnston believes, has seen specimens since their reintroduction. The date is well fixed, because Mr Young, who was a West India merchant, sailed for Demerara the following year, and did not return. The bird was shown upon the dining-room table for several days, for the inspection of all comers. It was the size of a moderate-sized Turkey."

This specimen I believe to have wandered from some of the centres of attempted restoration previously mentioned, or to have been an escaped bird. Being probably accompanied by another makes the former hypothesis the more tenable.

Chap. vii. p. 71 *et seq.*—*Extension in Forfarshire.*

The following are extracts from a letter from Lord Southesk to my publisher, Mr David Douglas, which the latter has been so good as to forward to me :—

"At p. 56 (Map), The author represents Capercailzies as 'established' in my park (due north from Farnell), and occasionally appearing along the river, thence to Brechin. My park has little but hardwood on it, and the portion outside is in arable. I doubt if a Capercailzie ever presented itself in all that part.

"The great fir-woods of the Munromman Moor stretch over some 5000 acres south from Aldbar Castle. Some 3000 acres of this belongs to me. It is full of Capercaillies. The first was shot in 1872, but they had appeared a year or two before. The first I saw myself was a hen-bird, but that was in a fir-wood of mine (Caldcott's Wood) near Dun's Dish. They do not, however, breed there. In Munromman Moor I have repeatedly come on young broods, and in shooting these we generally see a dozen or more old birds in course of a few hours."

I shall be much obliged to Lord Southesk if he will kindly keep me acquainted with any changes in the Capercaillzie population of his district, or of any "extension of range" in the neighbouring county of Kincardine.

Chap. xii. p. 82.—*Extension in Stirlingshire.*

One was killed in 1879 to south-west of the estate of West Quarter, in the south-east corner of the county. This is the first observed in this part of the country. It marches with Callendar estate.

A Capercaillie male went about last year — 1878 — in the grounds of Garscube House, near Maryhill. This is further south than Dougalstone.

In Castlecary high wood, in the spring of 1879, no less than three nests, of eight eggs each, were found by the person, who himself told me had seen them on the 18th May.

One was shot at Milngavie, near Glasgow, and exhibited at a meeting of the Nat. Hist. Soc. of Glasgow, on 23d January 1880, by Mr James Eggleton.

They were particularly numerous this past season in Chasefield Covers, before-mentioned, but scarcer in Torwood.

Chap. xiii. p. 93.—*Extension in Inverness.*

Sir Dudley Marjoribanks, Bart. of Guisachan, in a letter of date 27th December 1879, says: "Here—*e.g.* Guisachan—they have nearly died out,—why, I cannot tell, for the country, from its enormous stretches of the natural fir and birch, appears to be peculiarly adapted to the bird.

"Andersen—of fairy-tale note—sent me my first birds. Thirty-nine arrived in safety, and I kept them for some months, when, just as the breeding season was about to commence, two polecats got into the enclosure and killed all but two cock-birds. Afterwards I received several birds and more eggs from Taymouth—this was after the Marquis's death—and we were fairly successful in rearing young birds for two or three seasons; and then we gave the trouble up, thinking the bird was fairly established; and now they have almost disappeared, if not wholly so."

Chap. xiv. p. 96.—*Extension in Kincardineshire.*

Mr George Sim of Aberdeen informs me that one was shot within three miles of Aberdeen—a female—in the autumn of 1879. It was on the south side of the Dee when killed, and therefore in Kincardineshire. Mr Sim bought the bird from a poulterer. This is an interesting record, bearing out my former surmises as to the direction such extension would take in the Valley of the Dee and Aberdeenshire. I would be glad to receive similar data from any of my correspondents, or others, as regards its further extension beyond the boundaries presently occupied, as shown in the map accompanying my account of the bird.

Chap. xv. p. 98.—*Extension in Ross-shire.*

One is stated to have been shot on the "heights of Monar," near Beauly, about twenty years ago—say 1860—by one of the shepherds of the district, as stated in a letter from Mr R. Hornsby to Miss Dick Lauder of August 2, 1879. I would like to know what became of this specimen. See also Appendix, *ante*, p. 155. Is this the same bird said to have been "trapped at Struy," or another? The dates of the two certainly do not agree,—the Struy one being "about fifty or sixty years ago," and this "about twenty years ago."

Chap. xix. p. 107.—*Distribution.*

I have been asked the question, by a well-known and scientific ornithologist—"Has it ever struck you that the indigenous British Capercaillie is a race, and not quite the same as the Swedish bird?" It certainly does strike me that probably, following the law, which is pretty generally recognised, that insular examples of European species are found very generally to be smaller (and darker in colour) than Continental examples—such may have been the case. But in absence of any specimens of the indigenous race being available, so far as I know, the fact cannot, I fancy, now be ascertained with any certainty.

Appendix, p. 153.—*Bones at Settle.*

Mr John Bulbeck, jun., in a letter to Mr Peterkin, says: "We have not found any bones of Capercaillie in the Settle caves; in fact, we have found very few bones of birds at all."

Chap. v. p. 51, and Appendix, p. 154.—*The Capercaillie in Ireland.*

Colonel Cooper of Markree Castle, County Sligo, Ireland, is still persevering in his endeavours to introduce the Capercaillie to Ireland. I would be glad if any of our Scottish proprietors who possess plenty of these birds can in any way assist him during the present season.

Capercaillie for America.

An American reviewer in 'Forest and Stream'—Mr G. M. Fairchild, jun.—says: "From what I know and can learn of the Capercailzie and its habits, I am inclined to believe that it would thrive and multiply in our Great Maine woods or in the Michigan pineries," and suggests the propriety of "some of our wealthy sportsmen's associations" attempting to introduce it. As a naturalist, I am against the practice generally of "introductions," and "acclimatization societies;" but of course there are cases in which "introductions" confer benefits on a nation. All such, however, ought to be very carefully considered, both as to their probable success or possible failure, and also the consequences, should it be successful, to other interests, as well as to other species, before they are undertaken.

Dunipace House, Larbert,
May 17, 1880.

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 p.* 255.)

84. Palumbus torquatus, Gould. (Wood-Pigeon.)

THE Wood-Pigeon abounds more or less throughout the whole district, often doing, in the more agricultural parts, much damage to the farmer, which, however, is in some measure compensated by the good effected in a vast consumption of seeds of the most noxious weeds. Though large quantities of these birds are annually destroyed, there seems to be no perceptible decrease in their numbers, owing to accessions from the Continent, from whence they are known to reach our shores in large bodies every year. During the harvest months great numbers are shot on the tidal banks of the Tay between Newburgh and Perth, where, among the coarse herbage commonly known as salt-grass,[1] certain spots are cleared in the probable line of flight of the birds to the corn-fields, and on these are set up two or three stale-birds. The gunner,[2] concealed behind a screen of reeds and *débris*, is thus enabled, should the day be favourable and the birds flying well, to keep up a pretty constant fusilade, until driven from his post by the rising tide. As nearly every bird crossing the river, or following its course, naturally pitches to the stale-birds, it is immediately shot, then, propped up between two sticks, becomes in its turn a decoy to the next passer-by. In this way a sack-load is often secured in a single tide.

85. Columba œnas, Linn. (Stock-Dove.)

The Stock-Dove, though exceedingly rare, may perhaps now be justly included among the birds of the district, it having been found breeding in the vicinity of Dunkeld, by Mr Brooke. This bird has also been seen by myself, in the Carse of Gowrie; and from the vicinity and time of year in which a pair were noted,

[1] Chiefly composed of reed meadow-grass (*Glyceria aquatica*) and reed canary-grass (*Digraphis arundinacea*), interspersed with sea club-rush (*Scirpus maritimus*).

[2] Some one of the professionals, generally Newburgh men, who gain their livelihood on the river by shooting wild-fowl in winter, and varying their occupation in summer by getting Wood-Pigeons and catching Eels for the Dundee and London markets.

they were probably nesting on the Glencarse or Balthayock rocks,—a most fitting locality for the purpose. This, together with the recording of two examples, obtained lately in the southern part of Perthshire (*Ibis*, July 1878), leads me to hope that this bird will eventually prove to be more frequent than is generally supposed. The Turtle-Dove (*Turtur auritus*, Ray), on the other hand, though on more than one occasion noticed by myself, besides the capture of two examples in the district, within the last ten years, is, I think, of too irregular occurrence to warrant its being considered anything more than merely accidental; but as many birds of late years—probably from the gradually-increasing extent under agriculture—seem to be extending their area of distribution, and coming further north, the Turtle-Dove may in time increase in number.

86. Tetrao urogallus, Linn. (Capercailzie.)

Since the reintroduction of the Capercailzie, in 1837, by the late Marquis of Breadalbane, after a lapse of nearly three-quarters of a century, it has again become abundant; but for particulars of its increase and distribution, I must refer the reader to Mr Harvie-Brown's most carefully drawn up account of its extension in this country, as shown in his late very interesting publication on the subject—'The Capercaillie in Scotland.'

87. Tetrao tetrix, Linn. (Blackcock.)

In former years the Blackcock was much more numerous and widely spread in the district than it is at present. This is believed by many to have been caused by the presence and great increase of Capercailzie, on the first glance—perhaps naturally so—as the corresponding decrease in the black game dates from about the time of the reintroduction of the former. I, however, quite agree with Mr Harvie-Brown in believing that there are other causes at work, and that the principal of these are, extensive drainage and improvement of land. This is strongly shown to be the case on many spots on the Sidlaws and elsewhere, now highly drained, where, I recollect, black game were once numerous, but which have now totally disappeared,—and this in places where Capercailzie are not frequently seen.

88. Lagopus scoticus, Leach. (Red Grouse.)

Grouse abound in all the more highland parts of the district. On the lower hills, however, such as the Sidlaws and the eastern

parts of the Ochil range, they have of late years, with the exception of a few brace here and there, nearly disappeared, owing to extensive drainage, and the almost total annihilation of heather, by wholesale burning, for sheep-wintering. I have seen, however, up to two or three years ago, pretty large packs after the close of the shooting season; but these are no doubt birds that have been driven across Strathmore from the higher hills, and which return again, performing a kind of local migration. It is satisfactory to learn that, within the last few years, the Grouse has been successfully reintroduced[1] by Admiral Maitland Dougal of Scotscraig, on the heathy flats at the mouth of the Tay, on Tent's Muir, where they have since become resident.

89. Lagopus mutus, Leach. (Ptarmigan.)

Frequent on all the higher tops in Athole, Rannoch, and Breadalbane, the Ptarmigan, as is well known to those familiar with it at different seasons of the year, "in its native haunts," is well deserving of its name "Mutus," from its almost perpetual change of plumage,—from the pure white, which it attains in winter, varying into every shade of grey and brown in summer, and even for a short time in the breeding season, to almost black,—at these times approaching so nearly in colour and appearance to surrounding objects among the weather-beaten and lichen-crusted stones which it frequents, as to be almost undistinguishable, unless by chance the eye of the bird be caught. Guided by instinct in cases of sudden alarm, this similarity in colour is often taken advantage of with great effect, especially should there be young birds, when the whole covey, scattered among the loose stones, will squat motionless, for any length of time, till the danger be past. A curious instance of this was once observed by myself when botanising on Shiehallion. While crossing one of the numerous steep stony patches that clothe the north side of the mountain near its summit, my attention was drawn to a small, dark object, some few yards off, appearing and disappearing in a most unaccountable manner, and always in the same spot. Stealthily creeping up to within a short distance, I discovered the object of my attraction to be a large polecat, popping its head and shoulders in and out between the stones, and dancing up and down in a most extraordinary state of excitement, as if

[1] The term "reintroduced" is made use of, as doubtless, when the heath extended from mountain to sea, of which there is abundant proof, the muir-fowl then occupied every portion of the district.

under some spell. After watching its antics for a time, without being observed, a well-directed stone made him speedily disappear. Remaining perfectly still for several minutes longer, in the hopes of his again showing himself, I was suddenly startled by a bird springing up and taking wing from almost under my feet, then another and another, followed by several more all around me. I then discovered, to my surprise, that I had been sitting in the very middle of a covey of Ptarmigan. There was now no difficulty in accounting for the eccentricities of the polecat.

90. Perdix cinerea, Linn. (Partridge.)

Owing to the much greater extent of cultivation in the Highlands than formerly, the Partridge has become, within the last fifty years, very much more abundant in all the upper valleys and higher grounds, extending even to the very edge of the moors, where I have seen them associating with Grouse, and even mixed in the same covey. This mixed covey was frequently seen, during the greater part of the season, on one of the hills opposite to Pitlochrie, and was supposed to have been hatched in the same nest,—a hen Grouse having probably usurped that of a Partridge, or *vice versa*. In low-lying districts in the Carse of Gowrie, from drainage and the filling in of the ditches causing a scarcity of water, the Partridge is much scarcer than it was wont to be, and has, in consequence, now betaken itself a good deal more to the braes and hillsides.

Coturnix communis, Gould. (Common Quail.)

From what cause it is difficult to explain, unless it be from drainage, but the Quail, which some forty or fifty years ago was a regular visitant, and by no means an uncommon bird, breeding in the Carse of Gowrie and Lower Strathearn, has now, with the exception of an occasional straggler, almost entirely disappeared from the district. In those times, upwards of three couple have been shot in a single day. The last nest known to me in the Carse of Gowrie was in the summer of 1832, and since then the bird has scarcely ever been seen: I have therefore thought it better not to retain it on the list, but treat it as a mere casual.

91. Ardea cinerea, Linn. (Heron.)

The Heron seems to be widely spread, though sparingly, throughout the whole district, being a good deal kept under by gamekeepers, on account of its great destruction of trout

and other fish. It breeds in Strathearn, Rannoch, and Athole. In the latter place, the trees they used to occupy—a line of old beeches on the Hill of Tulloch, opposite Blair—were a few years ago cut down: they then took possession of some old Scots firs within the castle grounds, which they still occupy, but not in such numbers as formerly. In the autumn months they congregate a good deal on the lower parts of the Tay; and when the tide is out, twenty or thirty at a time may be counted (chiefly birds of the season), scattered over the mud-banks, intent on their fishing. As the tide rises they betake themselves to the old dykes which jut out into the river, where, if not disturbed, they patiently wait till it is time to resume operations.

BOTAURUS STELLARIS, Steph. (Bittern.)

I think there can be no doubt but that the Carse of Gowrie, no further back than the middle or the latter part of the last century,—when for the greater part covered with reeds, swamps, and marshes, "the land of fever and ague" (as it is known to have been),—was the home of the Bittern; but, as has been the case in many parts of England and elsewhere, the Bittern, where once common, has now, with the exception of an occasional straggler from the Continent, nearly disappeared: these, however, if left unmolested in some of the very few spots congenial to their habits still existing in the district, would doubtless remain and breed. A very fine and well-preserved specimen now at Carpow, Mr Cuthbert, the present tenant, kindly informs me, in a letter, dated March 1879, was shot in the neighbourhood, on the Gutter-hole fishing on the banks of the Tay, immediately below old Mugdrum House, in the spring, fifteen years before. This would give the date of the spring of 1864, it being probably one of a large flight mentioned by Mr Gould as reaching our shores in the winter of 1863-64, when, as he states, "examples were killed in every part of the country, from the extreme west of Cornwall to the northernmost part of Scotland, and adds that years may elapse before such numbers may appear again, for the slaughter of so many individuals must tend to diminish the race." Another fine example, killed in the neighbourhood of Blairgowrie, is now in the collection of the Perthshire Society of Natural Science. I have not the date or particulars of its capture, but as it was presented some few years ago, it may very possibly have also been one out of the same flight.

92. Vanellus cristatus, Temm. (Lapwing.)

Though widely dispersed throughout the whole district, the Lapwing, or Green Plover, is nowhere so abundant as formerly, especially in the lower parts, where thirty or forty years ago, in the autumn and the early winter months, it was to be seen in the fields in large flocks of many hundreds. In the destruction of slugs, especially on the strong clay lands in the Carse of Gowrie and Lower Strathearn, their presence was most beneficial,—so much so, that since their great diminution, I have known, in the late wet seasons, whole fields of autumn-wheat (especially after a crop of beans) so utterly destroyed by the slug, that they have had to be resown with some other grain in the following spring; and this I attribute entirely to the absence of the Peesweep, or Toughet—the common name given to it by the Carse natives, and only to be pronounced by one well versed in the old vernacular. The steady decrease of these birds can be traced, I think, chiefly to three causes: the presence of punt-gunners on the Tay of late years, who shoot them down in large numbers on the mud-banks at low water, to supply the various markets during the open season; while, in the close time, their eggs are collected with impunity, and if got into the London market sufficiently early, are sure to secure a large price; besides which, in these days of game-rearing, many a Plover's egg goes up to the London dealers in exchange for those of Partridges and Pheasants. No wonder, then, that the poor Lapwing gets every year scarcer and scarcer. In addition to this, owing to drainage and improvement in farming, especially in stiff lands, the ploughed fields are able to be worked much earlier in the season than formerly, and many a sitting of eggs, if not otherwise discovered and robbed, are either harrowed up and broken, or ruthlessly crushed by the roller passing over them; whereas in olden times these would have been safe, and the young birds hatched and able to take care of themselves by the time farming operations commenced; also, in these days of high farming, there is now little or no fallow land to be seen in the country, once the great haunt of the Peewit in the breeding season.

93. Charadrius pluvialis, Linn. (Golden Plover.)

A great deal that has been said in regard to the causes of the scarcity of the Lapwing may be repeated in the case of the

Golden Plover, which, in comparison with the immense numbers assembling in our fields every autumn, even only a few years back, there may be said to be not one now for every hundred that there were then. A few, however, are still to be found here and there, in the breeding season, scattered over most of the heathy tracts of the district, from the sources of the Tay to its mouth, at which latter place, on Tent's Muir—one of the great breeding-grounds of our Grallatores—this bird, along with many others, has greatly suffered from the constant depredation of their eggs by gatherers of them, from St Andrews and other places. For the prevention of this there is no law, rendering the Wild-Fowl Protection Act, without some clause in favour of eggs, of little or no avail in the saving of our birds (in the course of no very distant time) from total annihilation; and, just as in the case of the Great Auk, our Peewits and Golden Plovers, if some steps be not speedily taken, will soon be things of the past, and when "the steed is stolen, there will be no use locking the stable-door." I have heard the question asked, "Can it be truly said that, since the passing of the Wild-Fowl Protection Act in 1872, there has been the slightest increase in any single bird mentioned in it?" Certainly, as far as my experience goes, it seems to have been all the other way. Doubtless there are certain influences, over which we have no control, bearing against it, as far as the migratory portion of our birds are concerned, as, when they have left us and are no longer under our protecting care, they may be shot with impunity in the country to which they go, and even be sent back from thence to supply our markets. But to go no further than the Golden Plover and the Lapwing, which may be considered resident, "have they increased?" I fear the answer is "No," and always will be till egg-gathering is either abolished or in some measure greatly restricted.

94. ÆGIALITIS HIATICULA, Boie. (Ringed-Plover.)

The Ringed-Plover, or Ring-Dotterel, as it is commonly called, is frequent on many parts of the Tay and Earn, but seemingly rather local, breeding on the shingly banks of both these rivers, as well as the Tummel, where I have frequently found their nests in company with the Oyster-Catcher; but Mr Horn considers it rare in Strathtay. They also breed at the mouth of the Tay on Tent's Muir, and are frequently to be seen, at most seasons, on the sands in that locality.

95. Eudromias morinellus, Boie. (Dotterel.)

The Dotterel, which is strictly a migrant, reaches its breeding-grounds on our higher hills towards the middle of May, there being, I am happy to say, a few of these birds still to be seen in some of the upper parts of the district, but, like most others of the tribe, it has sadly diminished of late years, and in many parts where once not uncommon, it has entirely disappeared. This is especially the case on that part of the Sidlaws above the Carse braes, where the Dotterel was in former days frequently to be met with, but now is altogether unknown.

96. Hæmatopus ostralegus, Linn. (Oyster-Catcher.)

This beautiful bird, not being much in quest either by the sportsman or the professional gunner as an article either of sport or food, is still, I am glad to say, pretty abundant, though were it not for the continual robbing of its eggs as a delicacy, it would be greatly more so; but, fortunately, it requires a well-practised eye to find them, the eggs being so exactly the colour of the stones among which they are laid, and one of which is generally placed in the nest along with them, that they are pretty safe from detection, at least by a novice, who may easily pass within a foot without observing them. But the cleverest hunter for them I ever saw was a very large Newfoundland dog, who not only scented out the nests, but brought the eggs one by one to his master, returning each time to the nest for a fresh one, and so gently mouthing them that there never was an instance of a breakage. The Sea Piot, by which name this bird is more commonly known, is one of the most regular of our local migrants, frequenting the upper portions of the district in summer, and retiring to the sea-shore in winter. Almost to a day, about the 15th of March, on all the straths and haughs of Earn, Tay, and Tummel, may be heard the shrill piping cry, announcing their arrival on the breeding-grounds, situated on the broad shingly banks and islands, where they judiciously make use of such spots for the deposit of their eggs as to be out of reach of all ordinary spates; occupying during feeding-time the neighbouring fields and pastures, where they may often be seen following the plough, like the Rook, in search of worms and grubs, or associating themselves on the lower grounds along with the cattle. The Oyster-Catcher has been scheduled, and, I think, somewhat erroneously, in the Sea-Bird Act; whereas it seems to me that it

would have been more appropriately placed, like the Curlew and Plover, in that of the "Wild-Fowl," as I am not aware that it is ever found (at least with us), during the close season, on any part of the sea-shore, having long before that time—the 2d of April —retired inland and commenced breeding.

97. Numenius arquata, Lath. (Curlew.)

The Curlew, or Whaup, is well represented during the breeding season on all the high grounds throughout the district, where its loud trilling cry may be constantly heard. In the autumn they retire to the mud-banks on the lower parts of the Tay and adjoining sea-shores, where they congregate in considerable numbers, changing their quarters regularly, according to the state of the tide. When driven off the banks, they proceed inland for some distance, returning again on the first appearance of the ebb. Being wild, wary birds, they have been able to take care of themselves, and consequently their numbers have not greatly diminished.

Numenius phæopus, Lath. (Whimbrel.)

I have only once observed the Whimbrel on Tent's Muir, and that in a small flock in autumn, of six or seven birds; but not having any notice of their breeding there, or having been found in other parts of the district, I take it that they were only on their passage from their breeding-grounds in the North.

98. Limosa rufa, Temm. (Bar-tailed Godwit.)

The Godwit is not unfrequent during the autumn and winter months in the estuary on the mud-banks and shores about Tent's Muir, but I have never seen them higher up the river. These birds would be much more common were they not continually shot at and disturbed by punt-gunners.

99. Glottis canescens, Strickld. (Greenshank.)

The Greenshank is much rarer than formerly, though never a very common bird. During the autumn months they were not unfrequent on the mud-banks on the lower parts of the Tay, but it is only occasionally that they now appear. They are known to breed in Rannoch; and I have been informed by Mr Carrington that he had frequently seen the old birds, and he showed me one of their eggs which he had got on the moor.

100. Totanus calidris, Bechst. (Redshank.)

This was once an abundant bird, frequenting the mud-banks

on the lower part of the Tay both in the spring and autumn, retiring to the higher grounds to breed, where they might be seen in considerable numbers on most of our hills in spring; but of late years they have greatly diminished.

101. Actitis hypoleucos, Gould. (Sandpiper.)

The Sandpiper, or Summer Snipe, as it is sometimes called, gladdens us with its cheery piping note on its arrival early in May, dispersing itself over all our rivers and streams throughout the district, and at once commences its nesting duties, concealing its eggs carefully under some projecting tuft on the adjoining bank: these I have frequently found by the middle or third week in May.

Strepsilas interpres, Gould. (Turnstone.)

Calidris arenaria, Leach. (Sanderling.)

Both these birds have been noticed at the mouth of the Tay, but from their being so casual in appearance, especially the Sanderling, they can scarcely be included in the list of regular visitants.

102. Tringa canutus, Linn. (Knot.)

The Knot was many years ago abundant on all the mud-banks on the lower Tay, but, like the Godwit, Redshank, and many others, has been of late years greatly diminished, principally owing to the demand for these birds in the Edinburgh and other markets, especially at the time when game is scarce, and consequently they get no rest from the various gunners always in search of them.

Ancylocheilus subarquata, Kaup. (Curlew Sandpiper.)

Mr Horn records an example of the Curlew Sandpiper having been shot by Mr Dewar on Loch Tay, but no mention is made of the date of capture. I have never observed it on the lower part of the Tay or the sea-shore near the mouth, and therefore consider its appearance on Loch Tay merely accidental.

103. Pelidna cinclus, Bonap. (Dunlin.)

The Dunlin does not seem to make its appearance so high up the tideway in the Tay as it formerly did—frequenting all the banks and projecting points, in autumn and spring, nearly as high up as Perth. It is, however, yet to be seen in considerable

flocks on the banks a good deal lower down, and is to be found breeding on Tent's Muir pretty plentifully. It is somewhat curious that there is no notice of their doing so higher up in the district, where they might be expected, nor of their having ever been met with in the Highlands, or anywhere further up the river than that mentioned by Mr Marshall, of Stanley, who records one shot near the Stormontfield ponds,[1] four or five miles above Perth.

104. Scolopax rusticola, Linn. (Woodcock.)

There seems to be a belief among sportsmen in some quarters that the Woodcock has of late years greatly changed its habits, breeding and remaining all summer, and leaving this country in autumn, instead of coming to us only at that season and in the numbers it formerly did. This latter may be quite true of many parts of the country, but it must be recollected, as before stated, that none of our Grallatores are as abundant as in years past; besides which, much depends on the state of wind and weather as to whether birds on their passage from the Continent remain or proceed further on,—wild weather at that time, especially if accompanied with fog and adverse winds, throws them on our east coast. Should the contrary take place, few or none will be seen there, as they will then all have passed on to the west. That any change has taken place in their habits will be found, I think, to be a mistake. It is perhaps not generally known, excepting to those who have paid attention to the subject, that the Woodcock breeding in this country is no new thing; it has done so for years in every quarter of the country, from the south of England to the north of Scotland, but of course in very much fewer numbers than they do at present—and the reason is very simple: they were not protected then; they are now. Twenty years ago, and less, the Woodcock was shot sometimes in large numbers in March and April, and I have known a party of several guns turn out for the purpose as late as the 13th of April. Consequently all the breeding birds were destroyed. On this very subject Mr Gould, writing in his work on 'British Birds' some years ago, says: "Are we not killing the goose that lays the golden egg, when every scamp who can borrow a gun is permitted to shoot these birds in their evening flights or roadings during the months of March and April? I sincerely trust that, if this bird be not hereafter reckoned among the species desig-

[1] 'Scot. Nat.,' v. p. 257.

nated 'game,' it may be deemed advisable to pass a law inflicting a heavy penalty for every Woodcock killed between the 1st of February and the 12th of August. Were ordinary protection afforded to the bird, I see no reason why it should not become vastly more numerous. Every sportsman is aware that during the last fortnight in January the Woodcocks are found in pairs—mated, in fact, for the coming task of reproduction." Since the time that this was written, the Woodcock has been protected by law, and Mr Gould's prediction verified, as is shown by its great increase during the breeding season; but, unfortunately, it was not placed, as he suggested, in the Game Act, but inserted in the Wild-Fowl Act, the close time commencing on the 15th of February, which can now, on the decision of the local justices in any district, be extended to the 15th of March,[1] which, as far as the Woodcock is concerned, is a great deal too late. The 15th of January would have been better, for it seems to be quite overlooked that they are not only paired in January, but nest in the end of February and beginning of March, even laying their eggs with snow on the ground, thus giving time to rear three broods in the year. Consequently the shooting of a brace of Woodcock in early spring is tantamount to the destruction of fourteen birds. In proof of this, on the 16th of March of this present year, 1880, young Woodcock were seen on the wing in the Scone woods near Perth; and Mr Butter of Faskally has informed me that in the spring, in the woods about Faskally, where the Woodcock is plentiful in the breeding season, the young birds of the first brood are often seen in company with the old hen while she is hatching a second. It is a common belief that all our home-bred birds leave this country entirely; and the question has been asked, If so, what is the good of protecting them? why not shoot them down when we can get them? I leave that to be answered by those who see no harm in shooting a Partridge or any other bird off its nest. But do they all leave us? I think there is proof to show that they do not; at least, that a certain proportion remain, and that, though perhaps shifting their ground, they do not leave the country altogether. The late Sir Thomas Moncreiffe, well known to be a most accurate observer, was of strong opinion that the Woodcocks bred on Moncreiffe Hill never left it; and he fully believed, as he once

[1] This has already been taken advantage of in many districts, and is now in consideration by the Perthshire justices for the Tay and Forth.

himself assured me, that there was no season of the year in which native birds were not to be found in the woods there.

105. Gallinago scolopacina, Gould. (Common Snipe.)

The Snipe breeds pretty generally throughout the district. In September and October they are augmented by accessions from the Continent, but owing to drainage and other causes—chiefly the destruction of their eggs by egg-collectors on their breeding-grounds, not only in this country but in the north of Europe, to supply the Paris and London egg-dealers—they have become greatly reduced in numbers; so great a trade, indeed, is there, that I had once shown to me, when travelling in Shetland, a box containing no less than two hundred Snipes' eggs, all blown in the most approved manner, and ready to be sent off to a dealer in London, in execution of an order; and besides these there were a host of others of various species, such as Golden Plover, Redshanks, Dunlins, and many others. On the tidal banks of the Tay, where some years ago the Snipe were pretty plentiful, they have now almost entirely disappeared; and the few that do come are so continually fired at by shooters from the neighbouring towns, that they never get a moment's rest.

106. Limnocryptes gallinula, Kaup. (Jack-Snipe.)

This is entirely a winter visitant, and though nowhere very numerous, is generally spread throughout the district. On the banks of the Tay they used to be pretty abundant, but owing to the gradual rise of the ooze, and consequent hardening of the surface, these birds requiring much softer ground than the common Snipe, they now seldom come. Their arrival, at least in the lower part of the district, as far as my observation goes, is very regular, taking place almost to a day, generally about the 5th of October; and on one occasion only have I met with it as early as the 29th of September. Mr Horn, however, states that he has shot them on the 12th of August in Strathtay. This very early date would lead one almost to suppose that these birds which he saw must have been bred in the district—a fact in this country, I believe, never yet positively ascertained.

Phalaropus fulicarius, Bonap. (Grey Phalarope.)

A single specimen of this bird is mentioned by Mr Horn as having been obtained in Glen Lyon by Mr E. T. Booth. There

is no notice that I am aware of as to any other instance of this species having been found elsewhere in the district.

107. Lobipes hyperboreus, Cuv. (Red-necked Phalarope.)

The Red-necked Phalarope I found breeding some years ago in Athole, but not having visited the spot lately, I cannot say whether it is still to be found there. It is not unlikely, I think, that it frequents other parts of the district suitable to it, but from its unobtrusive habits it may easily have been overlooked.

108. Fulica atra, Linn. (Coot.)

Common in many parts, abounding on all the back-waters of the Earn, Methven Loch, and other places congenial to its habits.

109. Gallinula chloropus, Lath. (Moor-Hen).

Previous to the severe winter of 1878-79, the Water-Hen, as it is more generally called with us, was abundant, especially about the great reed-brakes of the Tay, but that year they perished everywhere, and were found dead in every direction, and it will probably take some years before there is any great increase in their numbers. Innocent as the Water-Hen is in appearance, it is a bird certainly not to be encouraged about a poultry-yard, which they will frequently enter, perhaps from the neighbouring duck-pond, picking up any stray morsel along with the fowls, and when not observed, will kill, on the sly, any young chick or duckling that may cross their path. Often have these depredations been put down to the rats, the shy and retiring little Water-Hen never having been suspected by the henwife to have been all the time the culprit.

110. Rallus aquaticus, Linn. (Water-Rail.)

Some years the Water-Rails are more abundant than in others, and may be considered only as an autumn and winter visitant with us, arriving about the beginning of October, and in open seasons remaining; but should very severe weather set in, they move further south. On the banks of the Tay they are not uncommon, on their first arrival, among the reed-brakes, both there and on the Earn. Though breeding in many parts of this country, I have never met them, or had any notice of their having been seen, during the summer months in any part of the Tay district.

111. Crex pratensis, Bechst. (Land-Rail or Corn-Crake.)

In the Carse of Gowrie and lower parts of the district the Land-Rail was very much more common than it is now, probably owing to drainage. Mr Horn considers it a scarce bird in Strathtay; while in Athole I am told it has become more abundant of late years. Being a shy bird, unless brought under observation by their craking on their first arrival, they may, as the season advances, very easily escape notice—the more especially as the call-note is then never heard; and they quietly slip away on their southern migration, merely leaving a young bird or two to be seen in the clover-fields when Partridge-shooting commences, and are consequently often supposed to be much scarcer than they really are.

112. Porzana maruetta, Viell. (Spotted Crake.)

This is by no means a common bird, though it has been got in various parts of the district, and on the lower parts of the Tay I have not unfrequently met with it, but only in autumn I have no notice of its breeding with us; but being a shy retiring bird, and most difficult to flush, darting through the long coarse grass more like a rat than a bird, it may hitherto have escaped observation.

(*To be continued.*)

THE MIGRATION OF BIRDS.

In a former volume of this magazine there is a remark—written, it is true, of one special group of natural objects, but which is applicable to all—that to the naturalist the most attractive object should be the one of which the least is known. Notwithstanding the amount that has been written regarding the migration of birds, how little is really known, after all, about this most interesting phenomenon. But that such is the case is not really much to be wondered at, when we consider the difficulties that stand in the way of the observer. However enthusiastic he may be, he cannot always be in the right place at the right moment, and hence most recorded observations on migration have hitherto been of a more or less sporadic nature. To the true naturalist the difficulties in the way of acquiring such an amount of full, continuous, and trustworthy records as will in time serve as material for elucidating the laws of migration, have only served to make the subject more attractive, and all will, we are sure, wel-

come with delight a scheme which promises to result in the accumulation of a large number of records of the times of arrival and departure of migratory birds on various points of our coasts.

The scheme to which we allude is to utilise as observers the keepers of the lighthouses and light-ships situated on various points of the coasts of the British Islands and other countries. The idea of so utilising these men has occurred to more than one ornithologist (amongst others, we believe, to our contributor Colonel Drummond Hay); but it has been left to Messrs Harvie Brown and Cordeaux to take action in the matter, and to these enthusiastic students of nature all praise for independently originating the plan must be given.

As appears from their "Report on the Migration of Birds in the Autumn of 1879" ('Zoologist,' May 1880), they applied to the keepers of *ninety* stations, with the result that returns were received from *sixty-two*, the others either being unable to make a report owing to the scarcity of birds, or not replying at all. Of the stations applied to, *twenty-six* were on the east coast of Scotland, and *thirty-four* on the west coast—returns being received from *thirteen* and *twenty four* respectively. On the east coast of England *thirty-seven* stations were asked, and *twenty-five* responded to the appeal. No returns were received from the Manx stations.

On the whole, the number of replies received was very encouraging, and we understand that Messrs Harvie Brown and Cordeaux have this year considerably extended the area of their inquiries. We shall look with interest to the future "reports," of which we hope the one before us is only the first of a long series.

F. B. W.

A NEW THYSANOPTEROUS INSECT OF THE GENUS PHLŒOTHRIPS FOUND IN SCOTLAND AND DESCRIBED

By O. M. REUTER.

PHLŒOTHRIPS SETINODIS, N. SP.

NIGRA, nitida, cum pedibus laevis; capite latitudine circiter dimidio longiore, planiusculo; oculis ovalibus; antennis, tibiis anticis totis, apice tibiarum posteriorum tarsisque omnibus luteis, his posteriòribus apice fuscescentibus; antennis articulo primo, basi secundi octavoque fuscis, articulo tertio duobus ultimis simul sumtis paullo longiore, quarto tertio paullo breviore, reliquis apicem versus sensim brevioribus; femoribus tarsisque muticis, illis anticis leviter incrassatis et posticis tantum paullo crassioribus; notis setis longis nigris pluribus erectis. Long. 2½—2⅔ mm.

Duo specimina, alterum ad Muchalls prope Aberdeen d. 3 julii, alterum ad Dava in Morayshire d. 2 augusti 1876 inveni.

Species colore antennarum et pedum a reliquis mox distincta. Caput latitudine circiter dimidio longius, planiusculum, lateribus parallelis, muticis, disco transversim subtilissime aciculato, utrinque paullo pone oculum seta nigra antrorsum vergente instructo. Oculi superne visi ovati, capitis fere magis quam tertiam anticam occupantes. Antennæ basin alarum anticarum subattingentes, luteæ, articulis apice albido-pilosis, articulo primo oculi diametro transverso duplo fere breviore, nigro, secundo primo longiore, basi nigro-fusco, apice testaceo, reliquis luteis, tertio secundo duplo longiore, elongato, a basi gracili apicem versus sensim levius incrassato, capitis latitudine interoculari longiore, quarto-sexto apicem versus crassioribus, quarto tertio paullulum breviore, reliquis versus apicem antennæ sensim brevioribus, quinto duobus ultimis conjunctis vix breviore, octavo gracillimo septimo saltem ⅓ breviore, fusco. Pronotum capite circiter ⅓ brevius, trapeziforme, basi quam apice duplo latius, setis tribus lateralibus, quarum seta intermedia setaque anguli postici longissimis, setis duabus brevioribus marginis antici duabusque mox ante marginem posticum longissimis apice convergentibus, nigris. Pterygothorax prothorace latior et fere ¾ longior, mesonoto pronoto fere duplo breviore, setis duabus. Alæ completæ basin tubi apicalis attingentes, longe nigro-ciliatæ, alæ superiores basi costa brevi setas tres nigras longas erectas emittente instructæ. Abdomen ovatum, segmentis longitudine subæqualibus, limbo utrinque biseriatim longe nigro- vel fusco-setoso, tubo apicali segmentis tribus præcedentibus conjunctis breviore. Pedes nigri, femoribus anticis modice incrassatis et posticis tantum paullo crassioribus, muticis, tibiis anticis totis et posterioribus apice luteis, tarsis luteis, posterioribus apice fuscescèntibus, anticis muticis.

Helsingfors, Finland, *May* 7, 1880.

Water-Spider (*Argyroneta aquatica*) **in Scotland.** — In a note on the above in the April part of the 'Scottish Naturalist,' Dr Trail mentions having found this species in a marsh on Scotston Moor; and he remarks that "this seems to be the first notice of the occurrence of this species in Scotland, as it is not noticed in Mr Cambridge's list of Scottish Spiders, published in the 'Zoologist' in 1877." In his paper on the Scottish Spiders, Mr Cambridge overlooked the fact that it is far from uncommon in the Possil Marsh, near Glasgow, where it has been a familiar object to me as far back as 1868-69. At that time I also obtained many specimens from an old pond or quarry-hole near Partick, but which is now filled up. It was only a short time since, on seeing some *Scottish* specimens of this species in the collection of Mr Henry C. Young of this city, that I learned it was not generally known as a native of Scotland.—J. M. Campbell, Kelvingrove Museum, Glasgow, *7th April* 1880.

Coleoptera of Scotland—Correction.—I see in the last number of the 'Scottish Naturalist' an error of Murray's copied into Dr Sharp's list of Scottish Coleoptera. I never found *Magdalinus atramentarius* at "Dollar," or anywhere else in Scotland. I fancy the mistake arose from Mr Murray mistaking "Dover" for "Dollar," as I have specimens in my cabinet from the former place; and if he asked me where I got them, he may have mistaken my answer.—John T. Boswell, Balmuto, Kirkcaldy, *April* 2, 1880.

PHYTOLOGY.

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 269.)

Myrtaceæ.

Punica granatum—Pomegranate. Gaelic: *gràn ubhal* (*gràn*, Latin, *granum*), grain-apple.

"Tha do gheuga mar lios *gràn ubhlan*, leis a'mheas a's taitniche."—Song of Solomon.

Thy plants are an orchard of pomegranates with pleasant fruits.

(Now generally written *pomgranat* in recent editions.)

Myrtus communis—Myrtle. Gaelic: *miortal.*

"An ait droighne fàsaidh an guithas, agus an ait drise fàsaidh am *miortal.*" —Isaiah lv. 13.

Instead of the thorn shall grow the fir, and instead of the briar, the myrtle.

Onagraceæ.

Epilobium montanum—Mountain willow-herb. Gaelic: *an seileachan*, diminutive of *seileach* (Latin: *salix*, a willow), from the resemblance of its leaves to the willow. Welsh: *helyglys*, same meaning.

E. angustifolium—Rosebay. Gaelic: *seileachan frangach*, French willow. *Feamainn* (in Breadalbane), a common name for plants growing near water, especially if they have long stalks.

Circæa lutetiana and **alpina**—Enchantress's nightshade. Gaelic and Irish: *fuinnseach.* Not improbably from Irish *uinnseach*, playing the wanton—the reference being to the fruit, which lays hold of the clothes of passengers, from being covered with hooked prickles (as Circe is fabled to have done with her enchantments); or *fuinn*, a veil, a covering. The genus grows in shady places, where shrubs fit for incantations may be found. "*Fuinn* (a word of various significations), also means the earth; and *seach*, dry—*i.e.*, the earth-dryer. *Fuinnseagal* (another Irish name), from *seagal* (Latin, *secale*), rye—*i.e.*, ground-rye" (Brockie). *Lus na h'oidhnan*, the maiden's or enchantress's weed.

LYTHRACEÆ.

Lythrum salicaria — Spiked lythrum, purple loosestrife. Gaelic: *lus an sith chainnt*, the peace-speaking plant.

> "Chuir Dia oirnn *craobh sìth chainnt*,
> Bha da'r dionadh gu leoir."—IAN LOM.
>
> God put the peace-speaking plant over us,
> Which sheltered us completely.

The name also applies to the common loosestrife, suggested probably by the Greek λυσις μαχη, of which the English name "loosestrife" is a translation. Irish: *breallan leana*. *Breal*, a knob, a gland. It was employed as a remedy for glandular diseases, or from the appearance of the plant when in seed. *Breallan* means also a vessel. The capsule is enclosed in the tube of the calyx, as if it were in a vessel. *Lean*, a swamp. Generally growing in watery places.

HALORAGEÆ.

Myriophyllum spicatum and **alterniflorum.**—Water-milfoil. Gaelic and Irish: *snaithe bhatheadh* (from *snaith*, a thread, a filament; and *bàth*, drown), the drowned thread.

GROSSULARIACEÆ.

Ribes, said to be the name of an acid plant. (*Rhèum ribes*, mentioned by the Arabian physicians, a different plant). More probably from the Celtic *riob*, *rib*, or *reub*, to ensnare or entangle, to tear—many of the species being prickly. Latin: *ribes*. Gaelic: *spiontag*, currant, gooseberry. Irish: *spiontog*, *spin*. Latin: *spina*, a thorn; also *spion*, pull, pluck, tear away. Welsh: *yspinem*.

Ribes nigrum—Black currant. Gaelic: *raosar dubh*, the black currant. *Raosar* (Scotch, *rizzar*—from French, *raisin;* Welsh, *rhyfion;* Old English, *raisin tree*), for red currant.

R. rubrum—Red or white currants. Gaelic: *raosar dearg* or *geal*, red or white currants; *dearc frangach*, French berry.

R. grossularia — Gooseberry-bush. Gaelic: *preas ghrosaid* (written also *groseag*, *grosaid*), the gooseberry—from *grossulus*, diminutive of *grossus*, an unripe fig, — "so called because its berries resemble little half-ripe figs, *grossi*" (Loudon). French: *groseille*. Welsh: *grwysen*. Scotch: *grozet*, *grozel*.

> "Suthan-lair's faile *ghroseidean*."—M'INTYRE.
>
> Wild strawberry and the odour of gooseberries.

Crassulaceæ.

(From Latin, *crassus*, thick—in reference to the fleshy leaves and stem. Gaelic: *crasag*, corpulent.)

Sedum rhodiola—Rose-root. Gaelic and Irish: *lus nan laoch*, the heroes' plant; *laoch*, from the Irish, meaning a hero, a champion, a term of approbation for a young man.

The badge of the Clan Gunn.

S. acre—Stonecrop, wall-pepper. Gaelic and Irish: *grafan nan clach*, the stone's pickaxe. Welsh: *flyddarlys*, prick madam. Also in Gaelic: *glas-lann* and *glas lean*, a green spot. Welsh: *manion y cerg*.

S. telephium—Orpine. Scotch: *orpie*. Gaelic: *orp* (from the French, *orpin*). *Lus nan laogh*, the calf or fawn's plant; *laogh*, a calf, a fawn, or young deer, a term of endearment for a young child. Irish: *laogh*. Welsh: *lho*. Manx: *leigh*. Armoric: *lue*. Welsh: *telefin* (from Latin, *telephium*).

Sempervirum tectorum — House-leek. Gaelic: *lus nan cluas*,[1] the ear-plant (the juice of the plant applied by itself, or mixed with cream, is used as a remedy for the ear-ache); *lus gharaidh*, the garden-wort; *oirp*, sometimes written *norp* (French, *orpin*); *tin gealach*, *tineas na gealaich*, lunacy—*tinn*, sick, and *gealach*, the moon (*geal*, white, from Greek, γαλα, milk);—it being employed as a remedy for various diseases, particularly those of women and children, and head complaints. Irish: *sinicin*, the little round hill; *tir-pin*, the ground-pine. Welsh: *llysie pen-ty*, house-top plant.

Cotyledon umbilicus—Navel-wort, wall-pennywort. Gaelic: *lamhan càt leacain*, the hill-cat's glove. Irish: *corn caisiol*, the wall drinking-horn (from *corn*, a cup, a convex surface; from its peltate round convex leaves). Latin: *cornu*, a horn. Welsh: *corn*. French: *corne;* and *caisiol*, a wall (or any stone building), where it frequently grows.

Saxifragaceæ.

Saxifraga — Saxifrage. Gaelic: *cloch-bhriseach* (Armstrong), stone-breaker—on account of its supposed medical virtue for that disease. Welsh: *cromil yr englyn*.

[1] This is what I always heard it called; but M'Donald gives *norn*, and in the Highland Society's Dictionary it is given *creamh-garaidh*, evidently a translation by the compilers, as they give the same name to the Leek.—Fergusson.

S. granulata—Meadow saxifrage. Gaelic and Irish: *moran*, which means many, a large number—probably referring to its many granular roots.

Chryosplenium oppositifolium — Golden saxifrage. Gaelic: *lus nan laogh* (the same for *Sedum telephium*). Irish: *clabrus*, from *clabar*, mud, growing in muddy places; *gloiris*, from *gloire*, glory, radiance,—another name given by the authorities for the "golden saxifrage;" but they probably mean *Saxifraga aizoides*, a more handsome plant, and extremely common beside the brooks and rivulets among the hills.

Parnassia palustris — Grass of Parnassus. Shaw gives the name *fionnsgoth* (*fionn*, white, pleasant, and *sgoth*, a flower), "a flower," but he does not specify which. *Finonan geal* has also been given as the name in certain districts, which seems to indicate that *fionnsgoth* is the true Celtic name.

Araliaceæ.

Hedera—"Has been derived from *hedra*, a cord, in Celtic" (Loudon).

Hedera helix—Ivy. Gaelic: *eidheann*, that which clothes or covers (from *eid*, to clothe, to cover); written also *eigheann* (*eige*, a web), *eidhne*, *eitheann*.

"Spionn an *eitheann* o'craobh."—Old Poem.
Tear the ivy from the tree.

"*Eitheann* nan crag."—Ossian.
The rock-ivy.

"Briseadh tro chreag nan eidheann dlu'
Am fuaran ùr le torraman trom."—Miann a Bhard Aosda.
Let the new-born gurgling fountain gush from the ivy-covered rock.

Faithleadgh, Irish: *faithlah*, that which takes hold or possession. Welsh: *iiddew* (from *eiddiaw*, to appropriate). Irish: *aighneann* (from *aighne*, affection), that which is symbolic of affection, from its clinging habit. *Gort*, sour, bitter—the berries being unpalatable to human beings, though eaten by birds. *Ialluin* (from *iall*, a thong, or that which surrounds); perhaps from the same root as *helix*. Greek: ἑιλέω (*eileo*, to encompass); also *iadh-shlat*, the twig that surrounds,—a name likewise given to the honeysuckle (*Lonicera periclymenum*), because it twines like the ivy—

"Mar *iadh-shlat* ri stoc aosda."
Like an ivy to an old trunk.

An gàth, a spear, a dart.

The badge of the Clan Gordon.

Cornaceæ.

Cornus (from Latin: *cornu*, a horn). Gaelic: *corn*. French: *corne*. "The wood being thought to be hard and durable as horn."

Cornus sanguinea—Dogwood, cornel-tree. Gaelic: *coin-bhil*, dogwood; *conbhaiscne*, dog-tree (*baiscne*, Irish, a tree). Irish: *crann coirnel*, cornel-tree.

C. suecica—Dwarf cornel,—literally, Swedish cornel. Gaelic and Irish: *lus-a-chraois*, plant of gluttony (*craos*, a wide mouth; gluttony, appetite). "The berries have a sweet, waterish taste, and are supposed by the Highlanders to create a great appetite,—whence the Erse name of the plant" (Stuart of Killin).

Umbelliferæ.

Hydrocotyle vulgaris—Marsh pennywort. Gaelic: *lus na peighinn*, the pennywort. Irish: *lus na pinghine* (O'Reilly), from the resemblance of its peltate leaf to a *peighinn*,—a Scotch penny, or the fourth part of a shilling sterling.

Eryngium maritimum—Sea-holly. Gaelic and Irish: *cuileann tràgha*, sea-shore holly. (See *Ilex aquifolium*). Welsh: *y môr gelyn*, sea-holly (*celynen*, holly).

Sanicula europæa—Wood sanicle. Gaelic: *bodan coille*, wood-tail,—the little old man of the wood. Irish: *caogma*,—*caog*, to wink. *Buine*, an ulcer,—a noted herb, "to heal all green wounds speedily, or any ulcers. This is one of *Venus*, her herbs, to cure either wounds or what other mischief *Mars* inflicteth upon the body of man" (Culpepper). Welsh: *clust yr arth*, bear's-ear.

Conium maculatum—Hemlock. Gaelic: *minmhear* (Shaw),—smooth or small fingered, or branched, in reference to its foliage; *mongach mhear*, and *muinmhear*,—*mong* and *muing*, a mane, from its smooth, glossy, pinnatifid leaves. *Minbhar*, soft-topped or soft-foliaged. *Iteodha*, *iteotha*,—*ite*, feathers, plumage. The appearance of the foliage has evidently suggested these names, and not the qualities of the plant, although it is looked upon still with much antipathy.

"Is coslach e measg chaich
Ri *iteodha* an garadh."—M'Intyre.

Among other people he is like a hemlock in a garden.

"Mar so tha breitheanas a' fàs a nìos, mar an *iteotha* ann claisibh na machrach."—Hos. x. 4.

Thus judgment springeth up like a *hemlock* in the furrows of the field.

Welsh: *gwin dillad*, pain-killer. Manx: *aghue.*

"Ta'n *aghue* veg shuyr da'n *aghue* vooar."—MANX PROVERB.

The little hemlock is sister to the big hemlock.

(A small sin is akin to the great one.)

Cicuta virosa — Water-hemlock. "The hemlock given to prisoners as poison" (Pliny); and that with which Socrates was poisoned. Gaelic and Irish: *fealla bog*, the soft deceiver; *feall*, treason, falsehood; and *feallair* (*feall fhear*), a deceiver,—from the some root (Latin, *fallo*, to deceive). Welsh: *cegid.* Latin: *cicuta.*

Smyrnium olusatrum — Alexanders. Gaelic: *lus nan gràn dubh*, the plant with black seeds,—on account of its large black seeds. It was formerly eaten as a salad or pot-herb, whence, and from its blackness, the name *olusatrum* (Latin: *olus*, a vegetable, and *ater*, black). "'Alexanders,' because it was supposed to have been brought from Alexandria" (Ray).

Apium (from Celtic root, *abh*, a fluid or water, Latinised into *apium*).

Apium graveolens — Smallage, wild celery. Gaelic: *lus na smalaig*, a corruption of smallage. *Pearsal mhor*, the large parsley. Irish: *meirse.* Greek: μειρα, to divide; or Anglo-Saxon: *merse*, a lake, sea. Latin: *mare*,—marshy ground being its habitat. Welsh: *persli frengig*, French parsley.

Petroselinum sativum—Parsley. Gaelic: *pearsal* (corruption from the Greek, πετρος, *petros*, a rock, and σελινον, *selinon*, parsley). *Muinean Mhuire*, Mary's sprouts. Welsh: *persli.*

Heliosciadium inundatum — Marshwort. Gaelic: *fualactar* (from *fual*, water). The plant grows in ditches, among water.

Carum carui—Caraway. Scotch: *carvie;* Gaelic: *carbhaidh* (a corruption from the generic name), from Caria, in Asia Minor, because it was originally found there;—also written *carbhinn.*

"Cathair thalmhanta's *carbhinn* chroc cheannach."—M'INTYRE.

The yarrow and the horny-headed caraway.

Lus Mhic Chuimein, M'Cumin's wort. The name is derived from the Arabic *gamoùn*, the seeds of the plant *Cuminum cyminum* (*cumin*), which are used like those of caraway.

Bunium flexuosum—The earth-nut. Gaelic: *braonan bhuachail*, the shepherd's drop (or nut); *braonan bachlaig* (Shaw); *cno*

thalmhainn,—*cno*, a nut, *thalmhainn*, earth,—ploughed land, ground. (Hebrew: תִּלִּים, *tilim*, ridges, heaps; תלם, *talam*, break, as into ridges or furrows,—heap up. Latin: *tellus*. Arabic: *tēl*). Irish: *caor thalmhainn*, earth-berry; *coirearan muic*, pig-berries, or pig-nuts. *Cutharlan*, a plant with a bulbous root.

Fœniculum vulgare—Fennel. Gaelic: *lus an t'saiodh*, the hayweed. *Fineal*, from Latin, *fœnum*, hay,—the smell of the plant resembling that of hay. Irish: *fineal chumhthra* (*cumhra*, sweet, fragrant). Welsh: *ffenigl*.

Ligusticum, from Liguria, where one species is common.

Ligusticum scoticum—Lovage. Gaelic: *siunas*, from *sion*, a blast, a storm,—growing in exposed situations. In the Western Isles, where it is frequent on the rocks at the sea-side, it is sometimes eaten raw as a salad, or boiled as greens.

Levisticum officinale[1]—Common lovage. Gaelic: *luibh an liugair*, the cajoler's weed. It was supposed to soothe patients subject to hysterics and other complaints. Irish: *lus an liagaire*, the physician's plant, from which the Gaelic name is a corruption. Welsh: *dulys*, the dusky plant.

Meum athamanticum—Meu, spignel, baldmoney. Gaelic: *muilceann*. Scotch: *micken*,—*muilceann*,[2] possibly from *muil*, a scent; *muleideachd*, a bad smell (Shaw); *ceann*, a head or top. The whole plant is highly aromatic, with a hot flavour like lovage. Highlanders are very fond of chewing its roots.

Angelica—(So named from the supposed angelic virtues of some of the species).

A. sylvestris—Wood angelica. Gaelic: *lus nam buadha*, the plant having virtues or powers. *Cuinneog mhighe*, the whey bucket. *Galluran*, perhaps from *gall* (Greek: *gala*), milk, from its power of curdling milk; for this reason, hay containing it is considered unsuitable for cattle. Irish: *contran*. *Aingealag*: angelica.

Crithmum maritimum—Samphire. Gaelic: *saimbhir*, a corruption of the French name St Pierre (St Peter), from Greek, πέτρα, a rock or crag. (The samphire grows on cliffs on the shore). Gaelic: *lus nan cnàmh*, the digesting weed; *cnàmh*

[1] Levisticum, from Latin, *levo*, I assuage.

[2] In Invernesshire, *bricin* or *bricin dubh*, perhaps from *bri*, juice; or, as mentioned in Lightfoot, vol. i. p. 158, as Sibbald says it grows on the banks of the Breick Water in West Lothian, may not some native of the banks of the Breick have given it this local name in remembrance of seeing it growing on the banks of his native Breick?—FERGUSSON.

(from Greek: χναω; Welsh: *cnoi*; Irish: *cnaoi*), chew, digest. The herb makes a good salad, and is used medicinally. Irish: *grioloigin*,—*griol*, to slap, to strike.

Peucedanum ostruthium—Great masterwort. Gaelic: *mòr fhliodh* (Armstrong), the large excrescence, or the large chickweed.

P. officinale—Hog-fennel or sow-fennel. Gaelic: *fineal sraide* (Shaw),—*sraide*, a lane, a walk, a street. This plant is not found in Scotland, but was cultivated in olden times for the stimulating qualities attributed to the root.

Anethum graveolens — Strong-scented or common dill. Gaelic and Irish: *dile* (M'Donald) (Latin: *diligo*), — *dile*, a word in Gaelic meaning love, affection, friendship. The whole plant is very aromatic, and is used for medicinal preparations.

Sium (from *siu*, "water in Celtic," Loudon), perhaps from *sjo* (Gothic), water, lake, sea.

S. sisarum—Skirrets. Gaelic: *crumagan* (Shaw), from *crom*, bent, crooked, from the form of its tubers. The tubers were boiled and served up with butter, and were declared by Worlridge, in 1682, to be "the sweetest, whitest, and most pleasant of roots;" formerly cultivated in Scotland under the name of "crummock," a corruption of the Gaelic name.

S. angustifolium—Water-parsnip. Gaelic: *folachdan* (Armstrong), from *folachd*, luxuriant vegetation; *an*, water. Irish: *cosadh dubhadh*, the great water-parsnip (O'Reilly), (*cos*, a foot, stalk, shaft, and *dubh*, great, prodigious).

Pastinaca sativa — Parsnip. Gaelic: *meacan-an-righ*, the king's root, royal root. *Curran geal* (from *cur*, to sow, *geal*, white). Irish: *cuiridin ban*, the same meaning (*cuirim*, I plant or sow). Welsh: *moron gwynion*, field-carrot.

Ægopodium podagraria — Goat-, gout-, or bishop-weed. Gaelic: *lus an easbuig*,—*easbuig*, a bishop. A name also given to *Chrysanthemum leucanthemum*, but with a different signification.

Heracleum sphondylium — Cow-parsnip. Gaelic: *odharan*, from *odhar* (Greek: ωχρος; English: *ochre*), pale, dun, yellowish, in reference to the colour of the flower. *Meacan-a-chruidh*, the cow's plant. The plant is wholesome and nourishing for cattle. *Gunnachan sputachain*, squirt-guns. Children's name for the plant, because they make squirt-guns from its hollow stems.

Daucus carota—Carrot. Gaelic: *curran* (from *cur*, to sow),

a root like that of the carrot. *Carrait*, corruption from *carota*, which is said to be derived from the Celtic root *car*, red, from the colour of the root. *Muran*—(Welsh: *moron*), a plant with tapering roots. Irish: *curran bhuidhe*, the yellow root.

"*Muran* brighar 's an grunnasg lionmhar."—M'Intyre.
The sappy carrot and the plentiful groundsel.

Irish: *mugoman*,—*mugan*, a mug, from the hollow bird's-nest-like flower.

Anthriscus { **cerifolium**, **vulgaris**, **temulentum** }—Chervil. Gaelic: *costag*, a common name for the chervils (from *cost*, an aromatic plant; Greek: κόστος, *kostos*, same meaning). *Costag a bhaile gheamhraidh* (*bhaile gheamhraidh*, cultivated ground). "*A. vulgaris* was formerly cultivated as a pot-herb" (Dr Hooker).

Myrrhis (from Greek: μυρον, *myron*, perfume; Gaelic: *mirr*, —*tus agus mirr*, frankincense and myrrh).

M. odorata—Sweet cicely or great chervil. Gaelic: *cos uisge* (Shaw), the scented water-plant.[1] "Sweet chervil, gathered while young, and put among other herbs in a sallet, addeth a marvellous good relish to all the rest" (Parkinson).

Coriandrum (a name used by Pliny, derived from κορις, *coris*, a bug, from the fetid smell of the leaves).

C. sativum—Coriander. Gaelic: *coireiman*,—*lus a choire*, corruptions from the Greek. It is still used by druggists for various purposes, and by distillers for flavouring spirits.

(*To be continued.*)

PRELIMINARY LIST OF THE FUNGI OF PERTHSHIRE.

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

(*Continued from page* 278.)

CÆOMACEI.

LXXX. TILLETIA, Tul.

587. Caries, Tul. Perth.

LXXXI. USTILAGO, Lk.

588. Segetum Ditm. (=Carbo, Tul.) Common.
589. Urceolorum, Tul. On *Carex panicea*, &c. Rannoch, Glen Tilt.

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[1] In Braemar it is commonly called *mirr*.—Ed. 'Scottish Naturalist.'

590. Longissima, Tul. On *Poa aquatica* and *Glyceria*. Frequent.
591. Vinosa, Tul. On *Oxyria*. Glen Tilt.[1]
592. Utriculosa, Tul. Glen Lochay (on *Polygonum hydropiper*); Glen Tilt (on *P. viviparum*).
593. Antherarum, Fr. On *Silene*, *Lychnis*, and *Stellaria graminea*. Common.
594. Succisæ, Mœg. On *Scabiosa succisa*. Rannoch, 1879.

LXXXII. UROCYSTIS, Rabh.

595. Pompholygodes, Schl. On *Ranunculus repens*. Perth.

LXXXIII. UROMYCES, Lev.

596. Ficariæ, Lev.
  i. Æcidium ficariæ, P. Common.
  iii. Uromyces ficariæ, Lev. Common.
597. Geranii, D. C. On *Geranium sylvaticum* and *pratense*.
  i. Æcidium geranii, D. C. Killiecrankie.
  iii. Uromyces geranii, Cke. Common.
598. Parnassiæ, Schröt.
  i. Æcidium parnassiæ, Grev. Glen Shee.
599. Appendiculatus, Lev.
  iii. Uromyces appendiculatus, Lev. Rannoch, Glen Tilt.
600. Orobi, Fckl.
  i. Æcidium orobi, D. C. Rannoch, Glen Tilt.
601. Fabæ, Fckl.
  iii. Puccinia fabæ, Sk. (=Uromyces fabæ, De By.) Common. This the same as No. 582, which must be deleted.
602. Apiculatus, Lev. On *Trifolium repens*.
  iii. Æcidium apiculosa, Lev. Glen Tilt.
603. Alchemillæ, D. C. On *Alchemilla vulgaris*.
  ii. Uredo alchemillæ, P. Glen Tilt.
  iii. Uromyces intrusa, Lev. Common.
604. Scrophulariæ, Lib. On *Scrophularia nodosa*.
  i. Æcidium scrophulariæ, D. C. Dunkeld.
  iii. Puccinia scrophulariæ, Lib. (=Uromyces concomitans, B. and Br.) Dunkeld.

[1] This species would appear to be perennial. I scattered fresh spores over and about cultivated and unaffected plants of Oxyria, but without result. On the other hand, an affected plant brought from Glen Tilt and grown in the garden, reproduced the fungus the following year.

[2] Certain species of *Æcidium* are now considered to be only forms of certain polymorphic fungi, which may properly find a place in the genus *Uromyces*. Three stages in the development of many of these fungi are either known or suspected, and are thus denoted :—

i. The Hymenium or *Æcidium*.
ii. The Stylospore or *Uredo*.
iii. The Teleutospore or *Uromyces*.

See 'Grevillea,' vol. vii. p. 133. In the list I have indicated which of the stages are known to me as occurring in Perthshire.

605. Avicularіæ, Schröt.
iii. Uromyces polygoni, Fckl. Dupplin.
606. Valerianæ, Fckl. On *Valeriana officinalis.*
i. Æcidium valerianacearum, Duby. Moncreiffe.
iii. Uromyces valerianæ, Fckl. (= Lecythea valerianæ, B.) Dunkeld.
607. Urticæ, Cke. On *Urtica dioica.*
i. Æcidium urticæ, D. C. Craigie, Dupplin.
608. Concentricus, Lev. On *Scilla nutans.*
iii. Uromyces concentricus, Lev. Methven, Dunkeld.

LXXXIV. COLEOSPORIUM, Lev.

609. Tussilaginis, Lev. Common.
610. Pingue, Lev. Craighall, Reichip. Var. *alchemillæ,* B. and Br. Common.
611. Petasitis, Lev. Dead waters of the Earn, Dupplin, Inver.
612. Campanulæ, Lev. Common.
613. Sonchi-arvensis, Lev. Common.
614. Rhinanthacearum, Lev. Dupplin, Rannoch.
615. Senecionis, Fr. Common.

LXXXV. MELAMPSORA, Cast.

616. Salicina, Lev. Dupplin, Kenmore.
617. Betulina, Desm. Common.
618. Tremulæ, Tul. Inver, Glen Tilt.
619. Populina, Lev. On *Populus balsamifera,* at Annat Lodge. Probably overlooked.
620. Euphorbiæ, Cast. Bridge of Earn, Rattray.

LXXXVI. CYSTOPUS, De By.

621. Candidus, Lev. Common.

LXXXVII. UREDO, Lev.

622. Filicum, Desm. Ben Lawers, Glen Tilt. On *Cystopteris.*
623. Pustulata, P. Rannoch.
624. Hypericorum, D. C. Pitroddie, Birnam.
625. Orchidis, A. and S. Glen Shee.
626. Caryophyllacearum, Johnston. Almondbank (*Cerastium arvense*).
627. Porphyrogenita, Kze. Lynedoch, Dunkeld, Rannoch, &c.
628. Vacciniorum, P. Common on *Vaccinium myrtillus;* on *V. vitis-idæa,* in Rannoch; and on *V. uliginosum,* in Glen Tilt.
629. Confluens, D. C. Not uncommon.
630. Empetri, D. C. Rannoch, Sow of Athole.
631. Bifrons, Grev. Common.

LXXXVIII. TRICHOBASIS, Lev.

632. Pyrolæ, B. Woods near Perth.
633. Suaveolens, Lev. Common.

LXXXIX. LECYTHEA, Lev.

634. Saliceti, Lev. Common.
635. Lini, Lev. Rannoch, Glen Tilt.

XC. PROTOMYCES, Unger.

636. Macrosporus, Ung. Not uncommon.
637. Menyanthis, De By. On *Menyanthes*, Loch Ericht.

XCI. ENTYLOMA, De Bary.

638. Ungeriarum, De By. Perth.

XCII. SYNCHITRIUM, De Bary.

639. Mercurialis, Fckl. Killin, Rannoch, Kinnoull.

ÆCIDIACEI.

XCIII. RŒSTELIA, Reb.

640. Cornuta, Tul. Common in the Highlands.
641. Lacerata, Tul. Dunkeld.

XCIV. PERIDERMIUM, Chev.

642. Pini, Chev. On branches of Scots fir, Rannoch.
643. Acicolum, Lk. On leaves of Scots fir, Moncreiffe, Rannoch, Blair-Athole.

XCV. ÆCIDIUM, Pers.[1]

644. Leucospermum, D. C. Methven Wood, Killiecrankie.
645. Albescens, Grev. Bonhard, Invermay.
646. Epilobii, D. C. Parkfield, Kinfauns Station.
647. Berberidis, P. Gannochy.
648. Crassum, P. Var. *periclymeni*, D. C. Glen Tilt.
649. Thalictri, Grev. Rannoch.
650. Galii, P. On *Galium verum*. Glen Tilt.
651. Bunii, D. C. On *Bunium flexuosum*. Not uncommon.
652. Grossulariæ, D. C. Common.
653. Depauperans, Vize. On *Viola amœna*. Annat Lodge.
654. Violæ, Schum. Common.
655. Compositarum, Mart. Common. The following so-called varieties occur: *taraxaci*, Grev.; *tussilaginis*, P. (the most frequent); and *lapsani*, Purt.
656. Menthæ, D. C. Moncreiffe.
657. Pedicularis, Lob. Rannoch, Dalnaspidal, Glen Tilt.
658. Primulæ, D. C. Moncreiffe.
659. Trifolii-repentis, Klug. On *Trifolium repens*. Glen Tilt.

XCVI. MILESIA, B. White.

660. Polypodii, B. W. Reichip, Annat Lodge, Dunsinane Hill.

HYPHOMYCETES.

ISARIACEI.

XCVII. ISARIA, Fr.

661. Arachnophila, Fr. Parkfield.

XCVIII. CERATIUM, A. and S.

662. Hydnoides, A. and S. Balinluig.

[1] See note to Uromyces, *supra*.

STILBACEI.

XCIX. VOLUTELLA, Fr.

663. Setosa, B. Dupplin.

C. TUBERCULARIA, Tode.

664. Granulata, P. Rannoch.

CI. FUSARIUM, Lk.

665. Lateritium, Nees. Hilton.

CII. EPICOCCUM, Lk.

666. Neglectum, Desm. Parkfield.

CIII. ILLOSPORIUM, Mont.

667. Roseum, Fr. Dunkeld, Dupplin.
668. Carneum, Fr. Moncreiffe.

CIV. ÆGERITA, P.

669. Candida, P. Dupplin, Killin.

DEMATIEI.

CV. DENDRYPHIUM, C.

670. Curtu r, B. and Br. Dupplin.

CVI. SPOROCYBE, Fr.

671. Nigrella, B. Dupplin.

CVII. HELMINTHOSPORIUM, Lk.

672. Nanum, Nees. Parkfield.
673. Fusiforme, C. Moncreiffe.

CVIII. MACROSPORIUM, Fr.

674. Cheiranthi, Fr. On dead stems and damp paper. Annat Lodge.
675. Concinnum, B. Killiecrankie.

CIX. TRIPOSPORIUM, C.

676. Elegans, C. Moncreiffe.

CX. POLYTHRINCIUM, Kze.

677. Trifolii, Kze. Glen Tilt.

CXI. CLADOSPORIUM, Lk.

678. Herbarum, Lk. Common.
679. Epiphyllum, Nees. Dupplin, Rannoch.

CXII. SPORODUM, C.

680. Conopleoides, C. Dron.

MUCEDINES.

CXIII. ASPERGILLUS, Mich.

681. Glaucus, Lk. Abundant.
682. Virens, Lk. Parkfield, Scone.

CXIV. RHINOTRICHUM, C.

683. Repens, Preuss. Moncreiffe.

CXV. PERONOSPORA, De Bary.

684. Infestans, Mont. Too common.
685. Nivea, Ung. Dupplin, Kinfauns (*Heracleum*).
686. Gangliformis, B. Perth, Kinfauns (*Senecio vulgaris*).
687. Urticæ, Casp. Rannoch.
688. Grisea, Ung. Parkfield.
689. Parasitica, P. Aberfeldy, Killiecrankie.
690. Sordida, B. Moncreiffe.
691. Candida, Fckl. Common.
692. Obliqua, Cke. Dupplin, Perth, Glen Tilt.
693. Ficariæ, Tul. Dupplin.
694. Rufibasis, B. and Br. Dunkeld, Rannoch, Killiecrankie.
695. Calotheca, De By. Dron, Craighall.

CXVI. POLYACTIS, Lk.

696. Vulgaris, Lk. Common.
697. Cana, B. Parkfield, Annat Lodge.

CXVII. PENICILLIUM, Lk.

698. Crustaceum, Fr. Common.
699. Candidum, Lk. Scone.

CXVIII. OIDIUM, Lk.

700. Aureum, Lk. Annat Lodge.
701. Fulvum, Lk. Rannoch.
702. Fasciculatum, B. Perth.

CXIX. DACTYLIUM, Nees.

703. Dendroides, Fr. Dunkeld (on *Trogia*), Rannoch.
704. Roseum, B. Dupplin.
705. Spirale, B. and B. White. Glen Tilt.
706. Modestum, B. and B. White. Glen Tilt.
707. Cervinum, B. and Br. Balinluig.

CXX. SPOROTRICHUM, Lk.

708. Chlorinum, Lk. Parkfield.

CXXI. ZYGODESMUS, C.

709. Fuscus, C. Parkfield.

CXXII. MENISPORA, P.

710. Ciliata, C. Moncreiffe.

CXXIII. ACREMONIUM, Lk.

711. Verticillatum, Lk. Dupplin.

CXXIV. BOTRYOSPORIUM, C.

712. Diffusum, C. Parkfield.

(*To be continued.*)

GEOLOGY.

ON THE VALUE OF THE NAMES OF PLACES IN INDICATING THE ANCIENT SURFACE-FEATURES OF THE COUNTRY.

By the Rev. ADAM MILROY, D.D.

(*Continued from p.* 284.)

IT frequently happens that we find the word Inch applied to a long flat meadow along a river. This use of the word is common in Ireland, and we find it in the Inches of Perth. Here, too, the word means an island,—only let us bear in mind that the term describes the condition of the river holm at the time when it was so designated, and may not be descriptive of the condition in which it is at present. For here, as in other cases, the name is retained, though the conditions have altered. A river branches at a certain point, the branches unite further down, and the land enclosed by the two branches forms, and is called, an island. In process of time the course of the current is changed, one branch ceases to run in its former channel, and thus what was once an island in the midst of the stream becomes a river holm, joined to the mainland. But the name Inch remains as a witness to the condition which previously existed. Thus it has fared with the Inches of Perth. Unfortunately, some people thought that the name was descriptive, not of what they had been, but of what they still are,—that if they are called inches or islands, therefore they must at the present moment be islands. Casting about in their minds to make the North Inch an island, they found the Tay on the one side. Then they found a small mill-stream flowing from the lade, which conducts water from the Almond to drive the grain-mills of Perth. This small mill-stream, after turning the mill-wheel at Balhousie, skirts a part of the North Inch and falls into the Tay. There, it is said, is the origin of the word Inch, as applied to the North Inch of Perth.

This explanation, given in the first Statistical Account of Scotland, has been copied by compilers of gazetteers and guide-books, and is currently adopted. Now we have the Tay on one side of the North Inch, and skirting another part we have a comparatively modern small mill-stream; but that still leaves a great part of the North Inch, which is skirted neither by mill-lade, nor drain, nor ditch, but forms a part of the adjacent country. The name Inch was applied to it, because they who gave the name gave it to a veritable island formed by the branching of the Tay. At the head of the North Inch there is a spot marked on old maps as "the Bulwark," known to the modern golfer as the place where "the mound-hole" is situated—that is where the Tay branched. The main body of the water flowed in its present channel, but a branch separating from the main stream at the spot we have indicated had flowed a very little to the east of where Rose Terrace is now situated, ran directly south below Methven Street, followed the course of King Street, then along the back of the South Inch, and following the line of the Craigie burn, once more joined the main channel of the river. The course can still be traced, notwithstanding all the artificial changes made. There would be a veritable island or inch, comprehending the present Inches, and the site on which Perth now stands. It must have been covered with water when the Tay was in flood, just as we still see the North and South Inches becoming lakes when the Tay rises to a great height. The island being very low and flat, may have been divided in some places by streams crossing from the smaller branch to the greater: one such stream seems to have followed pretty much the course of the modern mill-lade, below Methven Street to the Tay; but the general aspect presented would be that of a low, long flat island, formed by the branching of the Tay at the top of the North Inch, and the reunion of these branches at the bottom of the South Inch; and the name which was given to it—a name descriptive of the scene which then met the view—is used by us in the present day, when the branch which formed the island's western boundary has long been the site of public parks, terraces, streets, and crescents.

In an old map there are marked two small fields, called respectively the North Inch and the South Inch, between the Woody Island and the top of the North Inch. These now form a part of a large field on the farm of Muirton. I mention these to show how there were islands formed—then they became a part of the mainland, and then their name is forgotten.

Before leaving the subject of Inches, let me advert to one situated about twelve miles from Perth, in the valley of the Pow, in the parish of Madderty—Inchaffray, the site of the Abbey. Its name is interesting. We have the familiar Inch. Affray is a contraction of *aifrenn*, which again is a modification of the Latin *offerenda*. This Latin word *offerenda* was the old name for the service of the Mass, so that Inisaifrenn is quite correctly rendered in ecclesiastical Latin, *insula missarum*. Now, if the name Inchaffray had been applied to it only after the Abbey was founded there by Earl Gilbert, we might have concluded that Gaelic was the spoken language in the Pow valley and Strathearn long after the close of the twelfth century. But in the deed of gift by Earl Gilbert the place is called Incheaffron, showing that the place bore that name before the Augustinian monks had settled there. We are thus referred to a period further back, and we find that a monastery of Columban monks had existed there. It is next to impossible that in the parish of Madderty there could have been a Columban monastery, and another and separate place where Mass was regularly performed. It is therefore in the highest degree likely that Incheaffron was the site of the Columban establishment, and received its name from the service which the Columban monks there celebrated. In this, as in so many other cases, the Augustinian Abbey of Inchaffray was not an establishment on a new site, but took the place of the much earlier Columban monastery. In this way we are thrown, for the origin of the name, nearly 500 years further back. And the name is a proof, not that Gaelic was spoken in Strathearn in the beginning of the thirteenth century and afterwards, but that Gaelic was spoken in Strathearn when the monks of Columba formed a settlement there: a fact which is quite true, but which we know from other and more direct sources.

Inchaffray gives evidences of the same changes that the other Inches gave. It stands on the Pow on a level of 130 feet, and rises 8 or 9 feet above the flat on which it is situated. Before the channel of the Pow was deepened, the 130-feet flat level was subject to inundations. When the country was inundated, it presented the appearance of a long lake. Inchaffray would become a small low island; and such was the spot surrounded by water or morass when the Celtic inhabitants gave it the name of *inch*.

When we ascend from the low grounds, where the *abers* and *inches* are found, to a higher level, we find a different state of

things. Below we find evidences of change—here we have evidences of permanency. The old names are still descriptive of the present physical features. The Kins are still bold striking headlands, the Drums still appear as long ridges; on the rising ground to the west of Perth, Tullylumb and Tulloch are still hillocks. We often find an epithet true at the present day to the minutest particulars. Let us take a scene on the banks of the Almond. Before doing so, notice for a moment the name of the river. In the local pronunciation the "l" and the "d" disappear,—and rightly so, for they never should have been there. Amon very fairly represents the pronunciation of the Gaelic word signifying "water." The Celtic inhabitants spoke of the river on the banks of which they lived as Amon, "the water," just as a Glasgow man speaks of going "down the water." When Gaelic ceased to be spoken, "Amon," "the water," lost its meaning, and became a proper name. We find the word applied to other rivers, as is but natural—as the Almond, near Edinburgh. Under a slight change we find it frequently as the Avon; but whether Almond or Avon, it is the Gaelic word meaning water—a word cognate with the Latin *amnis*, a river. Just above the bridge of Almond, at Almondbank, the river has cut a channel through the sandstone rocks which rise up on each side in high and frequently precipitous cliffs. In some parts a level space is found extending from the present channel of the stream to the base of the cliff. One such spot is called Cromwellpark, the site at present of a bleach-field. This name was thought to point to Oliver Cromwell. Consequently we are told that when the Protector was in Perth, he had a small advanced camp in this place to check the approach of the Highlanders. This story was regarded as receiving complete confirmation when, on digging the foundations for a house there, a square piece of iron weighing thirty pounds was found, which, of course, could be nothing else than a cannon-ball which Cromwell's Ironsides had brought with them to check the approach of the Highlanders, and which they had neglected to take with them on their departure. Such is the tradition as I find it recorded in the first edition of the 'Statistical Account of Scotland,' under the article "Parish of Redgorton," a tradition which is still current. Now, without referring particularly to the fact that in 1651 Cromwell did pay a sharp and short visit to Perth—that he came with a part of his army on the 1st of August, that he sat before the town on the 2d, that he entered it on its surrender on the 3d, and that we

find him writing letters from Leith on the 4th, and that thus he could not have much time to form a camp on that sequestered spot on the Almond—without dwelling on this, I merely say that if the Highlanders supposed to be coming to attack Perth had been likely to turn out of their way, and vary their journey by partly wading and partly swimming down the rocky and confined channel of the Almond in that part, that small holm at the foot of the cliffs was a likely spot to meet and engage them. But if the Highlanders were to come by any other manner, no spot could have been chosen where the soldiers of Cromwell could have been better out of the way, or where they could have been more defenceless had they been discovered and attacked. The word "park," added to Cromwell, is a thing of yesterday. But up on the high and steeply-sloping bank we have the name Cromwell applied to the farm which comprises the land along the summit. We have Cromwell Craig, the name of a precipitous cliff. Cromwell itself thus belongs to the steep banks. From Dr Joyce's 'Irish Local Names,' we find there are places of the same name in Limerick, where certainly the Protector is not held in grateful remembrance. Dr Joyce explains the name as being a pretty near approximation to the pronunciation of Crom-choill, a stooped or sloping wood.

Let any one look at the place, at the steep banks sweeping down to the channel; let him notice, also, that there is at that place a bend of the stream, and a corresponding curve of the cliffs; and as he further observes the steep curved slope, clothed at the present day, as of old, with wood,—he will at once recognise how appropriate the old Celtic name is to the scene presented. It is a word-picture of the landscape. We have in this case an instructive instance of the manner in which a word, appropriate and expressive, first loses its meaning; then is misapprehended and thought to refer to a modern historical personage; and finally, a legend springs up in order to account for the supposed connection. Here, too, we have an instance of the permanence of physical features. The landscape before us is the same that the ancient Celts described so vividly by the appellation they gave it.

Briefly summed up, our conclusions are these: In the higher levels little or no change has been made in the physical features. They are essentially the same to-day as they were when they received their Celtic descriptive names. In the lower levels some change has happened since that time—a change affect-

ing the surface merely: waters have decreased; the courses of streams have been prolonged; bog, morass, shallow lake, and river-channel have become dry and firm land. Such are the changes which the old names of places indicate. It is for the geologist to say whether his researches point to the same or to different conclusions.

It is only a few names and places I have been able to refer to. There is a wide and interesting and almost untrodden field in all the localities around us. Permit me, in closing, to enter a protest against a too common practice of changing an ancient name into a modern one which is thought to be more genteel, or at least personally more important. When names commemorative of some remote historical event, or descriptive of some ancient physical features, are thrown aside, and in their room are substituted such as Brownsfield, Jonesville, and Robinsonhall, the modern appellations will indeed tell a distant posterity, if they ever reach them, that the places thus designated were once on a time, and in some way or other, connected with the excellent individuals known respectively as Brown, Jones, and Robinson; but even Brown, Jones, and Robinson being judges, the information thus handed down to the future antiquarian or geologist cannot be regarded as equal in value to that which it has supplanted.

VARIOUS NOTES.

Those of us who were favoured with his acquaintance will sincerely regret to learn the death of Mr Robert Hislop, one of the last survivors of the old school of Scottish entomologists, which took place on 9th June. Mr Hislop's specialty was the order Coleoptera, in which he made many important discoveries of new British species. Though he did not himself write much (in our pages only three or four notes appear from his pen), he contributed privately much information that was published by others, and was always ready to assist from his stores of knowledge. His genial and unaffected manner will long be remembered by those who had the pleasure of accompanying him in his entomological rambles. Mr Hislop's name is commemorated in the beetle *Atomaria Hislopi*.

The Sixth Annual Conference of the Cryptogamic Society of Scotland is to be held at Glasgow in the third or fourth week of September. From the well-known energy of the Glasgow naturalists it is expected that the meeting will be successful in every way. Particulars of the arrangements will be announced soon. The usual meeting of the English mycologists is announced to be held at Hereford in the week beginning 4th October.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

(*Continued from p.* 288.)

EDITED BY D. SHARP, M.B.

VARIPES Germ. Very rare.

DISTRIBUTION—EAST. o Forth o o o o o o

WEST. o o o o o

"Dalmeny Park. Mr R. N. Greville." Murray Cat.

FAGI L.

DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ o o o

WEST. Solway o o o o

ASSIMILE Kirb.

DISTRIBUTION—EAST. ♀♀ Forth o o o o o o

WEST. Solway ♀♀ o o o

TRIFOLII L.

DISTRIBUTION—EAST. o o o o o o o o

WEST. Solway o o o o

"Raehills. Rev. W. Little." Murray Cat.

FLAVIPES Fab. Common.

DISTRIBUTION—EAST. ♀♀ ♀♀ Tay ♀♀ ♀♀ o o o

WEST. Solway ♀♀ o o o

RYEI Blackn.

DISTRIBUTION—EAST. o o o o o o o o Shetland.

WEST. o o o o o

NIGRITARSE Kirb.

DISTRIBUTION—EAST. ♀♀ ♀♀ o o o o o o

WEST. Solway ♀♀ o o o

TENUE Kirb.

DISTRIBUTION—EAST. ♀♀ Forth o o o o o o

WEST. Solway o o o o

PUNCTIGERUM Payk. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o o
WEST. o o o o o o
"Dalmeny Park. Mr R. N. Greville." Murray Cat.

VIRENS Hbst.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o o
WEST. ♀♀ ♀♀ o o o

PLATALEA Germ.
DISTRIBUTION—EAST. o Forth o o o o o o o
WEST. o o o o o o o
"Near Edinburgh. A. Murray." Murray Cat.

GYLLENHALLI Kirb. Very local.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ Dee o o o o
WEST. Solway Clyde o o o
This species was reared by Professor Trail from swellings on stems of Vicia cracca.

ERVI Kirb.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀♀ o o o

ONONIS Kirb. Common.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

MINIMUM Hbst. 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.

PISI Fab.
DISTRIBUTION—EAST. ♀♀ ♀♀ o o o o o o o
WEST. ♀♀ ♀♀ o o o
"Common and generally distributed." Murray Cat.

ÆTHIOPS Hbst.
DISTRIBUTION—EAST. Tweed Forth Tay o o o o o
WEST. Solway ♀♀ o o o

LOTI Kirb.
DISTRIBUTION—EAST. Tweed Forth o o o o o o o
WEST. Solway ♀♀ o o o

SPENCEI Kirb.
DISTRIBUTION—EAST. Tweed Forth Tay o o o o o
WEST. Solway ♀♀ o o o

VORAX Hbst.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. ♀♀ ♀♀ o o o

MINIATUM Germ.
DISTRIBUTION—EAST. ♀♀ ♀♀ o o o o o o o
WEST. ♀♀ ♀♀ o o o
"Occasional throughout Scotland." Murray.

CRUENTATUM Walt.
DISTRIBUTION—EAST. Tweed o Tay o o o o o
WEST. Solway o o o o

FRUMENTARIUM L.
DISTRIBUTION—EAST. ♀♀ ♀♀ Tay ♀♀ Moray ♀♀ Orkney o
WEST. Solway ♀♀ ♀♀ o o

SEDI Germ.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

VIOLACEUM Kirb.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ Sutherland Orkney o
WEST. Solway ♀♀ o o o

HYDROLAPATHI Kirb.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. Solway o o o o

MARCHICUM Hbst.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀♀ o o o

AFFINE Kirb.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. Solway o o o o
"Dumfriesshire, Cramond. Rev. W. Little." Murray Cat.

HUMILE Germ.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway ♀♀ o o o

RHINOMACER Th.

ATTELABOIDES F. Local. On Scots fir.
DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray o o o
WEST. Solway o o o o

RHYNCHITES Th.

CUPREUS L. Very rare. On mountain-ash.
DISTRIBUTION—EAST. ♀♀ o o o o o o o o
WEST. Solway o o o o

ÆNEOVIRENS Marsh. Scarce. On oak-trees.
DISTRIBUTION—EAST. Tweed o o o Moray o o o
WEST. Solway o o o o

PAUXILLUS Germ. Very rare.
DISTRIBUTION—EAST. o o o o o o o o o o
WEST. Solway o o o o
"Kirkpatrick-Juxta. Rev. W. Little." Murray Cat.

MEGACEPHALUS Germ. Local. On birch.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

GERMANICUS Hbst. Scarce.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ Moray o o o
WEST. Solway Clyde o o o

[**NANUS** Payk.
DISTRIBUTION—EAST. Tweed o o o Moray o o o
WEST. Solway o o o o

I have never seen a Scottish individual of this species, and think it very probable that the specimens should rather be referred to the following species.

UNCINATUS Th. Scarce.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

OPHTHALMICUS Steph. Very rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

BETULÆ L. Common. On birch.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ Dee Moray o o o
WEST. Solway ♀♀ o o o

ATTELABUS Th.

CURCULIONOIDES L. Rare.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. ♀♀ o o o o

APODERUS Th.

CORYLI L. Rare.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway o o o o

SCOLYTIDÆ.

HYLASTES Th.

CUNICULARIUS Ratz. Very rare.
DISTRIBUTION—EAST. o o o ♀ Moray o o o
WEST. o o o o o

ATER Payk. Common in the bark of fir logs.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o o
WEST. ♀ ♀ o o o

OPACUS Er.
DISTRIBUTION—EAST. Tweed o o o o o o
WEST. ♀ Clyde o o o

PALLIATUS Gyll. Common in the bark of fir logs.
DISTRIBUTION—EAST. ♀ Forth Tay Dee Moray o o o
WEST. Solway ♀ o o o

OBSCURUS Marsh. Rare.
DISTRIBUTION—EAST. Tweed Forth ♀ ♀ Moray o o o
WEST. o o o o o

HYLURGUS Th.

PINIPERDA L. Abundant in the bark of fir logs.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o o
WEST. Solway ♀ ♀ o o

MINOR Hart. Very rare. In the bark of fir logs.
DISTRIBUTION—EAST. o o ♀ Dee ♀ o o o
WEST. o o o o o

PHLŒOPHTHORUS Th.

RHODODACTYLUS Marsh. Scarce.
DISTRIBUTION—EAST. Tweed Forth Tay ♀ Moray o o o
WEST. ♀ ♀ o o o

HYLESINUS Th

CRENATUS Fab.
DISTRIBUTION—EAST. o Forth Tay o o o o o
WEST. o o o o o
"Near Edinburgh, Kinross-shire, Forfarshire." Murray Cat.

(*To be continued.*)

ZOOLOGY.

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 p.* 309.)

113 Anser ferus, Steph. (Grey Lag Goose.)

114. Anser segetum, Meyer. (Bean-Goose.)

115. Anser brachyrhynchus, Baill. (Pink-footed Goose.)

116. Anser albifrons, Bechst. (White-fronted Goose.)

The Carse of Gowrie, once the great stronghold of Wild Geese (consisting of the above four species), where from time immemorial they assembled in countless hordes, is still their principal place of resort, though in greatly reduced numbers,—the construction of a railway through the very heart of the ground they used to frequent, and the increased number of buildings which have sprung up in consequence within the last thirty years, having combined, together with steam-mills, &c., to drive them off the ground in a great measure — the Bean-Goose and White-fronted Goose having almost entirely disappeared, especially the former. The Grey and Pink-footed Geese are still, however, to be seen in pretty considerable flocks in the lower Carse from the first week of October till about the third week of April, when they take their departure for their breeding-grounds in the north. Of these the Pink-footed are by far the most abundant. It is singular that it should only be comparatively a very few years ago since this bird was known to naturalists, it having always been confounded with the Bean-Goose—the credit of their separation being due to M. Baillon of Abbeville, who was the first to point out the specific distinctions between the two only as far back as 1833. Long before this it was well known to every Wild-Goose

shooter in the Carse under the name of the Little Black-nebbed, the Bean-Goose (by far the less common of the two) being designated the Big Black-nebbed, both having the nail of the beak black, whereas in the two other species it is white,—the pink feet of the one, and the yellow legs of the other, being quite sufficient at all times to distinguish them. At certain states of the tide the Geese quit the river, and settling in large flocks on the fields, often do much damage both to the clover and young wheat; and especially in the spring-time, when, just previous to their departure in the month of April, they visit the newly-sown bean-fields, at which season the farmer is, by the Wild Birds Protection Act, interdicted from shooting them.

117. Bernicla Brenta, Gould. (Brent Goose.)

The Brent Goose, confined more to the mud-flats on our coast, is not often seen in the upper parts of the district. It has, however, been shot on Methven Loch, and one or two other places. Mr John Nelson of Dundee kindly informs me in a recent letter that, though not numerous, a few are to be seen every winter at the mouth of the Tay—the largest flocks noticed by him consisting of not more than twenty birds. I have been unable to ascertain any instance of the true Bernicle (*Bernicla leucopsis*, Boie) occurring with us, it seeming to be more of a western species.

Bernicla canadensis, Gould. (Canada Goose.)

This bird is so often kept as an ornament on artificial pieces of water, that its occasional appearance on our lochs and rivers is not to be wondered at, but at the same time renders it difficult to determine whether they are really found in a wild state in this country or not. Mr Brooke makes mention in the 'Zoologist' of having noticed four of these birds on Butterstone Loch, near Dunkeld, in the end of April, three or four years ago, which were restless and easily disturbed on the slightest sign of danger. These may possibly have been wild birds; for I can see no reason to doubt their occasional appearance, abounding as they do on the Atlantic shores of America. The Egyptian Goose (*Anser ægyptiacus*), on the other hand, which is also occasionally seen on our waters, I think more likely to be from domestic sources. A pair visited the Earn, near Moncreiffe, the winter before last (1878-79), and it has been occasionally seen on the Tay. A fine specimen

is in my own collection, shot on the Tay opposite Newburgh in the winter of 1829.

CYGNUS OLOR, Boie. (Mute Swan.)

The Mute Swan is now and then to be seen on the Tay and Earn, as also on our lochs, during severe winters, and several examples have from time to time been shot. Though known to be wild in Denmark and north-eastern Europe, they are not usually considered to be found wild in this country, but, like the Canada and Egyptian Geese, to be merely frozen-out domesticated birds. I have, however, seen them more than once flying up the Tay in small parties of three to seven birds, with all the strength of wing of any wild ones, and I see no reason to doubt why they should not occasionally be so.

CYGNUS FERUS, Leech. (Wild Swan or Whooper.)

Though many instances occur in severe winters of the Whooper being obtained in the district, their visits are too irregular to admit of their being considered more than occasional. Sixteen in a flock have been counted at one time passing up the Tay a year or two ago.

118. TADORNA VULPANSER, Flem. (Sheildrake.)

This I have found pretty abundant in the lower part of the Tay, breeding in the rabbit-burrows on Tents Muir; and Mr Nelson mentions their also breeding on the sands of Barry. In autumn and winter the Sheildrake assembles in pretty large flocks, coming up and returning with the tide, but seldom ascending much farther than the head of Mugdrum Island, and is easily distinguished from other ducks, though in the dark, by the peculiar croak.

119. MARECA PENELOPE, Selb. (Widgeon.)

The Widgeon is pretty frequent every winter and autumn, sometimes appearing in considerable numbers on many of our lochs and rivers, as also on the lower parts of the Tay, where they have considerably decreased of late years.

SPATULA CLYPEATA, Boie. (Shoveller.)

There are a few instances of the Shoveller being shot in the Tay at long intervals. Mr Thomas Marshall of Stanley makes mention of a male and female being noticed at Balathie in the

spring of 1879, the former of which was shot.[1] Had these birds been left unmolested, they might probably have remained and bred. It has also been lately got in the lower part of the Tay, below Broughty Ferry.

120. Anas boschas, Linn. (Wild Duck.)

121. Querquedula crecca, Steph. (Teal.)

Both the Wild Duck and Teal breed abundantly in many parts of the district. The nest of the former I have observed in a tree ten or twelve feet high overhanging the banks of a stream on the Ochils. Both these species used to visit the tidal part of the river in considerable numbers every winter, but now they are greatly reduced, from being so continually fired at.

Dafila acuta, Eyton. (Pin-tailed Duck.)

This beautiful duck seems to be rather local in its habits, being common on some parts of the British coasts and fens, and rare in other places. With us it can only be looked upon as a mere casual.

122. Nyroca ferina, Flem. (Pochard.)

123. Fuligula cristata, Steph. (Tufted Duck.)

Both the Pochard and Tufted Duck, though not very common with us, seem to be pretty generally dispersed. Though more frequently found in winter, there are several instances of their breeding in the district. Both these birds seem to be greatly more abundant on the western than the eastern coast, as I have found them in great numbers on the Clyde, more especially the Tufted Duck. This may also apply to the next species.

124. Fuligula marila, Steph. (Scaup Duck.)

The Scaup is not unfrequent on the tidal parts of the Tay, coming up and returning with the tide, but in nothing like the quantities to be found in the Clyde. A female Scaup, probably a wounded bird, made its appearance this spring (1880) during the open weather on the curling-pond at Seggieden, remaining for two or three weeks; and being unmolested, it became quite familiar. It fed principally upon a species of water-snail (*Limnæa limosa*) with which the pond abounded. Whether some

[1] Scot. Nat., vol. v. p. 260.

ill fate afterwards attended it, or that the snails being finished it went in search of other food, is not known, but it finally disappeared.

125. Somateria mollissima, Boie. (Eider Duck.)

During the winter months the Eider Duck is abundant at the mouth of the Tay, and Mr Nelson informs me that a few pairs nest on Tents Muir and the sands of Barry every summer. Mr Horn mentions the Eider Duck on Loch Tay: probably these birds may have reached the loch from the west coast, as I have no knowledge of their ever ascending the Tay from the east; indeed I have never found them doing so at any time, but have always seen them in the salt water.

Somateria spectabilis, Boie. (King Duck.)

The King Duck is said to have been seen occasionally off the mouth of the Tay during the winter months, and Mr Harvie-Brown states that Mr J. Anderson, in a letter to him, mentions that King Ducks were plentiful in the beginning of January (1879) about Dundee; and Mr Nelson tells me he killed a female of this species there some years ago.

126. Oidemia nigra, Flem. (Common Scoter.)

127. Oidemia fusca, Flem. (Velvet Scoter.)

Both these species are common in the salt water at the mouth of the river every winter, the latter being perhaps the more abundant of the two. Mr Harvie-Brown states his having noticed a large flock of Scoters frequenting St Andrews Bay all summer (Scot. Nat., vol. iii. p. 348),[1] and questions the cause of their appearing so late. That they do so, and I believe pretty regularly, there can, I think, be no doubt, as I have on several occasions, in different years, noticed them in the Bay of St Andrews in large flocks both in the months of June and July: these, through the aid of a powerful glass, I took to be mostly Velvet Scoters. I have also noticed large numbers very late in the season in the Forth; and the habit of their assembling themselves together in this way during the breeding season does not seem to be confined to this country, for I have observed the same fact in the Gulf of St Lawrence, where I saw the Scoters in large flocks all summer; and, as far as I could make out, they

[1] Proceedings of Nat. Soc. of Glasgow, Sept. 1879, p. 184.

all appeared to be male birds, and I naturally concluded the females were all on shore breeding. The birds that remain with us have also appeared to me to be composed of males only, probably young birds of the previous season. As the Scoter does not breed with us, their appearance at such a season is difficult to account for, unless they be young males excluded from the breeding-grounds, which remain together during the summer—a habit not uncommon in some of the Gulls.

128. Clangula glaucion, Brehm. (Golden-Eye.)

The Golden-Eye is frequent in the higher part of the estuary during the winter months, and goes some way up the Tay. When not disturbed, I have seen them congregated in considerable numbers after the close season about Kinfauns; and this year, on the 7th of April, I observed large numbers swimming and diving quite unsuspiciously close up to the salmon-fishers while at work; and had not next day been the Fast Day at Perth, when the river was covered with amateur shooters from early morning until sunset, driving every bird off the water six weeks after close-time, they probably would have remained some weeks longer. As it was, not another bird was afterwards to be seen. Mr Harvie-Brown mentions three Golden-Eyes being seen off the coast of Berwickshire as late as the 3d of May, and that Golden-Eyes were reported to have bred in a hollow tree at a locality in the south of Perthshire last summer (1879).[1]

129. Harelda glacialis, Steph. (Long-tailed Duck.)

The Long-tailed Duck, though not very numerous, is a regular winter visitant on the lower part of the estuary in the salt water. It is seldom, however, they make their appearance higher up.

130. Mergus castor, Linn. (Goosander.)

Of all the Mergus tribe the Goosander may be considered our most regular visitant, though rather local in its habits, frequenting many of the upper parts of the river in preference to the mouth, where, however, Mr Nelson observed them in large numbers a few winters ago. They are every winter to be seen on the Earn and Almond, and are common at Taymount and other parts of the Tay. An occasional pair have been known to breed in the upper part of the district.

[1] Proceedings of Nat. Soc. of Glasgow, Sept. 1879, p. 184.

131. Mergus serrator, Linn. (Red-breasted Merganser.)

Though a regular visitant, the Red-breasted Merganser does not seem to be so common as the above, and I have never had the good fortune to see it in this district in its full dress, as by the time of their assuming it they have all left for their breeding-grounds in the north. In the Isle of Sanday, in Orkney, I have found them in great numbers in the month of June in full dress. The Goosander, on the contrary, is with us frequently to be met with in the finest of plumage. It may be as well here to mention that Mr Nelson writes to me that three winters ago he saw an adult male Merganser on the water near Broughty Ferry, which from its appearance he took to be the Hooded Merganser (*Mergus cucullatus*, Linn.), but could not be certain. It is not improbable that what he saw was the bird in question, as there are several instances of this American species visiting our shores; and the white hood is so very marked that it could scarcely be any other bird, and would even at a distance distinguish it from the Red-breasted Merganser.

Mergus albellus, Linn. (Smew.)

There are occasional instances of this bird being shot in the district in very severe winters, but never in the full plumage. It can therefore only be looked upon as a mere casual. A few years ago, however, one was obtained in the full dress in the neighbourhood of Tents Muir, and is now in the College Museum at St Andrews.

Podiceps cristatus, Lath. (Great Crested Grebe.)

A good many years ago I recollect seeing a pair of these birds in full plumage, which were obtained in the vicinity of Dunkeld, and which I believe to have been shot on Loch Ordie; but there is no notice of their having been seen there of late years. Mr Nelson has obtained it at Broughty Ferry, and Dr M'Intosh mentions it from St Andrews Bay; but these were all in immature plumage.

Podiceps auritus, Gould. (Horned or Sclavonian Grebe.)

Though several instances are recorded of this bird having been got on the Tay and the vicinity of Tents Muir, its visits, like that of the above, being uncertain, it can only be looked upon as an occasional visitant.

132. Podiceps minor, Penn. (Little Grebe or Dabchick.)

Not uncommon in the district, but rather local in its distribution. I have observed it to frequent during the winter months some of the deep still pools on the Tay near Logierait, and some other parts. It, however, retires in the month of April to the lochs and backwaters, selecting some weedy spots to breed in: it is then very shy of observation and not easily discovered.

133. Colymbus glacialis, Linn. (Great Northern Diver.)

Though now a rare bird in the district, I have reason to believe that at one time it was not uncommon both on our lochs and on the Tay. I have known it obtained in full plumage on Loch Ordie, near Dunkeld, some years ago, where a pair were captured in a net set for pike. It has also been known to frequent Loch Oisinneach Mhor and other places. Mr Nelson states that a few individuals are seen about Broughty Ferry every winter, and that this present spring (1880) he saw a fine example in full summer plumage.

134. Colymbus arcticus, Linn. (Black-throated Diver.)

This is a rare bird in the district, but would no doubt be more frequent were it left unmolested on our lochs during the breeding season. A few years ago I saw a noble specimen at the late Mr Anderson's, fly-dresser, Dunkeld, in full summer plumage, which was shot on Loch Broom, a locality which used to be visited regularly by a pair of these birds. Mr Nelson considers this species rare on the lower Tay, and records only two examples obtained by him, and these in winter plumage: one obtained last winter (1879) is now in the collection of the Dundee Naturalists' Society. I have notice also of its occurrence opposite Tents Muir.

135. Colymbus septentrionalis, Linn. (Red-throated Diver.)

I have no notice of this bird breeding in the district, or having been got in the summer plumage. It is not unlikely, however, that it may prove to breed on Loch Lydon and some other retired spots where unmolested; but until further information can be obtained as to its whereabouts in the district in summer, it can only be considered as a winter visitant, at which season it confines itself chiefly to the lower parts of the Tay, where in some seasons, according to Mr Nelson, they are pretty numerous. In-

stances also occur of its having been got higher up in the Tay, as also in the Earn, but nowhere very common.

136. Alca torda, Linn. (Razorbill.)

137. Uria troile, Lath. (Guillemot.)

Both these birds are still to be seen pretty regularly at the mouth of the Tay, especially in the autumn and spring, the Razorbill being the more abundant of the two; but neither of them are to be seen in the numbers they used to be in former years. In the summer months, though a few are always about, they are chiefly then in the neighbourhood of their breeding-grounds at the Bass and St Abb's Head. Mr Nelson mentions an example of the Bridled Guillemot having been obtained below Broughty Ferry two winters ago, which is now in the collection of the Dundee Naturalists' Society. This variety of the common Guillemot appears to be much less known in the south than farther north. Some years ago, when visiting Pappa Westray in Orkney, I found the bridled variety in great abundance, breeding in company with the common bird. I may here take the opportunity of recording an example of an Albino Razorbill shot by me a little above the Island of May in the Firth of Forth, on the 13th of May 1836. It is a beautiful specimen, with pure yellowish-white bill and legs, the whole plumage of the purest white, and is still in good preservation in my collection at Megginch.

Uria grylle, Lath. (Black Guillemot.)

Though I have seen the Black Guillemot farther north, off the coast of Kincardine and Aberdeen, I have not observed it to be common about the Tay. It is, however, occasionally to be got both there and in St Andrews Bay.

Mergullus alle, Vieill. (Little Auk.)

A wonderful irruption of these birds took place in the very severe winter, just before Christmas, of 1879, spreading themselves from the mouth of the Tay upwards, even going far inland—and many captures were recorded from all parts. At other times it has only been known as a very rare winter visitant.

Fratercula arctica, Flem. (Puffin.)

Though more frequent than the above, making its appearance

at the mouth of the Tay and in the Bay sometimes in spring and autumn, its visits can only be looked upon as merely occasional; and in the same way as the above, it affords instances of having been got in several places far up the river, as well as inland, but all in immature plumage. Examples have been shot above the North Inch of Perth.

138. PHALACROCORAX CARBO, Gould. (Cormorant.)

Though never very numerous in the Tay, I have frequently noticed one or two near the mouth at all seasons, and occasionally a solitary individual may be seen with outstretched neck and rapid flight ascending the river, which they do even as far as Loch Tay. During the salmon close-time, when the river is quiet, they often come up with the tide, and may then be seen fishing and diving in many places not far below Perth: these, however, are always in immature plumage. Its congener, the Green or Crested Cormorant (*Phalacrocorax graculus*, Leach), which seems more confined to the western coast and the Orkneys, where it is abundant, I have never been able to ascertain any authentic instance of having occurred on the Tay or its vicinity, though in the places above mentioned it is generally the commoner of the two.

(*To be continued.*)

Chærocampa nerii at Crieff.—In a small collection of British insects made by Mr W. Grant of Strathearn, Crieff, I find among other things chiefly common, a very fair specimen of *Chærocampa nerii*. It was found in 1873 by Mr Grant's gardener among some grass which he was cutting, probably about July. The owner of the specimen was aware that it was an Oleander Hawk, but was quite ignorant of its rarity.—G. H. RAYNOR, Schoolhouse, Crieff, 14*th June* 1880.

Boldness of the Common Tern.—While I was walking through a grass field near the house here, on the 10th of this month, I heard the familiar cry of the Common Tern, which is a bird so bold and fearless that if a person approaches near one of the young birds that may be concealed in the grass, the parent bird will dart down again and again so close as *almost* to touch his hand or ear. This I have frequently experienced before; but on this occasion the bird repeatedly descended with great rapidity and struck me on the top of the head at least five or six times, apparently with its beak, so sharply that if I had not been wearing a cloth cap the smart raps would have been decidedly painful. Now, if it is at all a matter of doubt whether the Tern ever strikes or only threatens to do so, this note may perhaps be worthy of a place in your columns.—WM. TRAILL, N. Ronaldshay, 28*th July* 1880.

PHYTOLOGY.

A BOTANICAL REPORT ON THE LOCH OF RESCOBIE.

By ABRAM STURROCK.

MR G. DON, in his "Account of Native Plants of the County of Forfar," published in Headrick's 'Survey of Angus' (1813), says: "When the botanist traverses the marshes and examines the lakes in the low-lying districts of the county, he will find his trouble amply repaid." Botanists, since Don's day, do not seem to have been of that opinion. Whether it be that aquatic plants, or "water-weeds," as they are more generally called, are less attractive than their congeners on land, or that they are less easily gathered, I venture to assert that while there is scarcely an inch of ground but has been carefully scanned by the keen eye of the botanist, the most of our Scottish lochs, with all their wealth of floral treasure, still practically remain unexplored. That I am not far amiss in what I have stated, the reader may be inclined to admit when I say that in each of the only lochs that I have examined at all carefully, a rare plant was discovered—viz., in Cluny Loch, *Naias flexilis*, new to Britain; and in Rescobie Loch a Batrachian *Ranunculus*, which I think may prove to be new to the British Islands. It is in the hope that the botanical readers of 'The Scottish Naturalist' may be tempted to "do" a loch on their own account that I venture to lay before them the results of at least half-a-dozen visits to the Loch of Rescobie.

Rescobie Loch is situated in the valley of Strathmore, in the parish of Rescobie, in the county of Forfar, and about three miles east of the county town. It is the first of the two lochs (Rescobie and Balgavies) on the Lunan Water, and is about two miles distant from its source at the village of Lunanhead. It has a length from east to west of a little over a mile, and a width of about a quarter of a mile. The Caledonian Railway between Perth and Aberdeen passes along the south side of the loch, and crosses by an embankment over its south-eastern corner. The

flora of the loch is entirely lowland—Germanic, perhaps I ought to say. Though situated farther north than Cluny Loch in Perthshire, it lies considerably farther from the Silurian of the Highlands, and consequently does not partake of the sub-alpine character of that Perthshire loch; and you will look in vain for such plants as *Subularia aquatica*, *Lobelia Dortmanna*, and *Isoëtes lacustris*. There are three boats upon the loch—the owners of which, on being made acquainted with my purpose, kindly placed them at my disposal.

At the head of the loch there are several large pools—old marl-pits, I believe them to be—around and between which *Myosotis palustris* and *Ranunculus lingua* grow in great beauty and profusion. Associated with these, and elsewhere about the loch, is found the deadly *Cicuta virosa*, which occasionally—as it did in Don's day—proves fatal to cattle feeding on the margin of the loch. The vegetation in these "pots," as they are called, is extremely rich.

In these pools, or in and about the loch, I got the following plants. I dare not call the list exhaustive, but I have endeavoured to make it as complete as possible :—

Potamogeton natans.—Abundant.

P. zosteræfolius and *P. obtusifolius.*—Plentiful in the "pots," less so in the loch.

P. compressus and *P. prælongus.*—Here and there, but not abundant. Specimens of the latter, growing abundantly in one of the "pots," were remarkable for their much-abbreviated, regularly zigzagged internodes.

P. heterophyllus.—On the south side.

P. lucens.—Common. Its rarer and more striking form, *P. acuminatus*, also occurs; but fruiting specimens were scarce. In some cases I found the leaf reduced to the midrib.

P. perfoliatus and *P. crispus.*—Common.

P. pusillus.—Abundant on the north side near the wood. Last season I gathered it with stems 9 or 10 feet long.

P. pectinatus.—In two or three places on the south side.

P. polygonifolius.—In a ditch running into the loch near Clocksbriggs House.

P. rufescens.—Abundant in the burn between the lochs.[1]

Zanichellia palustris, sub. sp. *brachystemon.*—Not so abundant this season as last, when I found it littering the shore after a

[1] Specimens of *Potamogeton nitens*, said to have been gathered in Rescobie Loch, are in Edinburgh University Herbarium.—Ed. Sc. Nat.

storm like sea-weed. If it is annual, as I believe it to be, that may explain its scarcity this year.

Typha latifolia occurred, in Don's day, in this and Balgavies Loch; but now it is found no nearer than Milldens, in the Lunan, about a mile below the point where it leaves the latter loch.

Sparganium ramosum.—In great beds, and growing to a height of five or six feet. It is cut down and dried and used as litter, as also are *Phragmites communis* and *Scirpus lacustris*, when they are accessible.

Sp. simplex and *Sp. minimum.*—Not abundant.

Alisma Plantago and *A. ranunculoides.*—The latter on the gravelly shore between the church and the curling-pond.

Stratiotes aloides.—Don states that he brought this plant from a great distance and introduced it into the Loch of Forfar about 1792. It has not as yet proved troublesome in Rescobie Loch; but this plant and *Callitriche autumnalis* seem likely at no distant date, unless means are taken to eradicate them, to fill up Loch Fithie, a smaller loch in the neighbourhood, draining into one of the feeders of this loch.

Ceratophyllum demersum.—More plentiful in the "pots" than in the loch.

Callitriche autumnalis.—Abundant. *C. hamulata* in one of the "pots."

Littorella lacustris.—Carpets the shores on all sides.

Utricularia vulgaris.—In some of the pools at the head of this and Balgavies Loch.

Lysimachia thyrsiflora.—On the upper margin of the loch, but not in great abundance.

Veronica anagallis abounds in the burn that flows into the loch. *Lastrea Thelypteris* occurs in a small marsh not far from the loch.

Caltha radicans.—In the early summer Mr W. Graham was fortunate in picking up in a dry ditch, near the same place, what I am in hopes will prove to be Don's plant, gathered about 1790, not in the same spot, but in the same district. As, however, the plant has been put upon trial, it would be premature to make a positive assertion on the subject.

Myriophyllum spicatum.—The commonest plant in the loch.

Hippuris vulgaris.—In the marsh near the curling-pond, between the Brechin Road and the wood.

Nymphæa alba and *Nuphar luteum.*—At both ends of the loch.

Ranunculus peltatus, frequent; and *R. circinatus*, not scarce. There also occurs another Batrachian Ranunculus with long-stalked, twice trifurcate, collapsing leaves, which may be *R. peltatus*, var. *elongatus*, but I had no opportunity of examining flowers or fruit.

On the 27th of July last a small party of us, consisting of Mr J. Knox, Mr W. Graham, and myself, paid a visit to the loch, when Mr Graham observed a number of small star-like flowers at a considerable depth in the water. This proved to be the Batrachian *Ranunculus* I have already referred to in the beginning of this report. Though there was a depth of water of from 2½ to 3½ feet, we found to our surprise not only buds and flowers but well-matured fruit! As several eminent botanists seem to doubt the possibility of any Ranunculus fertilising under water, I insist that it is an impossibility that any of these flowers could ever have been near the surface of the water. The whole plant does not exceed a foot in length; it is procumbent in habit and roots at the nodes; the peduncles do not stand an inch in length; it was found in 3 feet and upwards of water; and at the time the loch stood at its lowest summer level.[1]

It may not be amiss that I should append a description of the plant as we found it.

Stems about a foot long, slender, rooting at the nodes. *Leaves* all submersed, shortly stalked, mostly twice trifurcate, with multifid segments, collapsing. *Stipules* adnate, not auricled.

[1] I can quite corroborate Mr Sturrock's statement as to the entirely submersed habit of this curious *Ranunculus*, as, by Mr Sturrock's invitation, Colonel Drummond Hay and I paid a visit to the loch in August. So far as we could judge—and we investigated the matter very thoroughly—there seemed to be not the least grounds for doubting that the flowers had been perfected and the ovules fertilised without ever reaching the air. Some of our esteemed English friends, botanists of the highest repute, think this impossible, but I do not see why they should. *Subularia* almost always flowers under water, but may sometimes, though rarely, flower out of water. (I saw it doing so this year.) Why, then, should a Batrachian Ranunculus not sometimes flower and produce seed in the water? As to how fertilisation is accomplished I offer no suggestion, beyond remarking that so far as inspection of a few buds goes, it is not accomplished before the flowers open. The plant is allied to *Drouetii*, but the species has not yet been determined.—Since the above was written, I have shown specimens to Dr Boswell, and compared them with the Batrachian Ranunculi in his herbarium. Dr Boswell is inclined to refer the Rescobie plant to the Scandinavian species *confervoides*, to which certainly it has much resemblance, though the carpels seem a little different.—Ed. Sc. Nat.

Buds globose, sub-pentagonal. Sepals blackish at the edge. Petals five-veined, small, not contiguous, star-like in the water. *Stamens* few, mostly six, about as long as the pistils. *Stigma* short, somewhat oblique.

Receptacle somewhat conical, thicker than the peduncle, with the usual annulus at the base. Inner edge of *carpels* nearly straight, outer semicircular. *Fr. ped.* about one inch long, somewhat exceeding the leaves, curved at the base.

Flowering and fruiting in deep water.

THE SCHOOLHOUSE, RATTRAY,
4th September 1880.

THE GAELIC NAMES OF PLANTS.

BY JOHN CAMERON.

(*Continued from p.* 320.)

LORANTHACEÆ.

Viscum album — Mistletoe. Gaelic and Irish: *uile-ice* (*uile*, Welsh: *hall* or *all*; Goth.: *alls*; German: *aller*; A. S.: *eal*; English: *all*; *ice*, Welsh: *iarc*, a cure or remedy), a nostrum, a panacea (M'Donald), all-heal. Armoric: *all-yiach*. Welsh: *oll-iach*. Irish: *uile iceach*. This is the ancient Druidical name for this plant. Pliny tells us, "The Druids (so they call their Magi) hold nothing in such sacred respect as the mistletoe, and the tree upon which it grows, provided it be an oak. 'Omnia sanantem appellantes suo vocabulo.' (They call it by a word signifying in their own language *All-heal.*) And having prepared sacrifices, and feast under the tree, they bring up two white bulls, whose horns are then first bound; the priest, in a white robe, ascends the tree, and cuts it off with a golden knife; it is received in a white sheet. Then, and not till then, they sacrifice the victims, praying that God would render His gift prosperous to those on whom He had bestowed it. When mistletoe is given as a potion, they are of opinion that it can remove animal barrenness, and that it is a remedy against all poisons." *Druidh-lus*, the Druid's weed. "The proper etymology is the ancient Celtic vocable *dru*, an oak, from which δρυς is taken" (Armstrong). *Sùgh dharaich*, the sap or substance of the oak, because it derives its substance from the oak, it being a parasite on that and other trees. (*Sùgh*, juice, sub-

stance, sap; Latin: *succus*). Irish: *guis*, viscous, sticky, on account of the sticky nature of the berries. French: *gui*.

Caprifoliaceæ.

Sambucus nigra — Common elder. Gaelic and Irish: *ruis*, meaning "wood." "The ancient name of the tree, which in the vulgar Irish is called *trom*" (O'Reilly); *druman* or *droman* (Sanscrit: *dru*, wood, tree; *drumas*, wood). Welsh: *ysgawen*, elder.

S. ebulus—Dwarf elder. Gaelic and Irish: *fliodh a bhalla*, the wall excrescence. *Mulart* "seems to be the same as the Welsh word *mwyllartaith* (*mwyll*, emollient, and *artaith*, torment") (Brockie). It was esteemed a powerful remedy for the innumerable ills that flesh is heir to. *Mulabhar* (*mul*, a multitude, and *bar*, top) may only be a corruption of *mulart*. The specific name is from εvβολη, *eubole*, an eruption. Welsh: *ysgawen Mair*, Mary's elder.

Viburnum opulus — Guelder-rose, Water-elder. Gaelic: *cèiriocan*,—*céir-iocan* (Latin: *cera*; Greek: χηρυς; Welsh: *cwyr*, wax), the healing, wax-like plant, from the waxy appearance of the flowers.

V. lantana—Wayfaring tree. Gaelic: *craobh fiadhain* (Armstrong), the wild or uncultivated tree.

Lonicera periclymenum—Woodbine, honeysuckle. Gaelic: *uillean* (elbows, arms, joints) elbow-like plant; *feith*, *feithlean*. Irish: *feathlog*, *fethlen*, from *feith*, a sinew, tendon, suggested by its twisting, sinewy stems. *Lus na meala*, the honey-plant, from *mil* (Greek: μελι; Latin: *mel*), honey. *Deolag*, or *deoghalag*, from *deothail*, to suck. Irish: *cas fa chrann*,[1] that which twists round the tree. *Baine gamhnach* (O'Reilly), the yearling's milk. A somewhat satirical name, implying that the sucking will produce scanty results. In Gaelic, *iadh shlat* is frequently applied both to this plant and to the ivy (see *Hedera helix*). Welsh: *gwyddfid*, tree-climber or hedge-climber.

Rubiaceæ.

Rubia tinctorum—Madder. Gaelic: *madar* (Armstrong).

Galium aparine—Goose-grass; cleavers. Gaelic: *gàrbh lus*,

[1] In Strathardle and many other districts, *leum-a-chrann* (*leum*, jump, *crann*, a tree) alluding to its jumping or spreading from tree to tree. High. Soc. Dict. gives *duilliur*, probably from its darkening whatever grew under it.—Fergusson.

the rough weed. Irish: *airmeirg*, from *airm*, arms, weapons, from its stem being so profusely armed with retrograde prickles.

G. saxatile (Armstrong) — Heath bedstraw. *Madar fraoch*, heath madder. It grows abundantly among heather. O'Reilly gives this name also to *G. verum*.

G. verum—Yellow bedstraw. *Ruin*, *ruamh*, from *ruadh*, red. "The Highlanders use the roots to dye red colour. Their manner of doing so is this: The bark is stripped off the roots, in which bark the virtue principally lies. They then boil the roots thus stripped in water, to extract what little virtue remains in them; and after taking them out, they last of all put the bark into the liquor, and boil that and the yarn they intend to dye together, adding alum to fix the colour" (Lightfoot).

Lus an leasaich (in Glen Lyon) the rennet-weed. "The rennet is made as already mentioned, with the decoction of this herb. The Highlanders commonly added the leaves of the *Urtica dioica* or stinging-nettle, with a little salt" (Lightfoot). Irish: *baladh chnis* (O'Reilly), the scented form (*baladh*, odour, scent, *cneas*, form).

Asperula odorata—Woodruff. Gaelic: *lusa-caitheamh*.[1] Probably the Irish name *baladh chnis*, the scented form, is the woodruff, and not the lady's bedstraw; it is more appropriate to the former than to the latter.

Valerianaceæ.

Valeriana officinalis—Great wild valerian. Gaelic: *an tri-bhileach* (M'Kenzie); *lus na tri bhilean* (Armstrong), the three-leaved plant, from the pinnate leaves and an odd terminal one, forming three prominent leaflets. Irish: *lus na ttri ballan*, the plant with three teats (*ballan*, a teat); perhaps from its three prominent stamens (Brockie); *carthan curaigh* (*carthan*, useful, *curaigh*, a hero, a giant)—*i.e.*, the useful tall plant. Welsh: *y llysiewyn*, the beautiful plant; *y dri-aglog* (*dri*, three, *aglog*, burning; from its hot bitter taste).

V. dioica—Marsh or dwarf valerian. Irish: *carthan arraigh*, from *arrach*, dwarf; *caoirin leana*, that which gleams in the marsh (*caoir*, gleams, sparks, flames, flashes; *leana*, a swamp, a marsh). Although this plant is not recorded from Ireland, yet the names only occur in the Irish Gaelic.

[1] *Lusa-caitheamh*, the consumption herb, as it was much used for that disease.—Fergusson.

Dipsaceæ.

Dipsacus sylvestris } Teasel,
„ **fullonum** } Teasel, or fuller's teasel. Gaelic: *leadan,—liodan; liodan an fhucadair* (*leadan* or *liodan*, a head of hair, *fuachdair*, a fuller of cloth); used for raising the nap upon woollen cloth, by means of the hooked scales upon the heads of the fuller's teasel. Irish: *taga*. Welsh: *llysie y cribef*, carding plant, from *crib*, a comb, card.

Scabiosa succisa — Devil's bit scabious. Gaelic and Irish: *ura bhallach* (*ur*, fresh, new; *ballach*, from *ball*, a globular body, from its globular-shaped flower-heads, or *ballach*, spotted. This old Celtic word is found in many languages. Greek: βαλλω. German: *ball.*) *Urach mhullaich*, bottle-topped (*urach*, a bottle, from the form of the flower-head; *mullach*, top). *Odharach mhullaich*, a corruption of *urach*. (*Odhar* means dun or yellowish, but the flower is blue). *Greim an diabhail* (O'Reilly), devil's bit, from its præmorse root, the roots appearing as if bitten off. According to the old superstition, the devil, envying the benefits this plant might confer on mankind, bit away a part of the root, hence the name. Welsh: *y glafrllys*, from *clafr*, *clawr*, scab, mange, itch; translation of *scabiosa*, from *scabies*, the itch, which disorder it is said to cure.

Knautia arvensis—Corn-field knautia (so named in honour of C. Knaut, a German botanist) or field scabious. Gaelic: *gille guirmein*, the blue lad. Irish: *caba deasain*, the elegant cap; *caba*, a cap or hood; and *deas*, neat, pretty, elegant. *Bodach ghorm*, the blue old man.

Compositæ.

Helminthia echioides — Ox-tongue. Gaelic: *boglus* (Armstrong), a corruption from the Irish; *bolglus*, ox-weed, from *bolg*, a cow, an ox. A name also given to *Lycopsis arvensis*. *Bog luibh*, same meaning.

Lactuca sativa—Lettuce. Gaelic and Irish: *liatus*, lettuce, a corruption from *lactuca* (Latin: *lac*, milk), on account of the milky sap which flows copiously when the plant is cut; *luibh inite*, the eatable plant. Irish: *billeog math*, the good leaf. Welsh: *gwylath*, *gwyfluid*, *lacth*, milk.

Sonchus oleraceus — Common sow-thistle, milk-thistle. Gaelic and Irish: *bog ghioghan*, the soft thistle. Irish: *giogan*, a thistle. *Baine muic*, sow's milk.

S. arvensis—Gaelic : *blioch fochain*, the corn milk-plant; *blioch*, milky ; *fochan*, young corn. Welsh : *llaeth ysgallen*, milk-thistle (*ysgallen*, a thistle).

Hieracium pilosella—Mouse-ear hawkweed. Gaelic : *cluas luch*, mouse-ear ; *cluas liath*, the grey ear.

H. murorum—Wall hawkweed. Irish : *srubhan na muc*, the pig's snout (*srubh*, a snout).

Taraxacum dens-leonis—Dandelion. Gaelic : *bearnan brìde.*

> "Am *bearnan brìde* s'a pheighinn rioghil."—M'Intyre.
> The dandelion and the penny-royal.

Bearn, a notch, from its notched leaf[1] ; *brìde*,[2] from *brigh*, sap, juice, with which the plant abounds ; *bior nam brìde* (*bior*, sharp, tooth-like) ; *fiacal leomhain*, lion's teeth. Welsh : *dant y llew*, the same meaning as dandelion (*dent de lion*) and *leontodon* (λεων, a lion ; and οδους, a tooth), from the tooth like formation of the leaf. *Castearbhan nam muc* (Shaw)—The pig's sour-stemmed plant. Irish : *caisearbhan*, *cais-t'searbhain*, *castearbhan* (*cais*, a word of many significations, but here from *cas*, a foot ; *caiseag*, the stem of a plant ; *searbh*, bitter, sour).

Cichorium intybus — Succory or Chicory. Gaelic : *lus a't suicair*, a corruption from *cichorium*, which was so named from the Egyptian word *chikoùryeh*. Pliny remarks that the Egyptians made their chicory of much consequence, as it or a similar plant constituted half the food of the common people. It is also called in Gaelic *castearbhan*, the sour-stemmed plant.

C. endiva—Endive. Gaelic : *enach gharaidh* (*enach*, corruption of *endiva*, "from the Arabic name *hendibeh*" (Du Théis), *garadh*, a garden). Welsh : *ysgali y meirch*, horse-thistle.

Lapsana communis—Nipple-wort. Gaelic : *duilleag mhaith*, the good leaf ; *duilleag mhìn*, the smooth leaf. Irish : *duilleog bhrighid*, the efficacious leaf, or perhaps St Bridget's leaf, the saint who, according to Celtic superstition, had the power of revealing to girls their future husbands. French : *herbe aux mamelles*, having been formerly applied to the breasts of women to allay irritation caused by nursing. *Duilleog bhraghad*, or *braighhe*, the breast.

[1] "Most certainly *brìde* comes from its being in flower plentifully on *latha fheill-brīde*."—Fergusson.

[2] *Bride* is also a corruption of *brighit*, St Bridget. *Latha fheill-brìde*, Candlemas, St Bridget's Day.

"Tha do phòg mar ùbhlan garaidh,
'S tha do *bhraighe* mar an neoinean."—M'Intyre, *Oran Gaoil.*
Thy kiss is like the apples of the garden,
And thy bosom like the daisy.

"If it was used by the French for rubbing the breasts, nothing seems more likely than that it would be also so used by the Celts of Ireland and Scotland, which would at once give it the name of *dulleog braghad*" (Fergusson).

Arctium—Celtic: *art*, a bear. Greek: αρκτος, from the rough bristly hair of the fruit.

A. lappa—Burdock. Gaelic and Irish: *suirichean suirich*, the foolish wooer (*suiriche*, a fool; *suirich*, a lover or wooer); *seircean suirich*, affectionate wooer (*seirc*, affectionate). *Mac-an-dogha*,[1] the mischievous plant (*mac-an* for *meacan*, a plant); *doghadh*, mischievous (Shaw). *Meacan-tobhach-dubh*, the plant that seizes (*tobhach*, wrestling, seizing, inducing; *dubh*, black, or large). *Leadan liosda* (*leadan*, a head of hair; *liosda*, stiff). Irish: *copag tuaithil*, the ungainly docken; *ceosan*, the bur, or fruit.

"Mar *cheosan* air sgiathan fhirein."—Ossian.
Like bur clinging to the eagle's wing.

Welsh: *cynghau*, closely packed. *Cribe y bleidd*, wolf's comb. *Caca muci*, puck's dung. *Lappa*, from Celtic, *llap* (Loudon). Gaelic (for hand) *lamh*. Welsh: *llamh*.

Carduus heterophyllus—Melancholy thistle. Gaelic: *cluas an fheidh*, the deer's ear.

C. palustris—Marsh-thistle. Gaelic: *cluaran leana* (*cluaran*, a thistle; *lean*, a swamp);

"Lubadh *cluaran* mu Lora nan sion."—Ossian.
Bending the thistle round Lora of the storms.

Cluaran, a general name for all the thistles. Welsh: *ys gallen*.

C. lanceolatus—Spear-thistle. Gaelic: *an cluaran deilgneach*, the prickly thistle (*deilgne*, prickle-thorn).

C. arvensis—Corn-thistle. Gaelic: *aigheannach*, the valiant one (from *aighe*, stout, valiant).

C. marianus—Mary's thistle. Gaelic: *fothannan beannuichte*. Irish: *fothannan beanduighte* (Latin: *benedictus*), the blessed thistle (so called from the superstition that its leaves are stained with the Virgin Mary's milk); *fothannan*, *foghnan*, *fonndan*, a thistle. Danish: *fön*, thistle-down.

[1] *Dogha* also means burnt or singed. It was formerly burned to procure from its ashes a white alkaline salt, as good as the best potash.

"Leannaibh am *foghnan*."—OSSIAN.
Pursue the thistle-down.

"'Feadh nan raointean lom ud,
Far nach cinn na *foth 'nain*."
Among these bare hillsides,
Where the thistles will not grow.

M'Donald has another name, *cluaran òir*, the gold thistle.

"Gaoir bheachainn bhùi 's ruadha
Ri deoghladh *chluaran òir*."
The buzzing of yellow and red wasps
Sucking the golden thistle.

It is uncertain to which thistle, if any, the reference is made, unless it be to *Carlina vulgaris*, the carline thistle. *Cluaran*, occasionally means a daisy, *Chrysanthemum segetum*, one of its names being *liathan*.

"*Liath chluaran* nam magh."—OSSIAN.
The hoary thistle (or daisy) of the field.

Here the reference is evidently to the corn-marigold; in all probability M'Donald refers to the same flower, and not to any thistle (see *Chrysanthemum segetum*).

The thistle, the badge of the Clan Stuart.

Cynara scolymus—Artichoke. Gaelic: *farusgag*, from *farusg*, the inner rind, the part used being the lower part of the receptacle of the flower, freed from the bristles and seed-down, and the lower part of the leaves of the involucre. *Bliosan*, not unlikely to be a contraction from *bli-liosan*,—*bli* (*bligh*), milk (with its florets milk was formerly coagulated); and *lios*, a garden. These names apply also to *Helianthus tuberosus*, Jerusalem artichoke, especially to the tubers; and *plur na greine*, to the flower, from the popular error that the flower turns with the sun.

Centaurea nigra—Knapweed. Gaelic: *cnapan dubh*, the black knob (from *cnap*, a knob; Welsh, Armoric, and Irish: *cnap;* Saxon: *cnæp;* Danish *cnap.*) *Mullach dubh*, the black top. Irish: *niansgoth*, the daughter's flower (*nian*, a daughter; *sgoth*, a flower).

C. cyanus—Blue-bottle. Gaelic: *gorman*, the blue one. In some places, *gille-guirmean*, the blue lad. *Curachd chubhaig*, the cuckoo's cap or hood. Irish: *curac na cuig*, the same meaning. Welsh: *penlas wen*, blue headed beauty.

Artemisia vulgaris—Mugwort. Gaelic: *liath lus*, the grey weed. *Mòr manta* (Shaw), the large demure-looking plant (*mòr*,

large; *manta*, demure, bashful). *Mughard*, Mugwort (*mugan*, in Irish, a *mug*, or *mugart*, a hog). Irish: *bofulan ban*, or *buafannan bàn*, the white toad, or serpent (*buaf*, a toad; *buafa*, a serpent; Latin: *bufo*, a toad); *buafannan liath*, the grey toad or serpent. Welsh: *llwydlys*, grey weed.

A. absinthium—Common wormwood. Gaelic: *buramaide*. Irish: *borramotor*, also *burbun* (*burrais*, a worm or caterpillar; *maide*, wood)—*i.e.*, wormwood. *Searbh luibh*, bitter plant.

"Chuir e air mhisg mi le *searbh-luibhean*."—STUART.
He hath made me drunk with wormwood.

"Mar a *bhurmaid*."
Like the wormwood.

It was formerly used instead of hops to increase the intoxicating quality of malt liquor. *Roide*, gall, bitterness. *Graban* (from Gothic, *grub*, dig).[1] Welsh: *bermod chwerwlys*, bitter weed.

A. abrotanum — Southernwood. Gaelic: *meath chaltuinn*. (*Meath*, Latin *mitis*, faint, weary, effeminate. Its strong smell is said to prevent faintness and weariness. *Caltuinn*, from *càl*, Latin: *cald;* Italian: *cala;* French: *cale*, a bay, sea-shore, a harbour.) It grows in similar situations to *A. maritima*. Irish: *surabhan*, *suramont*, and Welsh, *siwdrmwt*. The sour one (*sùr*, sour), and "southernwood," also from the same root. Welsh: *llysier cyrff*, ale-wort (*cyrff*, Latin, *cervisia*, ale), it being frequently used instead of hops to give a bitter taste to malt liquors.

Gnaphalium dioicum, G. sylvaticum — Cudweed. Gaelic: *càt luibh*, the cat's weed. *Gnàbh*, or *cnàmh lus*, the weed that wastes slowly (from γναφάλιον), a word with which Dioscorides describes a plant with white soft leaves, which served the purpose of cotton. This well describes these plants. They have all beautifully soft woolly leaves; and, on account of the permanence of the form and colour of their dry flowers, are called "Everlasting."

Filago germanica—Common cotton rose. Gaelic and Irish: *liath lus roid*, the gall (or wormwood) grey weed.

[1] The occasional occurrence of Gothic roots in plants' names in the Western Highlands and Isles, is accounted for by the conquest of these parts by the Norwegians in the ninth century, and the fact of their rule existing there for at least two centuries under the sway of the Norwegian kings of Man and the Isles.

Petasites vulgaris—Butter-bur, pestilence-wort. Gaelic and Irish: *gallan mòr*, the big branch, possibly referring to its large leaf. Greek: γαλανος, mast. Danish: *galan*, a stripling. *Pobal*, more correctly *pubal*. Welsh: *pabel*, a tent, a covering.

"Shidhich iad am *pubuill*."—Ossian.
They pitched their tents.

The Greek name, πετασος, a broad covering, in allusion to its large leaves, which are larger than that of any other British plant, and form an excellent shelter for small animals.

Tussilago farfara—Colt's foot. Gaelic: *cluas liath*, grey ear. *Gorm liath*, greyish green. *Duilliur spuing*, the tinder-leaf.

"Cho tioram ri *spuing*."
As dry as tinder.

The leaf, dipped in saltpetre, and then dried, made excellent tinder or touchwood. Gaelic and Irish: *fathan* or *athan*, meaning fire. It was used for lighting fire. The leaves were smoked before the introduction of tobacco, and still form the principal ingredient in the British herb tobacco. *Gallan-greannchair* (*gallan*, see "Petasites;" *greann*, hair standing on end, a beard), probably referring to its pappus. Irish: *cassachdaighe* (O'Reilly), a remedy for a cough (*casachd*, a cough; *aighe* or *ice*, a remedy). "The leaves smoked, or a syrup or decoction of them and the flowers, stand recommended in coughs and other disorders of the breast and lungs" (Lightfoot). Welsh: *carn y cbol* (*carn*, hoof, and *cbol*, foal or colt), colt's-foot.

Senecio vulgaris—Groundsel. Gaelic: *am bualan*, from *bual*, a remedy. *Lus pharliath*,[1] grey Peter's weed, a name suggested by its aged appearance, even in the spring-time. Latin: *senecio*. Welsh: *ben-felan*, sly woman. *Sail bhuinn* (*sail*, a heel; *buinn*, an ulcer.) "The Highlanders use it externally in cataplasms as a cooler, and to bring on suppurations" (Lightfoot). *Grunnasg* (from *grunnd*, ground; German: *grund*). Welsh: *grunsel*.

"Muran brioghar s'an *grunnasg* lionmhor."—M'Intyre.
The sappy carrot and the plentiful groundsel.

Irish: *crann lus*, the plough-weed. *Buafanan na h' easgaran*

[1] In Breadalbane, Glenlyon, and other places, the plant is called *Lùs Pharlisle*—

"*Lùs Pharlisle* cuiridh e ghoimh es a chraimh."
The groundsel will extinguish acute pain in the bone—

it being frequently applied as a cure for rheumatic pains.

(*buaf*, a toad, a serpent, but in this name evidently a corruption from *bualan*, a remedy, or *buadh*, to overcome; *easgaran*, the plague), a remedy for the plague. A name given also to the ragwort.

S. Jacobæa—Ragwort. Gaelic and Irish: *buadhlan buidhe* (from *buadh*, to overcome; *buidhe*, yellow); *buadhghallan*, the stripling or branch that overcomes; *guiseag bhuidhe*, or *cuiseag*, the yellow-stalked plant; *cuiseag*, a stalk. Welsh: *llysiu'r ysgyfarnog*, the hare's plant; *llysiu'r nedir*, the serpent's weed —agreeing with one of its Irish names, *buafanan*,—*buaf*, a serpent or toad.

Inula Helenium — Elecampane, said to be from the officinal name, *inula campana*, but probably a corruption of Helénula, Little Helen (Jones). Greek: ἕλενος, the elecampane. Gaelic: *aillean*, from *aille*, beautiful, handsome. Irish: *Ellea* (Gaelic, *Eilidh*), Helen. The famous Helen of Troy, who is said to have availed herself of the cosmetic properties of the plant. *Creamh*, sometimes, but more generally applied to *Allium ursinum* (which see).

Bellis perennis—Daisy. Gaelic and Irish: *nèionan*, or *nòinean*, the noon-flower (from *noìn*, noon; Welsh: *nawn*; Latin: *nona*, the ninth hour, from *novem*, ninth. The ninth hour, or three in the afternoon, was the noon of the ancients).

"'San *nèoinean* beag's mo lamh air cluin."—Mian a Bhard Aosda.
And the little daisy surrounding my hillock.

Buidheag (in Perthshire), the little yellow one.

"Geibh sinn a *bhuidheag* san lòn."—Old Song.
We shall find the daisy in the meadow.

Gugan (Armstrong), a daisy, a bud, a flower.

Chrysanthemum segetum — Corn-marigold. Gaelic: *bile buidhe*, the yellow blossom. *Bileach choigeach*, the stranger or foreigner. *Liathan*, Irish, *lia*, the hoary grey one (from Greek λεῖος; Welsh: *llwyd*), on account of the light-grey appearance of the plant, expressed botanically by the term glaucous. *An dithean òir*, the golden flower, or chrysanthemum (χρυσος, gold; ανθος, a flower).

"Mar mhìn-chìoch nan *or dhithean* beag."
Like the tender breast of the little marigold.

"Do *dhithean* lurach luaineach
Mar thuarneagan de'n 'òr."—M'Donald.
Thy lovely marigolds like waving cups of gold.

Dithean is frequently used in a general sense for "flower," also for "darnel."

"Tir nan *dithean* miadar daite."
Land of flowers, meadow dyed.
"*Dithein* nan gleann."
The flowers of the valley.

Welsh: *gold mair*, marigold. Irish: *buafanan buidhe*, the yellow toad.

C. leucanthemum—*An neonan mòr*, the big daisy. *Am bréinean-brothach*[1] (*breine*, stench; *brothach*, scabby). *Easbuig-ban*, from Irish *easbudh*, silly, idle (*easbudh brothach*, the King's-evil). This plant was esteemed an excellent remedy for that complaint. Irish: *easbuig speain* (*Speain* or *Easbain*, Spain).

(*To be continued.*)

PRELIMINARY LIST OF THE FUNGI OF PERTHSHIRE.

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

(*Continued from page* 325.)

TRICHODERMACEI.

CXXV. INSTITALE, Fr.

713. Effusa, Fr. Not uncommon. Parasitic on *Polyporus destructor*, and forming the plant long known as *Ptychogaster albus*. *See* Mycologia Scotica, p. 287.

PHYSOMYCETES.

ANTENNARIEI.

CXXVI. ZASMIDIUM, Fr.

714. Cellare, Fr. In wine-cellars in Perth, &c.

MUCORINI.

CXXVII. ASCOPHORA, Tde.

715. Mucedo, Tde. Common.

CXXVIII. MUCOR, Mich.

716. Mucedo, L. Common.
717. Caninus, P. Near Perth?
718. Hyalinus, Cke. Dupplin.

CXXIX. PILOBOLUS, Tde.

719. Crystallinus, Tde. Dupplin, Glen Tilt, &c.

CXXX. HYDROPHORA, Tde.

720. Stercorea, Tde. Near Perth?

[1] *Breinean-brothach* was probably also applied to *A. cotula*, for which there is no Gaelic name recorded.

CXXXI. SPORODINIA, Lk.

721. Dichotoma, C. Parkfield.

SAPROLEGNIEI.

CXXXII. SAPROLEGNIA, Nees.

722. Ferax, Kutz. Common in the terrestrial condition, *Empusa musca*, Cohn.

ASCOMYCETES.

ONYGENEI.

CXXXIII. ONYGENA, P.

723. Equina, P. On decaying sheep's-horns. Rannoch.

PERISPORIACEI.

CXXXIV. SPHÆROTHECA, Lev.

724. Pannosa, Lev. Common.
725. Castagnei, Lev. Quarrymill.

CXXXV. PHYLLACTINIA, Lev.

726. Guttata, Lev. Pitroddie, Dunkeld, Glen Lochay.

CXXXVI. UNCINULA, Lev.

727. Bicornis, Lev. Parkfield, Dunkeld, Killin.
728. Wallrothii, Lev. Dunkeld.

CXXXVII. MICROSPHÆRIA, Lev.

729. Penicellata, Lev. Perth, Stobhall, Dunkeld, Kenmore.
730. Berberidis, Lev. Common.
731. Grossulariæ, Lev. Common.

CXXXVIII. ERYSIPHE, Hedw.

732. Lamprocarpa, Lev. Perth, Dupplin.
733. Graminis, D.C. Dupplin.
734. Martii, Lk. Parkfield, Dupplin.
735. Montagnei, Lev. Perth.
736. Communis, L. Common.

CXXXIX. ASCOTRICHA, B.

737. Chartarum, B. Perth.

CXL. EUROTIUM, Lk.

738. Herbariorum, Lk. Parkfield, Rannoch.
739. Fulvescens, Cke. Dupplin.

ELVELLACEI.

CXLI. MORCHELLA, Dill.

740. Esculenta, P. Invermay, Inver.

CXLII. GYROMITRA, Fr.

741. Esculenta, Fr. Moncreiffe, Almondbank Station, Dunkeld, Rannoch.

CXLIII. HELVELLA, L.

742. Crispa, Fr. Not uncommon.
743. Lacunosa, Afz. Rannoch.
744. Elastica, Bull. Moncreiffe.

CXLIV. MITRULA, Fr.

745. Paludosa, Fr. Path of Condie, Dunkeld, Rannoch.

CXLV. SPATHULARIA, P.

746. Flavida, P. Scone, Balinluig, Pitlochry, Killiecrankie, Rannoch.

CXLVI. LEOTIA, Hill.

747. Lubrica, P. Not uncommon.

CXLVII. VIBRISSEA, Fr.

748. Truncorum, Fr. Balinluig.
749. Margarita, B. W. Rannoch, Glen Tilt.
750. Microscopica, B. and Br. Blackwood of Rannoch, 1875.

CXLVIII. GEOGLOSSUM, P.

751. Viride, P. Falls of Lochay.
752. Tremellosum, Cke. Rannoch, 1875.
753. Glabrum, P. Moncreiffe, Dunkeld, Killin, Rannoch.
754. Hirsutum, P. Dunkeld.
755. Difforme, Fr. Dunkeld, Killiecrankie, Rannoch.
756. Glutinosum, P. Dunkeld.

CXLIX. PEZIZA, L.

i. *Aleuria.*

757. Acetabulum, L. Glen Tilt?
758. Macropus, P. Moncreiffe, Kinnoull, Rannoch.
759. Venosa, P. Banks of the Almond.
760. Badia, P. Kinnoull, Balinluig, Killin, Rannoch.
761. Cochleata, Huds. Moncreiffe, Seggieden, Rannoch, Glen Tilt (a pale form).
762. Leporina, Batsch. Rossie Priory.
763. Onotica, P. Moncreiffe, Kinnoull, Scone Den.
764. Aurantia, Fr. Seggieden, Parkfield, Dunkeld, Abercairney.
765. Luculenta, Cke. Inver.
766. Cupularis, L. Moncreiffe.
767. Polytrichi, Schum. Rannoch.
768. Granulata, Bull. Not uncommon.
769. Vivida, Nyl. Rannoch.

ii. *Lachnea.*

770. Hemisphærica, Wigg. Moncreiffe.
771. Hirta, Sch. Moncreiffe.
772. Trechispora, B. and Br. Moncreiffe, Craighall.
773. Coprinaria, Cke. Rannoch, 1875.
774. Scutellata, L. Moncreiffe, Dupplin, Inver, Killin.

775. Stercorea, P. Hilton, Rannoch.
776. Virginea, Batsch. Dupplin, Rannoch.
777. Nivea, Fr. Dupplin, Balinluig.
778. Hyalina, P. Killin.
779. Comitessæ, Cke. Dupplin.
780. Calycina, Schum. Common.
781. Bicolor, Bull. Dunkeld.
782. Schumacheri, Fr. Kenmore, Killin.
783. Sulphurea, P. Dupplin.
784. Apala, B. and Br. Parkfield, Methven Bog.
785. Fusca, P. Rannoch.

iii. *Phialea.*

786. Firma, P. Killin, Rannoch.
787. Curreiana, Tul. Methven Bog.
788. Coronata, Bull. Dupplin.
789. Cyathoidea, Bull. Dupplin.
790. Caucus, Reb. Moncreiffe.
791. Amentacea, Balb. Moncreiffe.
792. Cinerea, Batsch. Dupplin, Dunkeld, Kenmore, &c.
793. Axillaris, Nees. Rannoch, Glen Tilt.
794. Leucostigma, Fr. Dupplin.
795. Vulgaris, Fr. Dupplin, Balinluig, Rannoch.
796. Fusarioides, B. Perth, &c.
797. Monilifera, Fckl. Dupplin.

CL. HELOTIUM, Fr.

798. Fibuliforme, Fr. Moncreiffe.
799. Æruginosum, Fr. Common.
800. Virgultorum, Fr. Moncreiffe, Rannoch, Killin.
801. Tuba, Fr. Bonhard, Craighall.
802. Scoparium, Cke. Dupplin.
803. Citrinum, Fr. Not uncommon.
804. Pallescens, Fr. Near Perth.
805. Pruinosum, Jerd. Dupplin.
806. Herbarum, Fr. Dupplin.

CLI. PATELLARIA, Fr.

807. Atrata, Fr. Rannoch.
808. Discolor, Mont. Reichip.
809. Lecideola, Fr. Killiecrankie.

CLII. PSILOPEZIZA, B.

810. Myrothecioides, B. and Br. Craighall.

CLIII. ASCOBOLUS, Tde.

811. Furfuraceus, P. Rannoch, Glen Tilt.
812. Glaber, P. Rannoch.
813. Immersus, P. Rannoch.
814. Argentens. Curr. Rannoch.
815. Ciliatus, Schm. Rannoch.

816. Æruginens, Fr. Glen Shee.
817. Cookei, Boud. Rannoch, 1875.
818. Crenulatus, K. Rannoch, 1875.
819. Pilosus, Fr. Var. minor. Rannoch, 1875.

CLIV. BULGARIA, Fr.

820. Inquinans, Fr. Moncreiffe, Dupplin.
821. Sarcoides, Fr. Common.

CLV. ASCOMYCES, M. and D.

822. Pruni, Fckl. Glen Tilt (*Prunus Padus*), St Fillans (*P. spinosa*).
823. Tosquinetii, West. Kinfauns.

TUBERACEI.

CLVI. ELAPHOMYCES, Nees.

824. Variegatus, Vitt. Moncreiffe, Rannoch, &c.

PHACIDIACEI.

CLVII. PHACIDIUM, Fr.

825. Vaccinii, Fr. Var. minus. Rannoch.
826. Coronatum, Fr. Rannoch.
827. Dentatum, Fr. Killiecrankie.
828. Repandum, Fr. Kinfauns.
829. Trifolii, Boud. Gannochy.
830. Ranunculi, Desm. Dupplin, Rannoch.
831. Leptideum, Fr. Strath Tay.
832. Carbonaceum, Fr. Methven Bog?

CLVIII. LABRELLA, Fr.

833. Ptarmicæ, Desm. Rannoch, 1875.

CLIX. RHYTISMA, Fr.

834. Maximum, Fr. Aberfeldy, Kenmore, Killiecrankie.
835. Salicinum, Fr. Strathbraan.
836. Acerinum, Fr. Abundant.
837. Empetri, B. W. Common in Breadalbane, Rannoch, and Athole.

CLX. HYSTERIUM, Tde.

838. Curvatum, Fr. Aberfeldy.
839. Pinastri, Schrad. Common.

CLXI. COLPOMA, Wallr.

840. Quercinum, Wallr. Kenmore, Rannoch.

CLXII. LOPHIUM, Fr.

841. Mytilinum, Fr. Rannoch.

CLXIII. STEGIA, Fr.

842. Ilicis, Fr. Common.

CLXIV. TROCHILA, Fr.

843. Lauro-cerasi, Fr. Common.

844. Buxi, Capr. Dupplin.
845. Craterium, Fr. Dupplin, Annat Lodge.

CLXV. DICHÆNA, Fr.

846. Rugosa, Fr. Dupplin.

SPHÆRIACEI.

CLXVI. TORRUBIA, Lév.

847. Militaris. Fr. Annat Lodge. In the *Isaria* condition at Scone and Rannoch.
848. Ophioglossoides, Tul. Scone, Dunkeld, Rannoch.

CLXVII. CLAVICEPS, Tul.

849. Purpurea, Tul. Common.

CLXVIII. EPICHLOE, Fr.

850. Typhina, B. Not uncommon.

CLXIX. HYPOMYCES, Tul.

851. Chrysospermus, Tul. Common in the *Sepedonium* condition.

CLXX. HYPOCREA, Fr.

852. Rufa, Fr. Common in the *Trichoderma* condition.

CLXXI. NECTRIA, Fr.

853. Cinnabarina, Fr. Common.
854. Cucurbitula, Fr. Dupplin.
855. Episphæria, Fr. Dupplin.
856. Rousseliana, Mont. Dupplin.
857. Coccinea, Fr. Dron.
858. Corallina. Moncreiffe, Nov. 1876.

CLXXII. XYLARIA, Fr.

859. Polymorpha, Grev. Rossie Priory.
860. Hypoxylon, Grev. Common.
861. Carpophila, Fr. Annat Lodge, Methven Wood.
862. Scotica, Cke. Meikleour.

CLXXIII. USTULINA, Tul.

863. Vulgaris, Tul. Kinnoull, Perth.

CLXXIV. HYPOXYLON, Fr.

864. Coccineum, Bull. Dupplin.
865. Multiforme, Fr. Moncreiffe, Killin, Killiecrankie.
866. Rubiginosum, Fr. Moncreiffe, Parkfield.
867. Udum, Fr. Kenmore.

CLXXV. EUTYPA, Tul.

868. Lata, Tul. Dupplin.

CLXXVI. POLYSTIGMA, P.

869. Rubrum, P. Kinnoull, Stobhall.
870. Fulvum, D. C. Rannoch.

CLXXVII. DOTHIDEA, Fr.

871. Ulmi, Fr. Dupplin, Scone Den.
872. Podagrariæ, Fr. Common.
873. Junci, Fr. Killin.
874. Graminis, Fr. Dupplin, Kinnoull, &c.
875. Johnstoni, B. and Br. Bonhard.
876. Pteridis, Fr. Rannoch.
877. Tetraspora, B. and Br. Scone.
878. Filicina, Fr. Not uncommon.

(*To be continued.*)

NOTICES OF NEW BOOKS.

An Elementary Text-Book of Botany. Translated from the German of Dr K. Prantl. The translation revised by Dr S. H. Vines. London: W. Swan, Sonnenschein, & Allen. 1880. 8vo. Pp. vii and 332. With 275 Woodcuts.

"This book was written by Prof. Prantl to meet a growing demand for a work on Botany, which, while less voluminous than the well-known 'Lehrbuch' of Prof. Sachs, should resemble it in its mode of treatment of the subject, and should serve as an introduction to it. That it has not failed in this object is shown by the fact of its having already reached a third edition. It is hoped that this English edition will as adequately supply the want of a work of this kind, which has long been felt in this country."—Preface to the English edition, p. 10.

We do not think we are mistaken in believing that this work will take the place that Dr Vines (who has furnished an excellent translation) claims for it. Sachs's standard book in its English translation is too well known to make a sketch of the work under review necessary; and though it is not faultless, we can recommend it with all sincerity. Exception may be taken to the fact that the theory that lichens are fungi parasitic upon algæ is given as proved. We notice also that Sachs's figure of the hymenium of *Agaricus campestris*, showing the basidia furnished with two sterigmata only, is reproduced, though Mr W. G. Smith has shown in this magazine and elsewhere that they have the more usual four sterigmata.

Charles Waterton. By James Simson. Edinburgh: Maclachlan & Stewart. 1880. 8vo. Pp. 40.

As the author places on the title-page the well-known lines, "nothing extenuate, nor set down aught in malice," we cannot imagine for a moment but that he wishes to give a calm estimate of Waterton as a man and as a naturalist. His estimate of Waterton is not favourable; but as the latter died in 1859, and his qualifications as a naturalist were gauged long before that date, we can congratulate Mr Simson neither upon his choice of a subject nor upon the manner in which he has handled it.

The Geological Antiquity of Insects. Twelve Papers on Fossil Entomology. By Herbert Goss. London : J. Van Voorst. 1880. 8vo. Pp. 50.

Three Papers on Fossil Insects, and the British and Foreign Formations in which Insect Remains have been detected. By H. Goss. Reprinted from the 'Proceedings of the Geologists' Association.'

Mr Goss has rendered excellent service to the science of entomology in preparing and publishing these Papers. Every one who aspires to the name of entomologist must, or ought to, be anxious to know something of the geological history of insects ; but heretofore, if he wished to acquire this knowledge, he would have needed to expend a very large amount of time—first, to find out in which of many books, pamphlets, and transactions of societies, reference was made to fossil insects ; and second, to consult these references. Mr Goss has done all this for him, brought the widely-scattered notices together, arranged the insects of each formation in their proper order, and pointed out the plants and animals with whom they were associated, as well as the light thrown by the existence of the insects upon climate, &c. May we, in thanking very heartily the author for his work, be allowed to express the hope that, when the numerous insect remains recently, or still being, discovered in North America are "worked out," he will publish a supplement to his present papers?

That Mr W. F. Kirby is author of **European Butterflies and Moths** (in monthly parts—London : Cassell, Petter, & Galpin) is sufficient assurance that the work continues to be of the same excellent character as we indicated in noticing it before. The Noctuæ have now been well entered on in the text, but the illustrations have only got as far as the Bombyces. If there is one point in which the author shows a little weakness, it is in the distribution of some of our Scottish species. As a rule, the range of a species is given broadly (as, *e.g.*, "Central Europe and Northern Asia"), British species being indicated by a prefixed * ; but Mr Kirby occasionally descends to particulars, and as in the case of a local species like *Cirrhœdia xerampelina*, tells us that it is "extremely local in Central Europe ; somewhat commoner in England, France, and Ireland," thus implying (though not directly stating) that it is absent from Scotland, where in fact it is somewhat widely distributed. We might give several other instances of similar errors, and would recommend Mr Kirby to glance over the list of Scottish Lepidoptera published some time ago in this magazine. We notice also that it is expressly stated that only the type form of *Nemeophila plantaginis* occurs in Britain ; the fact being that the var. *hospita* is rather widely spread in northern Scotland, and if we are not mistaken, having been recently recorded from England or Wales. The two forms of *Phragmatœcia fuliginosa* are so well marked that we are surprised to find that they are not indicated, and can only imagine that the author is not acquainted with the northern form. In the description of *Scotelosoma satellitia*, the form with the three white spots representing the reniform stigma is the only one described—the one where these spots are yellow, and which is nearly as common, being unmentioned. These, however, are mostly trivial errors in a work which we can otherwise heartily recommend.

Proceedings of the Natural History Society of Glasgow. Vol. IV. Part I. 1878-79. Glasgow : published by the Society.

The Fauna of Scotland, with special reference to Clydesdale and the Western District. Glasgow : published by the Natural History Society of

Glasgow.—Mammalia, by E. R. Alston. Fresh and Brackish Water Ostracoda, by D. Robertson.

As we have had occasion to notice before, the Glasgow Society of Natural History (with which, by the way, we believe the Glasgow Society of Field Naturalists is now united) is doing excellent work, and this part of its 'Transactions' is full of interest. Amongst the more important papers are: Mr Etheridge's "Observations on the Swollen Condition of Carboniferous Crinoid Stems," illustrated by two good plates; Mr W. Horn's "Notes on the Birds of the North-West of Perthshire;" Mr Harvie-Brown's remarks "On the Mammalia of the Outer Hebrides," &c. Not the least important of the work done by the Glasgow Society is the preparation and publication of lists of the animals of Scotland, with special reference to the west. Of these lists three parts have been published, one of which (Hymenoptera, Part I.) has been already noticed. Of the two at present before us, we purpose reserving Mr Alston's "Mammalia" for a more lengthy notice hereafter. The remaining list—that of the Ostracoda, by Mr David Robertson—is of great value, not only for the light it throws on the geographical distribution of the species, but for the many interesting remarks on their habits, and the instruction given for collecting and preserving. Mr Robertson insists strongly on the importance of attaching, without delay, locality labels to all material collected; and young naturalists (be the objects collected what they may) will do well to make a habit of doing this. How many collections of (say) insects are there that are comparatively worthless, from a scientific point of view, because the localities of the specimens are only preserved (or said to be preserved) in the memory! As it is evident from the list before us that the greater part of the fresh and brackish waters of Scotland have yet been unsearched, we hope some of our younger naturalists may be tempted by Mr Robertson's instructions to commence the study of the Ostracoda. It seems a pity to be obliged to find fault; but the list has one typographical blemish to which we feel constrained to call attention. In the lists of species given for various localities, the specific name and that of the author thereof are separated by, in some cases, nearly one-third of the breadth of the page, so—

Cypris gibba, ... Ramdohr.

The object of this mode of arrangement we do not exactly understand, as the ordinary method of putting it—*Cypris gibba*, Ramdohr—would have looked much better.

Dr Munro, Kilmarnock, is to be congratulated on his account of the excavation of the Lochlee Crannog (Proceedings of the Society of Antiquaries of Scotland, vol. xiii.), and it is a pity that all such antiquarian discoveries do not have such careful historians. To us this Crannog, which is in an old lake basin, now dry, on the farm of Lochlee, near Tarbolton in Ayrshire—once occupied by the father of Robert Burns the poet—is chiefly interesting from the light it throws on the fauna and flora of the period in which it was constructed and inhabited. That this period was not very distant seems evident from some of the implements that have been found. In fact, it is possible that it is not much older than the time of the Roman occupation of Britain. Hence it is difficult to imagine that the Reindeer inhabited Ayrshire at so late a period, though Professor Rolleston is inclined to believe that two very fragmentary antlers found in the Crannog belong to that species.

To those who wish to know the effects of the severe winter of 1878-79 upon bird-life, Mr Harvie-Brown's **Ornithological Journal**, communicated to the 'Natural History of Glasgow,' may be of great use, as it not only contains the author's observations, but a series of notes collected from various sources.

We have received a copy of Part I. of Brooke's **Popular Botany** (London: J. A. Brooke & Co.), which may turn out to be of use in making popular the study of plants; but it is impossible to judge of this from a single number. It has coloured illustrations—rather coarse in colouring—and woodcuts. The medicinal and other uses of plants are especially treated of; and to people who *will* try to poison themselves or others by mistaking aconite for horse-radish, the work will be found useful.

A Monographic Revision and Synopsis of the Trichoptera of the European Fauna. By R. M'Lachlan. Large 8vo. Pp. 523, ciii., and iv. Plates lix. London: J. Van Voorst. 1874-80.—Nearly a quarter of a century ago Dr Hagen (then of Germany, now of America) attempted to direct attention to the much-neglected order of the Neuroptera (Dragon-flies, Caddis-flies, &c.) by publishing a series of papers in successive 'Entomologists' Annuals.' If he expected to convert the whole entomological population to the study of his favourites, we fear that Dr Hagen must have been disappointed. It is true that a few collectors here and there directed a kind of half-hearted attention to the Neuroptera; but the majority, intent on the acquisition of their favourite and much-pursued Lepidoptera, passed by with a scarcely concealed contempt for those who wasted their time on such "rubbish" as Dragon-flies and Caddis-worms. In this general indifference, the men who, with a will, put their shoulders to the wheel and devoted their energies to the work, stand out in striking contrast, and the foremost place amongst these is easily awarded to the author of the memoir in question, the accomplishment of which has only served to establish Mr M'Lachlan's reputation as one of the most philosophical entomologists (using the word in its highest meaning) of the day. To say that in the Synopsis 474 species are described, and that the 59 plates have about 2000 figures on them, will convey little idea of the labour faithfully expended on the work during the six years it has been in progress. To all who study or contemplate commencing the study of the Trichoptera, the work is, we need scarcely remark, essential; while other entomologists would do well to place on their shelves a volume which already occupies a place in the classics of entomology.

VARIOUS NOTES.

Of late years the south of Scotland, both east and west, has been fortunate in possessing a number of naturalists who include entomology amongst their studies. We are therefore not surprised, though much gratified, to be able to notice the formation in February last of a Society specially devoted to entomology, whose headquarters are at Galashiels, and whose title is, "The South of Scotland Entomological Society." Mr John Clapperton (Galashiels) is the secretary, and will no doubt be glad to give any information about the new Society, to which we wish all success.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

(*Continued from p.* 288.)

EDITED BY D. SHARP, M.B.

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

FRAXINI Fab. Common in the bark of felled ash-trees.
DISTRIBUTION—EAST. ♀ ♀ Tay ♀ ♀ o o o
WEST. Solway ♀ o o o

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

SCOLYTUS Th.

RATZEBURGI Jan. Very rare; in stumps of birch-trees.
DISTRIBUTION—EAST. o o Tay o o o o o
WEST. o o o o o

TRYPODENDRON
(Xyloterus Th.)

LINEATUM Er. In the bark of fir logs.
DISTRIBUTION—EAST. o o Tay Dee ♀ o o o
WEST. o o o o o

DOMESTICUM L. Rare.
DISTRIBUTION—EAST. Solway o o Dee Moray o o o
WEST. Solway o o o o

PITYOPHTHORUS Eich.

MICROGRAPHUS Gyll. Rare.
DISTRIBUTION—EAST. o o o Dee Moray o o o
WEST. o o o o o

CHALCOGRAPHUS L. Very local.
DISTRIBUTION—EAST. o o o o o o o o
WEST. o Clyde o o o

BIDENS Fab. Common in bark of fir logs.
DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray o o o
WEST. Solway Clyde o o o

QUADRIDENS Hord.
DISTRIBUTION—EAST. o o Tay Dee ♀♀ o o o
WEST. o o o o o

TOMICUS Eich.

ACUMINATUS Gyll.
DISTRIBUTION—EAST. o Forth Tay Dee ♀♀ o o o
WEST. o o o o o

LARICIS F.
DISTRIBUTION—EAST. o Forth o Dee o o o o
WEST. o o o o o

NIGRITUS Gyll. Very rare.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. o o o o o

ANTHRIBIDÆ.

PLATYRHINUS Th.

LATIROSTRIS Fab. Extremely rare. On fungi on trees.
DISTRIBUTION—EAST. o o Tay o o o o o
WEST. o o o o o

BRACHYTARSUS Th.

VARIUS Fab. Local. Amongst old hazel bushes.
DISTRIBUTION—EAST. ♀♀ o o o o o o o
WEST. Solway o o o o

BRUCHIDÆ.

BRUCHUS Th.

PECTINICORNIS L. Not indigenous. Imported in foreign beans, &c.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

PISI L. Not indigenous. Imported in peas.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway Clyde o o o

RUFIMANUS Boh. Not indigenous. Imported in beans.
DISTRIBUTION—EAST. o Forth Tay o o o o o
WEST. Solway o o o o

AFFINIS Frœh. Not indigenous. Imported in beans.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

CERAMBYCIDÆ.

AROMIA Serv.
(Callichroma Th.)

MOSCHATA L. Rare. Amongst sallows.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. Solway o o o o

CALLIDIUM Th.

VARIABILE L. Not indigenous. Introduced in timber.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

ASEMUM Th.

STRIATUM L. Local. In stumps of Scots fir.
DISTRIBUTION—EAST. ♀♀ Forth Tay Dee Moray o o o
WEST. Solway ♀♀ o o o

CLYTUS Fab.
(Platynotus Th.)

ARIETIS L. Very rare. Probably not indigenous, but introduced with timber.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o Clyde o o o

DORCADION Muls.

FULIGINATOR L. Not indigenous. Possibly introduced with ballast.

DISTRIBUTION—EAST. o o Tay o o o o o
WEST. o o o o o

"A single specimen found creeping over wet seaweed in St Andrews Bay. Dr Lowe." Murray Cat.

LAMIA Th.

TEXTOR L. Local and rare. Amongst sallows.

DISTRIBUTION—EAST. o o Tay o o o o o
WEST. o o Argyle o o

MONOCHAMUS Th.

DENTATOR Fab. Not indigenous. Introduced with timber from America.

DISTRIBUTION—EAST. o o o o o o o o
WEST. o Clyde o o o

"Taken alive in Glasgow. R. Hislop." Murray Cat.

ASTYNOMUS Dej.
(Acanthocinus Th.)

ÆDILIS L. Local. Amongst Scots fir logs.

DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

LIOPUS Th.

NEBULOSUS L. Scarce. Amongst oak trees.

DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway o o o o

POGONOCHERUS Th.

FASCICULATUS De Geer. Local. Amongst Scots fir.

DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

[HISPIDUS L. Very rare, if indigenous.

DISTRIBUTION—EAST. o Forth o o Moray o o o
WEST. o o o o o

DENTATUS Four. Very rare, if indigenous.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

"Moffat. Rev. W. Little." Murray Cat., under name *P. pilosus*, Fab.; the correctness of the determination is doubtful.

SAPERDA Th.

CARCHARIAS L. Very rare. On aspen.
DISTRIBUTION—EAST. o o o o Moray Sutherland o o
WEST. o o o o o

SCALARIS L. Very local. Probably on sallow or aspen.
DISTRIBUTION—EAST. o o Tay o o o o o
WEST. Solway o o o o

RHAGIUM Th.

INQUISITOR L. Common in some localities.
DISTRIBUTION—EAST. Tweed ♀♂ Tay Dee Moray o o o
WEST. Solway ♀♂ o o o

INDAGATOR L. Very local. Probably amongst birch.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. Solway? o o o o

BIFASCIATUM Fab. Common in fir wood.
DISTRIBUTION—EAST. Tweed Forth Tay Dee Moray o o o
WEST. Solway Clyde o o o

PACHYTA Th.

(Leptura *pars* Th.)

OCTOMACULATA Fab. Extremely rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

"Once taken in Peasedean, Berwickshire. Mr Hardy." Murray Cat.

SEXMACULATA L. Extremely rare.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. o o o o o

Found at Aviemore by Mrs King.

STRANGALIA Serv.

(Leptura *pars* Th.)

QUADRIFASCIATA L. Rare.
DISTRIBUTION—EAST. o o Tay ♀♂ Moray o o o
WEST. Solway Clyde o o o

ARMATA Hbst. Extremely rare.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

"Little Ross, Kirkcudbrightshire. Mr J. T. Syme." Murray Cat.

LEPTURA Th.

SANGUINOLENTA L. Extremely rare.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. o o o o o

Found at Aviemore by Mr G. C. Champion.

GRAMMOPTERA Serv.

TABACICOLOR De Geer. Very rare.
DISTRIBUTION—East Tweed Forth o o o o o o
WEST. o o o o o

"Peasedean, Berwickshire; Midcalder." Murray Cat.

RUFICORNIS Fab. Very rare.
DISTRIBUTION—East. Tweed Forth o o o o o o
WEST. o o o o o

"Colinton, near Edinburgh; Peasedean." Murray Cat.

CHRYSOMELIDÆ.

DONACIA Th.

CRASSIPES Fab. Local and rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. ♀ Clyde Argyle o o

BIDENS Ol. Local. On Potamogeton.
DISTRIBUTION—EAST. Tweed Forth ♀♀ Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

DENTIPES Fab. Scarce.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway Clyde o o o

SAGITTARIÆ Fab. Rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o Clyde o o o

No Scottish individual of this species has come under my notice.—D. S.

LEMNÆ Fab. Rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

This is another species of which no individual found in Scotland has been seen by me.—D. S.

OBSCURA Gyll. Rare.
DISTRIBUTION—EAST. o o Tay? o o o o
WEST. Solway o o o o

IMPRESSA Gyll. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. o Clyde o o o

"Ayrshire. Mr Hardy." Murray Cat. I have some doubts whether this is properly recorded as *D. impressa.*—D.S.

LINEARIS Hoppe. Common on reeds.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ ♀ o o

TYPHÆ Brahm. Very rare.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. ♀ Clyde o o o

SIMPLEX Fab. Rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Braid ponds; Lochleven." Murray Cat.

MENYANTHIDIS Fab. Rare.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. Solway o o o o

SERICEA L. Not common.
DISTRIBUTION—EAST. Tweed Forth ♀ Dee Moray o o o
WEST. Solway ♀ o o o

COMARI Suff. Common in bogs on the moors.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray o o o
WEST. Solway ♀ ♀ o o

HÆMONIA Th.

[ZOSTERÆ. Fab. Doubtful as Scottish.
DISTRIBUTION—EAST. o o Tay o o o o o
WEST. o o o o o

"Loch of Forfar. Dr Gilbert M'Nab." Murray Cat. This species is not included in the British Catalogue, and it is doubtful whether it was really the *H. zosteræ* or one of the other British species that was found.—D. S.

ZEUGOPHORA Th.

TURNERI Power. Very local. On aspen.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

LEMA Th.

PUNCTICOLLIS Curt. Rare. In ants' nests.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

CYANELLA Fab. Common.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ ♀♀ o o

MELANOPA L. Common in the south.
DISTRIBUTION—EAST. Tweed Forth ♀♀ o o o o
WEST. Solway ♀♀ o o o

CLYTHRA Th.

QUADRIPUNCTATA L. Rare.
DISTRIBUTION—EAST. o o Tay Dee Moray o o o
WEST. o o o o o

CRYPTOCEPHALUS Th.

SEXPUNCTATUS L. Very rare. On hazel.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

This has been found in two or three places in Dumfriesshire.—D. S.

(*To be continued.*)

END OF VOL. V.

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Magazine of Natural History.

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CONTENTS.

	Page
Editorial Note,	*Second page of wrapper*
Zoology—	
Glen Tilt; its Fauna and Flora,—EDITOR,	181
The Lepidoptera of Moncreiffe Hill,—Sir T. MONCREIFFE, Bart.,	191
Anecdote of the Manx Puffin of the Dardanelles,—J. H. GURNEY, jun., F.Z.S.,	198
Gynandromorphism in the Honey-bee,—W. FLETT,	199
A Deceived Bee,—HORACE SKEETE,	199
Acronycta Myricæ not a distinct species,—EDITOR,	199
Colias Edusa,—J. M'ANDREW,	199
Sphinx Convolvuli in Fife,—J. T. BOSWELL, LL.D., F.L.S.,	199
Phytology—	
On certain Lichens belonging to the genus Parmelia,—J. STIRTON, M.D., F.L.S.,	200
Scottish Galls (*Continued*),—Professor J. W. H. TRAIL,	203
Note on Mnium punctatum, var. elatum,—Rev. J. FERGUSSON,	207
Cryptogamic Society of Scotland,	215
Geology—	
The Gold-Field and Gold-Diggings of Crawford-Lindsay (Lanarkshire), —Dr LAUDER LINDSAY, F.R.S.E., F.L.S.,	208
Reviews,	214
Insecta Scotica—	
The Lepidoptera of Scotland,—EDITOR,	216
The Coleoptera of Scotland,—D. SHARP, M.B.,	223

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EDITORIAL NOTE.

SEVEN years have passed since the day when, with an audacity that astonished no one more than themselves, the members of the Perthshire Society of Natural Science determined to publish the transactions of their Society in the form of a quarterly magazine—'THE SCOTTISH NATURALIST.' Thanks to the favour with which many kind friends in all parts of the country welcomed the new-comer, it soon ceased to be merely the representative of one society only, and it was found expedient to drop the second part of the title—'Journal of the Perthshire Society of Natural Science.'

The management of the Magazine still remained in the hands of the Society, which carried it with more or less success, notwithstanding the difficulties which must attend publication by those not in "the trade."

Latterly, however, the council of the Society has come to the conclusion that, in the hands of a skilled publisher, the Magazine might be capable of further development; and it is therefore with much satisfaction that we are able to announce that arrangements have been made with Messrs Blackwood & Sons, whereby they will in future publish the 'Scottish Naturalist.'

May we hope that under the new arrangement not only will all old friends continue their kind support, but that they will be joined by many new ones both at home and abroad.

That the contributions to our columns are duly appreciated seems evident, from the fact that there is a constant demand for the back numbers, not only in Scotland, but from England and the continent of Europe. Under these circumstances we have determined to relax to a certain degree the stringency of the rule whereby localised articles in the Magazine were confined to Scottish Natural History; and, while still continuing to give the latter the pre-eminence, to admit, when space permits, notices of the Fauna and Flora of other countries.

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THE SCOTTISH NATURALIST

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Magazine of Natural History.

EDITED BY F. BUCHANAN WHITE, M.D., F.L.S.

CONTENTS.

	Page
Zoology—	
On Migration,—Colonel DRUMMOND HAY, C.M.Z.S.,	229
The Lepidoptera of Moncreiffe Hill,—Sir T. MONCREIFFE, Bart.,	241
Glen Tilt: its Fauna and Flora,—EDITOR,	244
Additional Localities of Scottish Coleoptera,—A. BUCHAN HEPBURN,	248
Short-sighted Policy,—J. H. GURNEY, Jun., F.Z.S.,	249
Guillemots colliding,—J. A. HARVIE BROWN, F.Z.S.,	249
Various Notes,	249
Phytology—	
Mycological Notes—Ptychogaster albus,—Rev. J. STEVENSON,	250
On certain Lichens belonging to the genus Parmelia,—J. STIRTON, M.D., F.L.S.,	252
Rosa micrantha in Scotland,—A. BROTHERSTON,	254
Xylaria polymorpha,—*Ibid.*,	254
New Scottish Fungi,—EDITOR,	255
Geology—	
The Gold-Field and Gold-Diggings of Crawford-Lindsay (Lanarkshire),—Dr LAUDER LINDSAY, F.R.S.E., F.L.S.,	256
Native Gold in Perthshire,—*Ibid.*,	268
Insecta Scotica—	
The Lepidoptera of Scotland,—EDITOR,	269
The Coleoptera of Scotland,—D. SHARP, M.B.,	273

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THE SCOTTISH NATURALIST

A QUARTERLY

Magazine of Natural History.

EDITED BY F. BUCHANAN WHITE, M.D., F.L.S.

CONTENTS.

	Page
Zoology—	
The Birds of the South-East of Scotland,—D'ARCY W. THOMPSON,	277
On Migration,—Colonel DRUMMOND HAY, C.M.Z.S.,	283
Dead Wood-Pigeons,—J. H. GURNEY, jun., F.Z.S.,	292
Acherontia atropos,—A. BROTHERSTON,	292
Alternation of Generations in the Cynipidæ,	292
The Lepidoptera of Moncreiffe Hill,—Sir T. MONCREIFFE, Bart.,	293
Eupithecia togata and Stigmonota perlepidana,—*Id.*,	297
Phytology—	
On certain Lichens belonging to the genus Parmelia,—J. STIRTON, M.D., F.L.S.,	298
A new Scottish Lichen,—*Id.*,	300
Glen Tilt: its Fauna and Flora,—EDITOR,	300
Mycological Notes—Hypocrea riccioidea, B.,—Rev. J. STEVENSON,	304
Cryptogamic Society of Scotland,	304
Geology—	
The Gold-Field and Gold-Diggings of Crawford-Lindsay (Lanarkshire),—Dr LAUDER LINDSAY, F.R.S.E., F.L.S.,	305
New Books,	318
Rook-literature—Professor NEWTON, F.R.S.,	318
Insecta Scotica—	
The Lepidoptera of Scotland,—EDITOR,	319
The Coleoptera of Scotland,—D. SHARP, M.B.,	322

WILLIAM BLACKWOOD & SONS, EDINBURGH,
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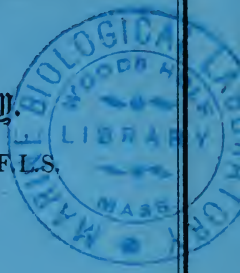

CONTENTS.

Page

Zoology—

The Birds of the South-East of Scotland,—D'ARCY W. THOMPSON, . 325
" " " —A. BROTHERSTON, . . 332
Notice of the Wryneck in Perthshire,—Colonel DRUMMOND HAY, C.M.Z.S., ... 333
The Lepidoptera of Moncreiffe Hill,—Sir T. MONCREIFFE, Bart., . 334
Vanessa antiopa in Fife,—Dr J. A. POWER, ... 340
" " on Ben Lawers,—A. CRAIG CHRISTIE, . . . 341
Capture of Pachnobia hyperborea,—F. BUCHANAN WHITE, . . 341
" Coccyx distinctana,—Sir T. MONCREIFFE, Bart., . . 341
Curious habit of Chrysocoris festaliella,—*Id.*, ... 341

Phytology—

The Fungi of Morayshire,—Rev. J. KEITH, A.M., ... 342
Cryptogamic Society of Scotland, ... 348

Geology—

The Gold-Field and Gold-Diggings of Crawford-Lindsay (Lanarkshire), —Dr W. LAUDER LINDSAY, F.R.S.E., F.L.S., ... 349

Reviews—

'European Butterflies and Moths,' by W. F. KIRBY, ... 361
'The Fauna of Scotland, with special reference to Clydesdale,' . . 361

Insecta Scotica—

The Coleoptera of Scotland,—D. SHARP, M.B., ... 362

TITLE-PAGE AND INDEX TO VOLUME IV.

WILLIAM BLACKWOOD & SONS, EDINBURGH,
AND 37 PATERNOSTER ROW, LONDON.

JOHN SMITH & SON, GLASGOW; LEWIS SMITH, ABERDEEN; JOHN CHRISTIE, PERTH;
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No. XXXIII. JANUARY 1879.

THE SCOTTISH NATURALIST

A QUARTERLY

Magazine of Natural History.

EDITED BY F. BUCHANAN WHITE, M.D., F.L.S.

CONTENTS.

Page

Geology—

Discovery of an Ancient Canoe in the Old Alluvium of the Tay at Perth,—J. GEIKIE, LL.D., F.R.S., F.G.S., ... 1

Phytology—

Supplementary list of Fungi found within the Province of Moray (*continued*),—Rev. J. KEITH, A.M., ... 8

Descriptions of New Scottish Lichens,—J. STIRTON, M.D., F.L.S., . 16

Cryptogamic Society of Scotland, ... 17

Report on the Scientific Portion of the Cryptogamic Society's late Exhibition,—Rev. J. STEVENSON, ... 20

Zoology—

The Lepidoptera of Moncreiffe Hill (*continued*),—Sir T. MONCREIFFE, Bart., ... 24

The Natural History of Gall Insects (*extract*), ... 27

Occurrence of Deiopeia pulchella in Scotland,—Sir T. MONCREIFFE, Bart., ... 36

Capture of Larvæ of Acherontia atropos,—T. MARSHALL, . . . 36

Esquimaux Curlew,—GEORGE SIM, ... 36

Stock-Dove Breeding in Scotland,—A. B. BROOKE, ... 36

Reviews—

Transactions of the Natural History Society of Aberdeen, 1878, . . 37

Proceedings of the Natural History Society of Glasgow, Vol. III., Part III., 38

Insecta Scotica—

The Lepidoptera of Scotland,—EDITOR, ... 39

The Coleoptera of Scotland,—D. SHARP, M.B., ... 44

WILLIAM BLACKWOOD & SONS, EDINBURGH,
AND 37 PATERNOSTER ROW, LONDON.

JOHN SMITH & SON, GLASGOW; LEWIS SMITH, ABERDEEN; JOHN CHRISTIE, PERTH; W. KIDD, DUNDEE; G. WALKER, MONTROSE; J. COOK & SON, ST ANDREWS; J. & J. H. RUTHERFURD, KELSO; R. S. SHEARER, STIRLING; W. M. DICK, AYR; JOHN ANDERSON & SON, DUMFRIES.

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No. XXXIV. APRIL 1879.

THE SCOTTISH NATURALIST

A QUARTERLY

Magazine of Natural History.

EDITED BY F. BUCHANAN WHITE, M.D., F.L.S.

CONTENTS.

Page

Zoology—

Birds'-Nesting,—ALLEN HARKER, ... 49
Notes on the Birds of the Basin of the Tay and its Tributaries,—COLONEL DRUMMOND HAY, C.M.Z.S., ... 56
The Aculeate Hymenoptera of the District surrounding Dumfries,—ROBERT SERVICE, ... 63
The Lepidoptera of Moncreiffe Hill (*concluded*),—Sir T. MONCREIFFE, Bart., ... 69
Occurrence of White's Thrush in Scotland,—A. BROTHERSTON, . . 78
Things to be observed in 1879, ... 80
Notes on the Effects of the Past Winter in the South-East of Scotland,—A. BROTHERSTON, ... 81
The Effect of the late Storm on our Wild Animals in the North-East of Scotland,—GEORGE SIM, ... 84

Phytology—

Glen Tilt: Its Fauna and Flora (*concluded*),—EDITOR, ... 85
Supplementary list of Fungi found within the Province of Moray (*concluded*),—Rev. J. KEITH, A.M., ... 93
Snowdrops and the Frost,—Sir T. MONCREIFFE, Bart., ... 94
NEW BOOKS, ... 94

WILLIAM BLACKWOOD & SONS, EDINBURGH,
AND 37 PATERNOSTER ROW, LONDON.

JOHN SMITH & SON, GLASGOW; LEWIS SMITH, ABERDEEN; JOHN CHRISTIE, PERTH; W. KIDD, DUNDEE; G. WALKER, MONTROSE; J. COOK & SON, ST ANDREWS; J. & J. H. RUTHERFURD, KELSO; R. S. SHEARER, STIRLING; W. M. DICK, AYR; JOHN ANDERSON & SON, DUMFRIES.

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THE SCOTTISH NATURALIST

A QUARTERLY

Magazine of Natural History.

EDITED BY F. BUCHANAN WHITE, M.D., F.L.S.

CONTENTS.

Page

Zoology—

The Mountain Lepidoptera of Britain: Their Distribution and its Causes,—EDITOR, ... 97

Notes on the Birds of the Basin of the Tay and its Tributaries (*continued*), —COLONEL DRUMMOND HAY, C.M.Z.S., ... 105

Lepidoptera in the Spring of 1879.—Sir T. MONCREIFFE, Bart., . . 115

Jottings from my Note-Book: Lepidoptera,—R. RENTON, . . . 116

Notes on 'The Lepidoptera of Moncreiffe Hill,'—C. G. BARRETT, . 117

Id.,—Sir T. MONCREIFFE, Bart., ... 118

Food-plant of Gelechia acuminatella,—EDITOR, ... 118

Phytology—

The Gaelic Names of Plants,—J. CAMERON, ... 119

Recent Advances in British Bryology,—Rev. J. FERGUSSON, . . 125

Notes on the Botany of Loch Lindores, Fifeshire,—EDITOR, . . 131

Trametes pini in Morayshire,—Rev. J. KEITH, A.M., ... 132

Notes of the Spring of 1879,—EDITOR, ... 132

VARIOUS NOTES, ... 135

Insecta Scotica—

The Coleoptera of Scotland (*continued*),—D. SHARP, M.B., . . 137

WILLIAM BLACKWOOD & SONS, EDINBURGH,
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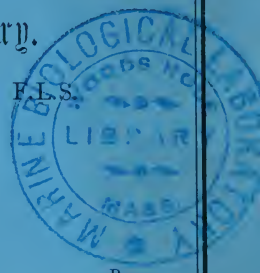

CONTENTS.

Page

IN MEMORIAM—SIR THOMAS MONCREIFFF, Bart. (*with portrait*), . 145

Zoology—

The Mountain Lepidoptera of Britain: Their Distribution and its Causes (*continued*),—EDITOR, ... 149

Notes on Lepidoptera,—R. RENTON, ... 160

Phytology—

Effects of the Past Winter and Present Summer on Hard-Wooded Plants,—COLONEL DRUMMOND HAY, C.M.Z.S., . . . 162

The Gaelic Names of Plants (*continued*),—J. CAMERON, . . . 167

Preliminary List of the Fungi of Perthshire,—EDITOR, . . . 173

Geology—

The Auriferous Quartz of Wanlockhead,—W. LAUDER LINDSAY, M.D., F.R.S.E., F.L.S., ... 183

Insecta Scotica—

The Coleoptera of Scotland (*continued*),—D. SHARP, M.B., . . 188

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CONTENTS.

	Page
Geology—	
Changes of Climate in Post-Glacial Times,—J. GEIKIE, LL.D., F.R.S.,	193
Zoology—	
Iceland Falcon in Mid-Lothian,—DAVID DOUGLAS,	203
Collembola and Thysanura in Scotland in 1876,—L. & O. M. REUTER,	204
Phytology—	
The Club-root Fungus,—A. STEPHEN WILSON,	209
Scottish Galls,—Professor J. W. H. TRAIL, M.A., M.D., F.L.S.,	213
New and Rare Scottish Lichens,—Dr J. STIRTON, F.L.S.,	217
Effects of the Past Winter and Present Summer on Hard-Wooded Plants (*concluded*),—COLONEL DRUMMOND HAY, C.M.Z.S.,	221
The Gaelic Names of Plants (*continued*),—J. CAMERON,	228
Unusual Blooming of the Hawthorn,—W. BISSETT,	234
New and Rare British Fungi,—EDITOR,	234
New and Rare Fungi found at the Forres Meeting of the Cryptogamic Society of Scotland,—Rev. J. STEVENSON,	234
New Books,	235
Various Notes,	236
Insecta Scotica—	
The Coleoptera of Scotland (*continued*),—D. SHARP, M.B.,	237

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CONTENTS.

Page

Zoology—

Notes on the Birds of the Basin of the Tay and its Tributaries (*continued*),—COLONEL DRUMMOND HAY, C.M.Z.S., . . . 241

Notes on Birds that have occurred near Stanley, in Perthshire,—THOMAS MARSHALL, ... 255

Water-Spider near Aberdeen,—Professor J. W. H. TRAIL, M.A., M.D., F.L.S., ... 261

Phytology—

The Gaelic Names of Plants (*continued*),—JOHN CAMERON, . . . 262

Preliminary List of the Fungi of Perthshire (*continued*),—EDITOR, . 270

Geology—

On the Value of the Names of Places in indicating the Ancient Surface-features of the Country,—Rev. A. MILROY, D.D., . . . 279

Insecta Scotica—

The Coleoptera of Scotland (*continued*),—D. SHARP, M.B., . . 285

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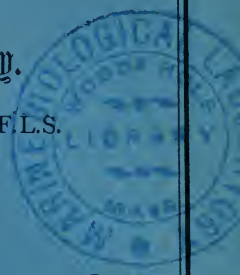

CONTENTS.

Page

Zoology—

The Capercaillie in Scotland,—J. A. HARVIE BROWN, F.Z.S., . . 289
Notes on the Birds of the Basin of the Tay and its Tributaries (*continued*),—COLONEL DRUMMOND HAY, C.M.Z.S., . . . 295
The Migration of Birds, ... 309
Description of a new Phlœothrips,—Dr O. M. REUTER, . . . 310
Water-Spider in Scotland,—J. M. CAMPBELL, ... 311
Coleoptera of Scotland—Correction,—J. T. BOSWELL, LL.D., F.L.S., 311

Phytology—

The Gaelic Names of Plants (*continued*),—JOHN CAMERON, . . . 312
Preliminary List of the Fungi of Perthshire (*continued*),—EDITOR, . 320

Geology—

On the Value of the Names of Places in indicating the Ancient Surface-features of the Country (*concluded*),—Rev. Dr MILROY, . . 326

Various Notes, ... 331

Insecta Scotica—

The Coleoptera of Scotland (*continued*),—D. SHARP, M.B., . . 332

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CONTENTS.

Page

Zoology—

Notes on the Birds of the Basin of the Tay and its Tributaries (*continued*),—COLONEL DRUMMOND HAY, C.M.Z.S., . . . 337
Chærocampa nerii at Crieff,—G. H. RAYNOR, ... 346
Boldness of the Common Tern,—W. TRAILL, ... 346

Phytology—

A Botanical Report on the Loch of Rescobie,—A. STURROCK, . . 347
The Gaelic Names of Plants (*continued*),—JOHN CAMERON, . . . 351
Preliminary List of the Fungi of Perthshire (*continued*),—EDITOR, . 361

Notices of New Books, ... 367

Various Notes, ... 370

Insecta Scotica—

The Coleoptera of Scotland (*continued*),—D. SHARP, M.B., . . 371

TITLE-PAGE AND INDEX TO VOLUME V.

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