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

It is our sad duty to record the death, on 3rd December 1894, at Perth, of one who has for the greater part of his life been a very potent force in the great advance that has been made in our knowledge of the fauna and flora of Scotland. His wide and accurate acquaintance with animals and plants alike, of many groups the knowledge of which is in these days usually distributed among numerous specialists, and his readiness to place that knowledge at the service of all who sought his aid, early made him recognised as a leader in his favourite studies. But the respect felt for his abilities soon ripened into a warmer regard on the part of his correspondents, who felt the healthy stimulus of contact with him.

Dr. Buchanan White spent several summers in different parts of Scotland in the practical study of natural history; but his memory will be linked especially with his native city, Perth. It was chiefly due to him that the Perthshire Society of Natural Science was founded in 1867, and that its museum is a model of what such a museum should be. He was the founder of the "Scottish Naturalist," of which the "Annals" is the descendant. We hope in our April number to give a more adequate sketch of his great services to natural history in Scotland, with an enumeration of his varied writings.

# THE STARLING IN SCOTLAND, ITS INCREASE AND DISTRIBUTION.

By J. A. Harvie-Brown, F.R.S.E.

Plate I.

Our British Ornithologists have long been aware that the subject of our present remarks has had a history, and that its increase and extension of range present some interesting and phenomenal facts. An examination of already published accounts in great measure renders this evident, as we hope to show in somewhat more detailed manner than has hitherto been done. We desire to place on record a consecutive account of its steps of advance, before it becomes too late to gather up and arrange the more important minutiæ which are at our disposal in the year of grace 1894. Were this not done, points might be missed ; and besides, future workers find their time taken up by traversing imperfectly worked ground in the past. We hope then to afford a new starting-point by this paper. Nevertheless, of the incompleteness of our attempt, perhaps no one can be more fully aware than ourselves.

*Introduction of the Species.*—If any important introductions of this bird have ever taken place anywhere in Scotland, we have been unable to trace them ; but we throw out the hint for other inquirers, as we do know that the Starling, just according to its rarity, was more kept as a pet-bird some forty years ago than it is now.

*Alternating Waves of Advance and Retreat.*—Some curious statistics appear in evidence of what we may be allowed to term alternating waves of advance and retreat. If, as appears from our earlier records, the Starling was at one time more abundant in the barren portions of our northern districts, such as Shetland, Orkney, north of Caithness, and the Outer Hebrides, than it was in the east and south-east and middle districts of Scotland, or the well-wooded areas of the south, there seems to be some reason for carefully considering—Whence originally came the Starlings which peopled our northern portions of Scotland ; and what bearing this distribution


SHETLAND ISLES
Yell
Unst
Mainland
ATLANTIC OCEAN
Shetland Isles 60 Miles N.E. of Orkney
Fair I.
ORKNEY ISLES
Westra
Sanda I.
Stronsa
Pomona
Hoy
Pentland Firth
SUTHERLAND
CAITHNESS
NORTH SEA
Lewis
The Minch
Harris
Little Minch
Nth Uist
Benbecula
South Uist
Barra
Skye
Canna
Rum
Eig
Muck
Coll
Tiree
Mull
Staffa
Iona
Firth of Lorn
Colonsay
Oronsay
Jura
Islay
Gigha
Arran
Butt of Clyde
North Channel
ROSS & CROMARTY
NAIRN
MORAY
ELGIN
BANFF
ABERDEEN
DEE
INVERNESS
Dornoch Firth
Moray Firth
KINCARDINE
ARGYLL
FORFAR
TAY
PERTH
NORTH SEA
Firth of Tay
FIFE
KINROSS
CLACKMAN
STIRLING
Firth of Forth
DUMBARTON
HADDINGTON
LINLITHG.
EDINBURGH
BERWICK
RENFREW
LANARK
PEEBLES
TWEED
SELKIRK
ROXBURGH
AYR
DUMFRIES
SOLWAY
KIRKCUDBRIGHT
WIGTOWN
Solway Firth
ENGLAND
IRISH SEA
MAP OF
SCOTLAND
TO ILLUSTRATE
Mr HARVIE BROWN'S PAPER
ON THE
STARLING
J. Bartholomew & Co. Edinr.
Faunal Areas thus
County Boundaries thus
From Time Immemorial
Scale of English Miles
0 10 20 30 40 50 100

may have had upon the allied subject of migration? Again, our later statistics show to us that a separate impulse appears to have been given to a wave of dispersal from the south, which advanced north along our south-west coasts and counties, and then apparently to some extent retreated again. In connection with these data we may ask the questions: Do our birds —which were formerly migrants only, but have since become resident and breeding species within our area—extend their breeding areas, resulting from their autumn movements; or do they do so, resulting from their spring movements only; or do they do so, resulting from combined observations and experiences gathered upon both spring and autumn journeys? (See under Dee and Caithness notes, *infra*, pp. 18 and 21.)

We believe, after some study of migrational phenomena, that there is a possibility that, as increase of breeding area of a species extends along the longitudes between north and south on the continents of Europe and Asia, so will there likely be an increase of latitudinal dispersal along the routes of migrants from east to west coming to the shores of Great Britain from the Continent; and resultant upon this, at least in some degree, there may be a corresponding increase of nesting localities north and south in our islands. Of this we may perhaps instance the well-known increase of the woodcock as a nesting species within the last thirty years, extending even, as it now does, to the barren hills and hollows of the Outer Hebrides. Thus, likely localities, viewed first in autumn flight, and then again in spring flight, may be revisited and finally occupied, however long a period may have passed before such became and continued as established residences.

Of a gradual pressure from congested centres within our own islands we have already given instances in other places, showing how lines of least resistance are followed, which are equivalent, or nearly so, to occupation of the most likely localities, first by a species pressing forward, though it has never previously migrated over the country (see under "Capercaillie in Scotland"). If congested centres occur—as they must do—of certain species in Britain, congested districts likewise, and under the same natural laws, must also occur on the Continent, or on large continental areas;

and if congestion results in extension north and south or east and west (as in the case of Pallas' Sand Grouse), or if climatal phenomena be the principal factors apart from congestion, then a corresponding wave of dispersal must take place, expanding and increasing according to the force of the outburst, density of the congestion, or violence of meteorological change, and reaching farther with each successive outburst.

How far the above remarks may be held as applicable to the species presently being treated of, may become apparent when we unite the links of our chain ; but we must leave to the study of many similar migrational and distributional phenomena, any final results indicating a general law.

The present distribution of the Starling on the Continent and generally, we shortly epitomise from Dresser's "Birds of Europe," vol. iv. p. 405.

In Scandinavia it is common, and abundant on the coast regions of Nordland: less abundant in Lofoten, and is very rare north of these islands. At Tromsöe it is "repeatedly observed" in spring and autumn (thus a migrant). Stray individuals are met with in East Finmark, and found *wintering* as far north as Væröe in Lofoten. In Sweden it does not range so far north as in Norway, "not being found above Northern Ångermanland and Umeå in 64° N. It occurs commonly in South and West Finland, but not in the north and north-east portions. It is rare in the Archangel Government in North Russia, but general in Central Russia and common in the South and the Ural, south of 67° N., and eastwards through Eastern Siberia and India. The allied forms *S. purpurascens*, Gould, *S. nitens*, Hume, being comparatively local geographical races (*cf.* Dresser, *op. cit.*) But perhaps nowhere is the Starling so abundant as in the plains of Holland.

The above Continental dispersal, even at the date of Dresser's great work, surely indicates the extension along the parallels or slightly across them from east to west or south of east to north of west,—which has been shown is the present direction of general migration of many species,—from

a colder area to a warmer, a wintering within the influence of the Gulf Stream both on the coast of Norway and in our isles. These isothermal lines cannot be despised.

Herr Müller in Faroe in his "Fugle Fauna" says: "This bird is a resident and not migratory, and is to be seen throughout the islands both summer and winter."

It does not seem necessary for us to endeavour to trace back the earlier history of the Starling beyond the end of last century as regards Scotland. Suffice it to say that, from all available evidence, it seems to have inhabited the Orkney and Shetland Isles "from time immemorial," as related by Mr. Robert Gray in his "Birds of the West of Scotland."

The note, however, in Pennant's "Caledonian Zoology," in Lightfoot's "Flora Scotica" (vol. i. p. 24 *of my interleaved copy*), that the *Stare* breeds "in great numbers in the cliffs of *Arran*, and other isles," can, however, be only taken as a misprint, or otherwise as a *lapsus calami*, for what is correctly stated in the earlier work of the same author—in the 2nd edition of his "British Zoology," 8vo, 4 vols. (1768-1770), vol. i. p. 231.

Then Fleming (1828) and Selby (1833) quote Pennant; Jenyns (1835) has nothing of value regarding its presence at Scottish localities; and Montagu (1833) is dumb.

Rutty ("Nat. Hist. of Dublin," 1772) does not mention the Starling, but his whole list of birds is very short and imperfect. But in 1849 Thompson speaks of it as "common and breeding in many parts of the island" (*i.e.* Ireland), and gives evidence of a regular and extensive migration, extending over several weeks, and as seen to "pour into Ireland from the north and wing their way southwards. This migration commences towards the middle of September, according to the season, and continues daily for about six or eight weeks. . . . They are generally seen only for one or two hours—from 8 to 10 A.M." Besides these remarks, there are others upon the migration of the Starling well worthy of perusal; perhaps not the least interesting being that these migratory flocks may almost be said to have been traced as starting from Port-Patrick in the South-West of Scotland, "leaving before sunrise to steer for the southward."

In 1845, Yarrell only quotes former authorities for

Scotland ; but Professor Newton, in his rewritten "Yarrell," in 1872, recognises the increase, and indeed epitomises all that our previous writers have said about it. He, however, finds that its breeding-places in Ireland are few and far between, and that from most places it disappears in spring, and that it is only abundant in winter.

But we must not forget MacGillivray's account in 1837. He treats of the species principally as a Hebridean one, describing its haunts in the sea-caves, and also quoting "Low and others" for its abundance in the Orkney and Shetland Isles. He adds : "These birds occur in many other parts of Scotland, but are generally rare in the middle and southern divisions." He also speaks of the Starlings of Skye "leaving their breeding haunts and roosting in different localities during the winter, whilst those of the Outer Hebrides and the North-Eastern Islands—equally treeless—*remain all the year round*."

But perhaps one of the most interesting remarks is one given in Lockhart's "Life of Sir Walter Scott." Sir Walter says : "When I was four or five years old I was staying at Lessudden Place,—an old mansion, the abode of [Scott of] Raeburn. A large pigeon-house was almost destroyed by Starlings, then a common bird, *though now seldom seen*"—the italics are ours—(*op. cit.* p. 704 ; Edinburgh, 1845). Here appears a very clear indication of the advancing and retreating wave of dispersal.

According to our usual practice, we desire to add the testimony of the "Old Statistical Account," which takes us back again to the end of last century. The records are as follows :—It is mentioned as a migratory species at Ballantrae, South-West Ayrshire, vol. i. (1791), p. 114. It is included in the following lists as occurring, viz. at Kirkhill, Inverness, vol. iv. (1792), p. 114 ; Shetland, vol. v. (1793), p. 189 ; Orkney, vol. vii. p. 547 ; Caithness, vol. vii. p. 574 ; Cara and Gigha ("Argyle") vol. viii. (1793), p. 51 ; "Dee," vol. ix. (1793), p. 108 ; "Tay," vol. ix. (1793), p. 235 ; Shetland again, vol. x. (1764), p. 201 ; "Argyle" (Cantyre), vol. xiv. (1795), p. 202 ; Roxburgh, vol. xvi. (1795), p. 76. The records for "Argyle," "Dee," and "Tay" are only isolated and rare, yet some are given upon the line of migration, such

as at Gigha, Cantyre, and Ballantrae (in Ayrshire) upon the same migratory course.

In the "Agricultural Survey of Scotland," by various authors, dating 1793 to 1815, it is interesting to observe that there are only two notices of the Starling, neither of which are of much value. One relates to the island of Arran, which merely includes it amongst other smaller species as "seem to be migrating"—Arran, 1807. The other relates to Forfarshire, in Don's appendix to the volume on that county, where he says: "*Sturnus vulgaris*, the Starling: frequent on the mountains,"—which we can hardly accept, notwithstanding Mr. Don's well-known abilities as an observer.

Coming now to the records of the "New Statistical Account," dating about forty to forty-five years later, or say about the middle of the present century, we find in some respects a valuable comparison. Not a single record appears yet from any south-east locality in Scotland, *i.e.* from the whole county of Berwick or the east part of East Lothian. But when we come north to Midlothian and the western portion of East Lothian we find it recorded as a rarity by Mr. Weir in the latter county (*op. cit.* vol. ii. p. 156, 1842), and by the Rev. Thomas Wright as nesting to the extent of two pairs in the old trees and ruins of Borthwick Church (vol. i. p. 159, 1843); and it is spoken of as a rare species in the district of Galashiels (vol. iii. p. 15, 1842). In Roxburgh it is spoken of as "having for many years disappeared," but "has again returned, and become common" (vol. iii. p. 4, 1842); and also as occurring in Eckford parish.

But when we come over the ridge into the Solway basin, we find it more frequently recorded. Definite records occur in Wigtownshire, thus:—"Coming in much larger flocks than formerly, along with Fieldfares." In Portpatrick parish: "The Starling appears in considerable numbers once a year, and sometimes twice, and has been known to breed (vol. iii. p. 137, 1842). Then in Ayrshire the notices are more frequent, and are given in the parishes of Ayr, Ardrossan, and Dunlop:—"The Starlings, which a few years ago were almost unknown, are now very common." Old Cumnock: "Has begun to visit us, and also in Stevenston, Kilbirnie, and Kilwinning." In Lanarkshire it is still spoken of as rare in

most instances, and is included in lists from Biggar and Douglas. In Renfrew: "The Starling regularly breeds," and remains all the year, and is considered a "regular visitor" in Paisley. In Neilston: "The Starling, though *rare for many years*, has again appeared in considerable numbers" (vol. viii. p. 320, 1843). In Dumbartonshire only one record occurs, in the parish of New Kilpatrick; and for Stirlingshire there is not a single record. In Clackmannan curiously, however, we find that it "has become plentiful in the parish of the same name as the county, being known to breed in the steeple of the old church."

Still rarer become the records in the north, in Perth and up the Tay valley. Only two localities are named in all the county: one in the parish of Bendochy, where flocks appear in autumn and winter, and a pair bred for two years prior to 1845 in elm trees at Cupar Grange; and another record is from St. Madoes parish. Bendochy parish is in the extreme east of Perthshire, and marches with Forfar, and is a low-lying district of Strathmore.

In Fifeshire, at Dunbog, we have the record: "It may be worthy of notice that a pair of Starlings built their nest and brought out their young last summer (1844?) in the shrubbery at Dunbog House," and it is included among "rare birds found occasionally" in Dunfermline parish. These are the only records from Fife.

It may appear at first blush that these printed records of the "Old Statistical" and "New Statistical Accounts" point to an advance northward and north-eastward from "Solway," rather than an advance northward and north-westward from "Tweed"; but we shall demonstrate further on, we believe, that "Tweed" has really had almost as important a *rôle* as "Solway" in the advance, though both, even after uniting their forces between "Forth" and "Clyde," seemed to have had greater difficulties to surmount on reaching Stirlingshire, where the waves appear to have received some considerable check to their northward progress, and that for some years, as will be seen from our records about to be given.

It is now our intention to continue the more minute records of its advance, which we have been able to collect by means of a special circular, and by correspondence all over

Scotland. We begin with "Tweed" and "Solway," and so continue to work north through "Forth" and "Clyde."

## Tweed.

The "Old Statistical Account" is silent (1791).

The "New Statistical Account" is also silent (1844).

Mr. James Hardy's data go back, he tells us, to 1830, when he was fifteen years of age. At that time, small parties of Starlings accompanied the Rooks to the cultivated fields in the neighbourhood of Dunglass. The Rooks came from Dunglass Rookery, which is partly in Berwickshire and partly in East Lothian, "where probably," says Mr. Hardy, "Starlings had by this time settled." A few years after, Starlings were found nesting near Cockburnspath, and young birds were kept in cages as pets. About this time many occurrences are noted in the "Berwickshire Naturalists' Club Proceedings"; and in Selby's "Report on the Ornithology of Berwickshire, and districts within the limits of the Berwickshire Naturalists' Club," it is included as a "permanent resident" at the date of 1841.

Mr. Hardy tells us, when writing to us in 1891, that no great increase became apparent "until of recent years, either here or in the east parts of Lothian, where now the numbers are something wonderful." Mr. Hardy adds a note which may have some significance, especially from such a practised and accurate observer: "Of late years the Starlings have disassociated themselves from the Rooks, and prefer the company of Lapwings."

Mr. George Muirhead, author of "The Birds of Berwickshire," writes us: "There has been a great increase. In the beginning of this century it was so rare in the county, that the late John Wilson of Edington Mains told me that he was sixteen years old before he saw one, and that in his boyhood the nest was considered to be a great prize, and the finding of it was spoken of a year afterwards." Mr. Wilson was born at Edington Mains, Berwickshire, in 1810; and lived there all his life, until he removed to Duns. He died about a year ago (*i.e.* say 1890). These records therefore go back to about 1826.

Now, by 1889, not only had the Starling occupied the richer "fallow" and "lea-lands," "carses," and lower agricultural regions of "Tweed," but had penetrated to the higher-lying farms of the Lammermuirs, a colony taking possession of old ash trees at Cranshaws, where Mr. Bertram, the tenant, says they were a recently arrived colony.

Again, by 1891 the colony at Dunglass (before mentioned) became such a numerous winter colony that the shrubberies were being broken down by the weight of birds which roosted there; and vast increase also took place about Cockburnspath. On the Northumbrian sandstone moors also the Starling began to breed in numbers; and in old trees in the Wooler district of the Cheviots.

At present they are omnipresent.

## Solway.

For information offered by the "Old Statistical Account" see vol. xvi. 1795, p. 76.

We have already referred to a prior existence of the species in vast numbers, as recorded by Sir Walter Scott.

On the Estate of Cargen (Kircudbrightshire), as we are informed by the proprietor, Mr. P. Dudgeon, the Starling has increased very decidedly within the last twenty-five or thirty years (dating back since December 1891); and about the earlier dates a nest was looked upon as a great curiosity. It may be said to have appeared there about that time—say from 1861 to 1866. It may therefore have made an earlier appearance in "Tweed"—say about 1825 to 1830, or rather sooner than in "Solway," on its second wave of dispersal. But it cannot be ascertained, by notes kept by Mr. Dudgeon, the direction whence they probably proceeded. The first shot about Cargen was twenty-six years ago, say 1865. At present there is a colony in winter of about 500 to 600 birds in a bed of rhododendron at the stables, and others besides.

According to Mr. Armistead of the Solway Fisheries, Starlings are not very abundant there, although much more common than formerly. Mr. Armistead never sees the enormous colonies which he so often meets with in Cumberland and Yorkshire, as well as in the South.

Mr. Adam Skirving, of Croy's Property, near Dalbeattie, says: "It was a new thing to see a Starling when I first crossed the border. Now (1891) it swarms. About thirty years ago (say 1860 or 1861) it began to make itself apparent, and at that time the earliest nest was discovered.

Again at Buccleuch, Parish of Castleton, Roxburgh, Starlings were reported as only appearing "during the last ten years" (*i.e.* back from the date of 1891—say 1881), "in increased numbers," but they have been known in the district for the last forty years—say since 1861.

## Forth.

No information is contained in either the "Old" or "New Statistical Accounts."

In Haddington, as already seen under "Tweed," "no great increase was evident, until recent years" (*cf.* Hardy). But since, as we are informed by Dr. Crombie of North Berwick, there has been a notable increase, their first appearance dating "years ago." Dr. James Howden when he lived at Musselburgh in 1847 as a lad, kept a notebook, "which," he writes us, "I still have, and I find headed 'The Fauna of the Parish of Inveresk.' Amongst the birds, '*Sturnus vulgaris*,' which is then said to be 'frequent.'" "About the same time," he continues, "I used to spend my holidays with Mr. A. Hepburn, then farmer at Whittinghame Mains, East Lothian, a keen naturalist. He and the late Robert Gray, then a bank clerk in Dunbar, and I used to shoot birds and skin them; and I distinctly remember thinking I had got a prize when I shot a Starling, whose skin I have to this day."

We can remember, within our own experience, the vast difference in numbers of the Starling when a boy at Merchiston Castle School, and when at home at Dunipace, Stirlingshire. Of its vast increase since then we have so many records and such a quantity of testimony that it is difficult to select the most striking. A few must suffice as applicable to Stirlingshire, referring to the carse-lands of Falkirk, up the valley of the Carron and Bonny to the bases of the central hills of the county, and as far west as the Blane valley and the upper waters of the river Forth.

Authorities east of the Denny Hills all agree they were rare birds about 1860, and began to get common about the next decade (say 1870).

But one valued correspondent—Mr. David Cram of Bonnybridge—takes exception to the above dates, and, from notes in his possession, says: "They became abundant as early as 1852 or 1853," and he remembers the first obtained in 1834. In that year he took a nest himself, the first we have record of. The next was of young ones procured at Carnock, Carse of Falkirk, which were reared by Mr. John Ure, Shoemaker, Larbert, who is still alive, and verifies the statement at about 1850. It is supposed locally that Starlings came from the direction of Ayrshire.

Coming now out of the "carse-lands" on to the "dry fields," and up the valleys which come down from the Denny Hills, my neighbour, Mr. John Laing of Langhill, puts their advent at about the same time as most recorders here, viz.: "Twenty years ago, or thereabouts, it was a *rara avis*," and boxes were put up to encourage them. Mr. Laing imagines they came from the east. In 1869, only one nest existed, in a hollow tree at Mr. Laing's house. Now (1891), there are six pairs breeding.

At Sauchie, farther to the north, by the east base of the Central Hills, Sir James Maitland, Bart., observed them first in 1888—a late date. Now, in winter, they appear in thousands. We have known them to swarm in winter upon rhododendrons on an island on Larbert Pond since, at least, 1880; and now (1891-94), we have returns from many localities all along the northern base of the Central Hills, upon the "dry field," and between these and the Carse of Stirling and Vale of Menteith. Colonel Stirling of Gargunnock says his late gardener put the date of first appearance at between 1840 and 1845,—an early date,—but the first noticeable increase is put down by Colonel Stirling at five or six years previous to 1891—say 1885 or 1886. Mr. James Stirling of Garden puts its first appearance at 1856. (Garden estate is about 10 to 12 miles farther west, and higher up the valley of the Forth than Gargunnock.) "A shoemaker," says Mr. Stirling, "walked from Stirling to Drymen Bridge to take a nest there, sometime in the

forties. (Drymen Bridge is still farther west by about 7 miles.)

Miss Mary Blackburn of Killearn, in the Blane valley, gives us valuable information at this point—carefully dated and reliable. In 1838, not a Starling was to be seen in the district by Miss Blackburn's grandfather. The next year (1839), he saw one or two, and he and a young groom "stealt a horse out of the stable" before any one was up in the morning, and went to Craigbarnet and took a Starling's nest there. "For four or five years after," continues Miss Blackburn, "he never saw another nest; but, *then*, the old butler here—who was a great bird-fancier—put up a box, and a Starling built in it, and since then they have increased rapidly. I do not think they are as numerous now as they were twenty years ago (say 1871)." By other notes from Miss Blackburn, there seems to have been a decided falling off in their numbers of late; but we cannot find space for all these interesting notes. They, however, very clearly seem to indicate an extension from Clyde, up the Blane valley, round the western bases of the Campsie Fells (or central hill ranges of Stirlingshire); and the data obtained from other sources coincide in a remarkable degree.

We now return to the north coast of the Firth of Forth, and follow the northern enclosing rim of the Ochils, Lomonds, and Fife Hills to Callander, *via* Stirling and the north side of the Vale of Menteith, and see how far dates there can be found to fit in (or otherwise) with those given from the south side of the Vale of Menteith.

On Lundin and Montrave in Fife, as we are informed by Mr. John Gilmour, "an immense increase has taken place." He continues: "Thirty-three years ago, only one pair was known to nest, in an old tree on a farm, and young were taken as pets. Since then (say 1859), they have increased rapidly, and they roost in thousands in Lundin fir-wood."

Passing farther west to Brankstone Grange, Mr. J. J. Dalgleish says: "Very decided increase observable since about 1850" (compare here "New Statistical Account of Clackmannan, *ut sup.*)

At Coldoch in South-West Perthshire, overlooking the Vale

of Menteith, as we are informed by the proprietor,—Robert Graham, Esq.,—"a very prodigious increase has been going on ever since I returned home twenty-one years ago (say 1871). The earliest nest I knew of was about the year 1838 in the hollow of an oak tree. The shrubs around the house last winter—1890-91—gave shelter to thousands. In the exceptionally severe winter of that season they never left—possibly owing to equal severity in England. They have indeed almost ceased to migrate, except short distances from all directions to roost."

Around Callander, Mr. J. Buchanan-Hamilton of Leny speaks of their increase within the last ten or twelve years, but has no notes of first appearance of birds or nesting. He adds: "My impression is that during these threescore years I have seen them come and go in waves as it were—sometimes several here, sometimes none." Again: "My impressions are that they come to us from the Lowlands, and that they did not penetrate in this locality much farther into the Highlands than Leny." Mr. Buchanan-Hamilton attributes "their increased numbers and the permanency of their residence here during the last ten or twelve years to the increased extent of land that I have reclaimed from our hill-sides, and the increased shelter of some 400 acres of woodland I have planted. In my boyhood I have no recollection of seeing any whatever in winter."

## Clyde.

We must now take up our thread again at "Clyde," at its junction with "Solway," or as near to it as possible.[1]

About twenty years ago Mr. D. Cram (already mentioned under evidence from "Forth" area) saw Starlings in thousands on the Castle Loch, Lochmaidon (?), Ayrshire; and saw them also near Lockerbie, Dumfries ("Solway").

At Glendoune, Girvan, Ayrshire, Mr. J. G. K. Young remembers seeing a few as long ago as he can recall, but they only became numerous about five years ago (say 1887).

[1] We have but few records, simply because, perhaps of all our Scottish areas, "Clyde," rich as it must be in its avifauna, seems to have but little attention paid to its vertebrate fauna in any thorough systematic manner, either by its societies or by individuals—a very great pity.

"They come in winter and autumn, increasing in numbers as the season advances, and occupy high laurels on the lawn now in thousands."

From Luss—west side of Loch Lomond—we have a very full account of them from Mr. Alfred Brown. He says: "The Starling has greatly increased in numbers, and is at present (1893) more numerous than at any previous time. I think the bird began to put itself in evidence about 1870, and has increased ever since. I remember in 1865 watching the Daws at Inch Moin and Inch Galbraith, and there were no Starlings (or hardly any) amongst them, and now there are as many Starlings as Daws." Mr. Brown enumerates a great variety of nesting-places, "all swarming with Starlings, and always associating with Daws."

## Argyle.

The "Old Statistical Account" gives Cara and Gigha (1793), vol. viii. p. 51; and Kilfinan in Cowall (1798), vol. viii. p. 51, and vol. xiv. p. 262.

The "New Statistical Account" mentions Inveraray and Kilchurn.

"Benderloch" (Mr. William Anderson Smith) tells us, ("Land and Water," July 1880): "We remember flocks of many hundreds in the country to the south of Glasgow ("Clyde"), now nearly thirty years ago. They had secured a firm hold of the country before that. . . . Yet it is only a few years since they arrived in the district of Benderloch."

The Duke of Argyll, writing in the same year, makes the date of their appearance at Inveraray very recent ("Land and Water"), and their arrival on the shores of the Clyde [North Shores—J. A. H.-B.] as comparatively so."

Anderson Smith also speaks of it in the Outer Hebrides as having "long held undisputed sway among the caves of the cliffs."

In 1867 Graham speaks of it as abundant in Iona in winter, and my friend Mr. Colin M'Vean can answer for their breeding there as early as 1848.

Now, in 1894, the Starling is almost universally distributed over all the lower and more fertile parts of the

mainland of Argyle, and in most of the isles simply swarms, as may be gathered from our own notes in our "Fauna of Argyll and the Inner Hebrides." But it is interesting still to find traces of farther extensions up *towards the hills, from the valleys* and from the haugh-lands to the mountain-slopes or remoter shepherds' houses and shooting-lodges, in quite recent years; filling up, as it were, blanks in its universality right and left of its main lines of least resistance, owing to the pressure upon the centres of earlier colonisation, and congestion.

Whilst the vanguards pushed on and populated the straths in the earlier stages of their advent, the later younger arrivals, whether reared on the spot, or migrants from other nurseries, were obliged to press up the hill-sides and more remote glens, as we believe is the case with many other more or less assertive species.

A difficulty now is suggested here, which at present we will only mention:—Whence came the vanguard of Starling immigration to Argyle mainland, and whence came the immigration to Argyle Isles? Did they both come from the same sources and the same directions, or from two diametrically different sources and directions, viz. from the "Clyde" and South-West entirely, from the Outer and Inner Hebrides entirely, or was its population drawn from the two sources—South-East and North-West—alike? More minute and more numerous data are required, we believe, before we can say whether or not the Starling population on the west of the backbone of Scotland drew its battalions from the older and equally vast centres of long, long standing on the pathway of the great autumn migration which, as we believe, is well proved, occurs down the range of the Outer Hebrides and crosses salient points of the Inner Isles (following the shore-lines and nearest shore-cuts), past "Clyde" to the Mull of Galloway, and thence, as we have endeavoured to indicate, shooting off to Ireland; or whether Argyle mainland is indebted to an advance over the mountain passes between the gates of the Highlands in the east and the wild west glens across the great backbone of Scotland?

## Tay.

"Old Statistical Account," vol. ix. (1793), p. 235.

Crossing northward from Forth into Tay by the shallow depressions which lead from Stirling by the west end of the Ochils, and by the "howes" or haughs of East Fife which pass round the eastern end of the Fife Lomonds, we obtain a certain number of records. But a blank wants filling up on the Forth watershed which rather incommodes us.

Our most interesting return is from a salient point overlooking the Firth of Tay in the north-east corner of Fife, viz. from Tayfield and Scotscraig; and for this we are indebted to Mr. William Berry of Tayfield. "At Tayfield," writes Mr. Berry, "I have noticed little change in their numbers;" and at Scotscraig Mr. John Fowlis "has observed a great decrease there during the last year or two." They used to roost in great numbers in a large wood on the property. John Fowlis has been about forty years keeper at Scotscraig, and when he was interviewed again gave the following information:—

"Thirty to thirty-five years ago (*i.e.* say 1856 to 1861), a Starling was looked upon as a rarity. They then came chiefly in summer. Four or five years ago they were in thousands here. There were nests in every corner. They roosted in clouds in the thick spruces of the West Hill, on the cliffs there, and in the ivy on the garden wall. This year (1891) there are very few." Mr. Berry adds: "Personally I have seen little change in numbers (two miles west of Scotscraig). When I first began to collect eggs, about twenty years ago (say 1871), Starlings' eggs were easily obtained, but not in quantities, and these words are perfectly true at the present time. They are common, but their numbers are not excessive."

On the opposite side of the estuary of Tay, Dr. Robert Robertson, of Fernbank House, Errol, reports an "extraordinary increase," and goes on to say: "Fifty years ago (say 1840 or 1841) only rarely a pair could be seen in this district. At present they are in thousands, and have increased steadily from then till now." Mr. Robertson cannot say whence they came, but adds: "They were numerous

about Glasgow before they became so plentiful here." He thinks the first nest was obtained between the years 1832 and 1842. The greatest increase has taken place within the ten years previous to 1891 (say 1881). They roost in "millions" among the tall reeds of the river Tay, about half a mile from Errol, and gather in thousands on the village church spire. Dr. Robertson goes on to say: "I have watched their increase with the greatest interest, and I have very good opportunities of doing so while attending to my practice through the Carse of Gowrie."

At Seggieden, on the south slope of the Sidlaw Hills, and nearer to Perth, Colonel Drummond-Hay gives exactly similar evidence. They began to be apparent in increase about 1882. Thousands frequent Mugdrum Island on the Tay, and north of Dundee decided increase has taken place in the last five or six years (Auct. R. V. Kerr, Sec. Nat. Hist. Soc. Dundee); and they apparently came from the south. At Sunnyside, Montrose, Dr. James Howden reports: "Marked increase during the last thirty-five years. No note of earliest appearances or nest. Along the coast-line up into Kincardineshire they collect in the autumn in thousands, as at the Den of Benholm and many other wooded "dens" or "denes." Mr. Atherstone, an old sportsman, tells Dr. Howden that the first he shot was in 1854. "Before this I used to pay fourpence a pair for their wings for trout-flies." In the Blairgowrie district it has rapidly increased, and roosts in thousands ("countless numbers") in the reeds of the Rae Loch; but about 1841 the bird was almost, if not quite, unknown. Half-a-crown was freely given for young ones from the nest.

Continuing up the Tay valley from Perth, Mr. Adam Steel notes the increase within the last sixteen years. The first nest was found about 1870 or 1871.

In "Dee," as we are informed by Mr. George Sim, the Starling was only an occasional visitor at the more remote localities, or a regular spring visitor or bird of passage, at the date of the "New Statistical Account." At Tarland Mr. Sim personally observed it every spring as a passing migrant prior even to 1860; but none remained to breed until about 1859-60; since when, however, they have

year by year increased. No district throughout the county is now without them, and they remain all the year round. The direction whence they first came was from the south. So far as Mr. Sim can recollect, 1860 was the year of the first nest found; but he had also been informed of a pair nesting between two chimneys in Peterhead in 1850, and in the old Castle of Tolquhon in 1856. The principal winter roost is at Courtstone, where they congregate in thousands.

## Moray.

"Old Statistical Account," Kirkhill, Inverness-shire, vol. iv. (1792), p. 114.

"New Statistical Account," Ardersier, Nairn, vol. xiv. p. 464.

We find in the "New Statistical Account" the notice that a "brood of fully fledged Starlings was seen in the churchyard, on the 5th June 1841," of the parish of Ardersier, which is the extreme north-east corner of the county.

Edward spoke of it as "rapidly increasing." It is recorded as early as 1844 by Dr. Gordon: "Seen in small flocks in the spring and autumn, and even sometimes in December." Again, "A few, like a brood, has been the only indication of their breeding in this part of the country" (*i.e.* by 1844). Captain Dunbar's testimony is also given as to their great scarcity when he was a lad, and similar remarks come to us from Abernethy on Spey, from Rev. Dr. Forsyth. In 1851 Starlings have been most abundant, and continued longer than hitherto observed to do; and they were supposed to have become so, on account of the abundance of a small caterpillar, *Plutella cruciferarum*, in the turnip-fields.

Of late years, as we have ourselves observed, Starlings are occupying even the cleared lands amongst the great pine forests of Rothiemurchus and Glenmore, etc., and have lately taken possession of old Great Spotted Woodpeckers' holes at the base of Carnacruinch Hill. By 1893 the increase became startlingly apparent, and they had reached far up among the foot-hills of the Cairngorms. In a very few years more, at the same rate of dispersal, it will be omnipresent.

North of the Moray Firth, the Starling is included without remark in Kincardine parish ("New Statistical Account," vol. xiv. (1845), p. 405), and in Edderton parish, as also in Rosskeen.

It would appear therefore that localities inside the Moray Firth became populated by the species at an earlier date than "Dee," or anywhere outside the Moray Firth to the south upon the Aberdeenshire coast.

## West Ross.

According to our accepted authorities for West Ross,—Messrs. Hinxman and Eagle Clarke,—the status of the Starling in West Ross is as follows :—"Very local, but seems to be rapidly spreading. Has only appeared in some districts during the last few years. Not known at Shieldaig prior to 1890. Five or six pairs were observed nesting in the cliffs of Eilean Mhor, Outer Loch Torridon, in June 1892. Said to have come to Applecross about the year 1883. Reported common in Fisherfield, especially as flocks, in the autumn. Resident." Besides the above, Mr. J. H. Dixon (1886) includes it as "very common in places. . . . In the island of Foura, at the mouth of Loch Ewe, it uses holes in the ground for its nest, along with the Stormy Petrel." We find also from our journals in the same year (1886) that a few Starlings were observed by us on Priest Island in June.

According to Rev. H. A. Macpherson, the Starling is resident (also 1886) in Skye. "In 1884 *great* (sic) numbers arrived in the drab nest-dress, in the Hamar plantations, on 23rd and 24th June." In the Birds of Skye, and especially of the parish of Duirinish, Buckley includes the Starling as among the birds of North-West Ross-shire, applying more particularly to the Loch Carron district (MS. list and notes in our possession). We would still desire fuller particulars and dates from especially early times, if we are to arrive at the directions whence came the Starling into West Ross. It does *not* seem as if they came from the Outer Hebrides through Skye, but rather down the west coast of the mainland (see Sutherland).

### Sutherland and Caithness.

The Starling was rare previous to the year 1870, and is at present (1887) confined mostly to the coast-line. A pair bred at Balnacoil, however, ten miles up the river Brora, in 1879. Abundant on the west, and common on the North Coast. Common by 1868 (Sinclair's List), and very abundant at Brawl Castle near Thurso in 1885. Very abundant at Hempriggs near Wick, and all over the cultivated land along the shore.

Caithness would therefore seem to have been somewhat removed from the direct influence of the great migration streams which rush through the Orkney Islands and the Pentland Firth to the north, and also equally out of the direct influence of the first waves pouring into the Moray Firth. How much Caithness coast-lines have been indebted to direct lateral extension and to an overflow from congested areas to the north, or how much to a similar lateral extension from the south, it is not easy to determine; but it apparently succeeded the observance of the spring migration, both here and on "Dee."

### Orkney and Shetland.

Buckley gives us our statistics for Orkney. Abundant in Low's time, and certainly not less common now. Resident and breeding. Mostly migrate in cold weather, but a few remain, roosting in holes in walls, etc., and in cliffs and in the rock-dove caves; and an equal abundance is recorded from Shetland as long ago as the date of the "Old Statistical Account" (1793), p. 189.

### Outer Hebrides.

As early as 1841, breeding and abundant, flocking in July. Resident in flocks till April. As far back as 1830 MacGillivray speaks of it in St. Kilda, where it had a Gaelic name. In 1848 Sir William Milner found its nest there. Gray found it common in 1871 in St. Kilda. MacGillivray goes as far back even as 1820 and speaks of it as inhabiting a cave on the west coast of Harris in "vast numbers"; and we also notice the remark in Charlesworth's "Magazine of Natural

History" regarding its occurrence at Rowdil Old Church in South Harris about 1797, and again in 1804.

The above notes are all extracted from our volume on the Outer Hebrides (pp. 68-69), and there is little to add since that volume was issued in 1888.

It seems to us therefore that two great centres of habitation have influenced the dispersal of the species: an earlier one in the Shetlands, Orkney, and the Outer Hebrides, and north coasts and north-east of Caithness, from north-east towards south-west; and a later one, entering Scotland in the south and passing north through the south and central districts of Scotland. Moray appears to have drawn its supplies from the northward, in comparatively recent years; but the districts to the south of the Grampians mostly, if not entirely, from the southwards. How much these have been augmented by migrations from Continental areas is of course difficult to decide, but there seems to be sufficient evidence in our correlation of dates to warrant the supposition that such an augmentation has taken place, as also in a correlation of parallel statistics connected with many other well-known species.

It might not, perhaps, be too rash to predict that the day may yet arrive when the Starling having increased still more prodigiously, and every crevice and cranny having become populated by these cosmopolites, a great struggle for existence even amongst themselves may become necessary to preserve the balance of nature. Before this can take place, however, the probability exists that some other weaker species may have to go to the wall. Indeed there are already indications of such a fact in at least one instance and locality,—by sheer force of numbers,—about which we may have more to say at another opportunity.

## Map.

It only remains for me to say, the present distribution of the Starling scarcely requires any mapping, so general and omnipresent is the species. In the map accompanying this paper we have not therefore attempted to indicate it specially; and they are only the earlier movements which we have chronicled upon the map, and these only sufficient to illustrate the remarks made in this paper.

# SOME FISHES NEW TO OR RARE IN THE FIRTH OF FORTH

By William Eagle Clarke, F.L.S.

The material for this contribution has been derived from two sources; namely (1) from specimens and data most kindly supplied by my friend Mr. Thomas Scott, Naturalist to the Fishery Board for Scotland, and (2) from notes and captures made by the writer at North Berwick during August 1894.

## Triglops murrayi, *Günther.*

The addition of this rare and peculiarly distributed species to the fauna of the Firth of Forth is an event of considerable interest from an ichthyological standpoint.

On the 28th of November 1890 Mr. Thomas Scott secured a specimen within the Firth, to the west of May Island. He carefully examined it at the time, with the aid of Day's "British and Irish Fishes"; and finding no species in that standard work corresponding with his capture, he preserved it for future consideration. Investigations in connection with those Orders upon which Mr. Scott is well known as a leading authority deprived him, however, of an opportunity for its determination; and eventually, in September last, he kindly handed it over to me for that purpose. This specimen is nearly 5 inches—125·5 mm.—in length. It was taken in water varying from 25 to 28 fathoms in depth, on ground with a mud bottom, situated about half way between the north and south shores of the Firth and lying west of May Island.

This species was described as new to science in 1885, from several specimens captured in the Mull of Kintyre, at a depth of 64 fathoms, in February and March; and four miles south-east of the island of Sanda, in 35 fathoms, in the middle of March. These examples were from 2·5 to 4 inches in length, and were obtained by Dr. John Murray whilst dredging on board the "Medusa." They are described by Dr. Günther in the "Proceedings of the Royal Society of Edinburgh" (vol. xv. p. 209, Plate IV. Fig. A).

In this magazine (1892, p. 76) Mr. George Sim recorded the first specimen of this little fish for the North Sea, an example having been taken fourteen miles off Aberdeen on the 1st of October 1890. Four others were obtained off Montrose in February 1891; and one off the Kincardineshire coast in September 1891. Mr. Sim informs me that these captures were made at depths ranging from 16 to 30 fathoms.

In the above notes reference has been made, I believe, to all that has been published concerning this fish.

A very remarkable feature in the history of this species is the fact that, according to our present knowledge of its distribution, *Triglops murrayi* is entirely confined to Scottish waters. It is a comparatively small species, and hence liable to be overlooked—perhaps regarded as a young *Trigla*, to which it bears a superficial resemblance.

An allied species, *Triglops pingelii*, occurs on the Norwegian coast: the other species of the genus are Arctic fishes.

ZEUS FABER, *Linn.* John Dorey.

A specimen, 15·32 inches in length, was captured off Pittenweem in October 1891. Mr. Scott regards this as a rare species in the Firth of Forth, where it has occurred both in deep and in very shallow water.

CARELOPHUS ASCANII (*Walb.*) Yarrell's Blenny.

I obtained a specimen of this fish at North Berwick, on the 9th of August 1894, which was 7.3 inches in length, and weighed 43.5 grammes = 1.53 ozs. It was captured on rocky ground south of Craigleith, at a depth of 10 fathoms, by means of a hook baited with mussel.

This is the first record, I believe, of the occurrence of this species *within* the Firth. The only other information, with which I am acquainted, regarding Yarrell's Blenny as a Forth fish is Dr. Wemyss Fulton's note on the capture of an example two miles off the mouth of the River Tyne on the 13th of September 1889 (see "Report of the Fishery Board for Scotland," 1889, part iii. p. 357). This specimen was also captured on a hook and line, and the fish is said not to have been previously known to take a bait.

My specimen when fresh-caught was of a chocolate brown colour, and not nearly so distinctly barred on the sides as the example figured in Day's "British and Irish Fishes."

### LUMPENUS LAMPETRIFORMIS (*Walb.*)

This is another species added to the British fauna since the publication of the late Dr. Day's standard work on the "British and Irish Fishes." It was, however, first recorded for our seas by that ichthyologist in the "Proceedings of the Zoological Society" for 1884 (pp. 445-446, Plate XII.) In May of that year a specimen was captured in a trawl 15 miles off St. Abb's Head, in 40 fathoms of water, and was forwarded to Dr. Day by Professor M'Intosh of St. Andrews.

Since then numerous examples have been taken in the deep waters of the Moray Firth, as recorded by Mr. Sim.

In 1888 Mr. Scott obtained specimens in the stomachs of Cod trawled in the Firth of Forth; but these being in a more or less mutilated condition, he hesitated to ascribe them to this species. On the 14th of May 1889 he was able to add this species to the fauna of the Forth; for on that date he captured eight specimens in the shrimp-net when trawling a few miles east of the island of Inchkeith, and several others were taken by him just outside May Island a day or two afterwards.

In 1889 Dr. Wemyss Fulton recorded ("Report of the Fishery Board for Scotland," 1889, Part iii. p. 357) more than 300 specimens of this fish captured in the trawl in the Firth during the year 1889, as many as 135 having been taken at one haul. He remarks that no doubt a migration of this fish to the mouth of the Firth—where most of the specimens were captured—had taken place. One specimen was taken in October, but the chief hauls were made in March, April, and May.

Mr. Scott sends me two fine specimens, respectively 11.5 and 13.5 inches in length, captured a little to east of the Bass Rock.

This Blennioid now appears to have become established in the Firth of Forth, has a somewhat wide range in its waters, and is not very uncommon, especially around May Island.

As a British fish *Lumpenus lampetriformis* is as yet entirely confined to the Scottish waters of the North Sea. It would appear, however, to be extending its range southwards, and will no doubt be sooner or later captured on the English coast. It is a common fish on the Norwegian coast, being most numerous in the extreme north; but it occurs in the Baltic, and also in the Iceland, Greenland, and Spitzbergen Seas.

Two coloured illustrations have appeared of this interesting fish during the present year (1894): one of these is given in Professor Smitt's "Scandinavian Fishes," Plate XI. Fig. 5; the second in the "Report of the Fishery Board for Scotland" for 1893, part. iii. Plate III. Fig. 2.

GADUS MINUTUS, *Linn.* Power Cod.

This species is not included in Dr. Parnell's classical essay on the "Fishes of the Forth." Among the material submitted to me by Mr. Scott is a specimen of this fish 4.18 inches in length, which was captured west of the Isle of May on the 29th of April 1890. Mr. Scott informs me that it is not a common species in the Forth, and is chiefly confined to the moderately deep water between May Island and Fidra and Elie, and at the mouth of the Firth, east of the May Island and the Bass Rock.

RHOMBUS PUNCTATUS, *Bloch.* Müller's Topknot.

The Little Black Hairy Fluke, as this fish is known in the Forth, does not appear to be by any means a common fish on the Scottish coasts. One sent to me by Mr. Scott was trawled in Largo Bay on the 15th of February 1890, and is 3.68 inches in length. I have a note regarding another Forth specimen, also taken in Largo Bay, on the 21st of March 1889.

RHOMBUS NORVEGICUS, *Günther.* Ekstrom's Topknot.

Professor M'Intosh, F.R.S., records in the "Report of the Fishery Board for Scotland," 1893 (part. iii. pp. 227-228),

the capture of a fine example of this fish, which is also known as the Norwegian Topknot, ten miles south-east of the Carr Lightship, on the 6th of April 1894. This specimen is a female developing ovaries, and measures 3.36 inches, or 85 mm., in length. Professor M'Intosh gives a full description of the specimen, and a coloured drawing and other figures (Plate IV. Figs. 5, 6, and 7). This species is not only an addition to the fauna of the Firth of Forth, but, I believe, to the fauna of the British waters of the North Sea. Couch in his "British Fishes" (vol. iii. p. 175, Plate CLXVII.) records and figures the first British specimen from the Bristol Channel; but this was considered by Dr. Day to be an example of *Rhombus unimaculatus*, or Bloch's Topknot, and hence the species has no place in his work on "British and Irish Fishes." Dr. Günther obtained a specimen off the Shetlands in 1868; and also records a third British specimen from Lamlash Bay, and a fourth in Kilbrennan Sound, in the "Proceedings of the Royal Society of Edinburgh" (vol. xv. p. 217, 1888). Mr. Holt obtained a specimen in Donegal Bay in 1891, as recorded in the "Proceedings of the Royal Dublin Society" (2), vii. p. 218. Finally, we have the Forth specimen, which concludes the list of the known British occurrences of this species.

The range of this fish is given by Professor Smitt ("Scandinavian Fishes," part i. p. 455, 1894) as extending from the Lofoden Islands to the Bristol Channel.

NEROPHIS LUMBRICIFORMIS (*Linn*). Worm Pipe-fish.

On the 20th of August 1894 I captured a specimen of this little fish under a stone between tide-marks at North Berwick. It was 4.12 inches in length, and weighed .35 gramme = .12 oz. I have been unable to find any previous record of the occurrence of this species in the Firth, and there seems to be little doubt that it is here recorded for the first time for the waters of the Forth.

The two following fishes are neither new nor rare in the Firth of Forth, but are recorded as remarkably fine examples of their respective species:—

COTTUS SCORPIUS, *Linn.* Short-spined Sea Bullhead.

I captured a fine and highly coloured example of this Bullhead in a rock-pool at North Berwick on the 20th of August 1894. This specimen was 10.87 inches in length, and weighed 328 grammes = 11.55 ozs. The head and sides, above the lateral line, were beautifully and plentifully variegated with bright pink; the pectoral and anal fins were broadly margined with rich orange, and the bars on the caudal fin were also of this last-named tint.

GASTEROSTEUS SPINACHIA, *Linn.* Fifteen-spined Stickleback.

A particularly large specimen, captured in a rock-pool at North Berwick on the 27th of August 1894, was 7.57 inches in length and weighed 16.3 grammes = .57 oz.

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## ON NEW AND RARE SPECIES OF COPEPODA FROM SCOTLAND.

By THOMAS SCOTT, F.L.S.,
Naturalist to the Fishery Board for Scotland,

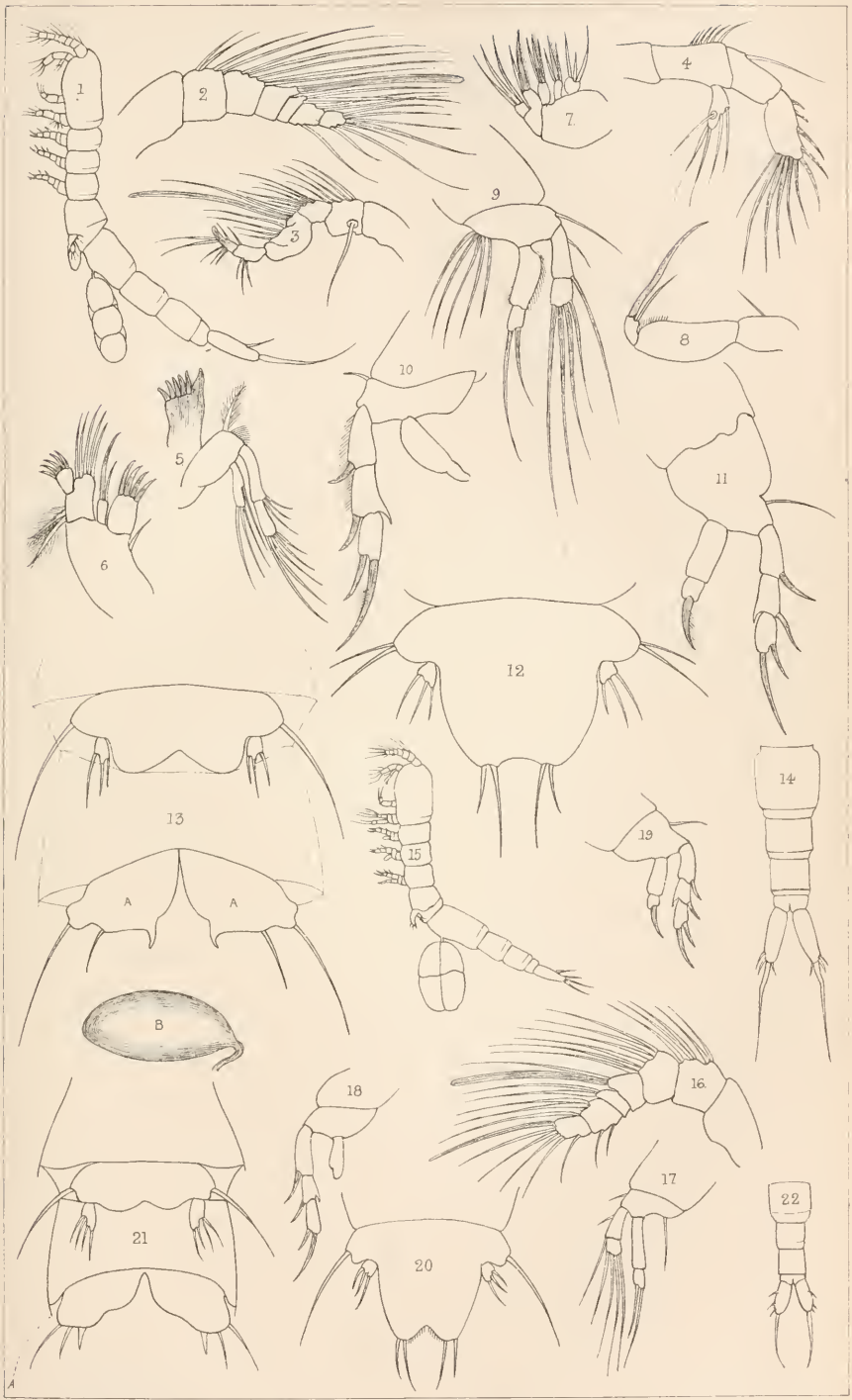
and ANDREW SCOTT,
Fisheries Assistant, University College, Liverpool.

PLATE II.

IN the following Notes we propose, first, to describe two new species of Copepoda, belonging apparently to the genus *Leptopsyllus*,—a somewhat curious genus recently instituted; and, second, to give additional records indicating an extension of distribution for several species already described.

### DESCRIPTIONS OF TWO NEW SPECIES OF LEPTOPSYLLUS.

*Preliminary Remarks.*—The genus *Leptopsyllus* was instituted for a somewhat abnormal and very slender form of Copepod captured in the Forth, a few miles west of Queensferry,

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Figs 1–14 LEPTOPSYLLUS ROBERTSONI, Sp n
Figs 15 22 LEPTOPSYLLUS MINOR, Sp n

on the 25th of January 1894: there were several specimens of this form. On the 20th of August following, three species (two of which are described here), apparently belonging to the same genus, were obtained in the Forth, near Musselburgh —they were taken in pools on the shore, near low-water mark; but these three species, though similar in habit and in general structure to the one obtained west of Queensferry, and for which the genus *Leptopsyllus* was instituted, differ from it in the following points:—1st, the mandible-palp is two-branched instead of one-branched—the distal branch being two-jointed, while the proximal branch, which is smaller, is one-jointed; 2nd, the second and third pairs of swimming feet are two-branched—the inner branches, which are one or two-jointed, being more or less rudimentary. But notwithstanding these and one or two other minor differences, the Musselburgh species are, in our opinion, undoubtedly congeneric with that from west of Queensferry, and we therefore prefer to amend the generic definition as published in part iii. of the "Twelfth Annual Report of the Fishery Board for Scotland," rather than establish a separate subgenus for them. The definition of the genus *Leptopsyllus* as amended will therefore be as follows[1]:—

LEPTOPSYLLUS (amended), *T. Scott*, "Twelfth Annual Report of the Fishery Board for Scotland," part iii. p. 253 (1894).—Body elongate, cylindrical, somewhat similar in form to *Cylindropsyllus*, Brady. Anterior antennæ (in the female, seven or) eight-jointed, short. (In the male the anterior antennæ are modified and hinged for grasping.) Posterior antennæ three-jointed; secondary branch small, one-jointed. Mandibles well developed, the broad biting part armed with several strong teeth; palp comparatively large, consisting of a single two-jointed branch (or of two branches—the distal branch being two-jointed, while the proximal branch, which is smaller, is one-jointed). Other mouth appendages as in *Cletodes*, except that the posterior foot-jaws are three-jointed. Both branches of the first pair of swimming feet short, two-jointed. In the second and third pairs the inner branches (are one or two-jointed and more or less rudimentary, or)

[1] The Amendments are within ( ).

are obsolete or entirely absent, but the outer branches are three-jointed. Inner branches of the fourth pair (usually) two-jointed and the outer branches three-jointed. Fifth pair foliaceous, small, two-branched (basal joints sometimes coalescent and forming a broad lamelliform plate ; the fifth pair in the male are smaller than those of the female. One ovisac, containing a few large ova).

LEPTOPSYLLUS ROBERTSONI, *Sp. nov.* (Plate II. Figs. 1-14).

*Description.—Female.*—Length ·63 mm. ($\frac{1}{40}$ of an inch). Body elongate and very slender. Anterior antennæ moderately stout, shorter than the first cephalothoracic segment, seven-jointed : the fifth joint is shorter than any of the others, as shown by the formula :—

| Proportional length of joints | 22 | 13 | 10 | 7 | 5 | 8 | 9 |
|---|---|---|---|---|---|---|---|
| Number of the joints | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Posterior antennæ nearly as in *Leptopsyllus typicus*, T. Scott. Mouth organs also nearly as in that species, except that the mandible-palp is two-branched ; the distal branch, which is slender and elongate, has the end joint equal to about two-thirds the length of the first joint ; the proximal one-jointed branch is nearly as long as the first joint of the distal branch. The first pair of swimming feet are similar to those of *Leptopsyllus typicus*, but the inner branches are rather longer than the outer, and there is a fascicle of moderately long setæ on the inner margin of the second basal joint (Fig. 9). In the second and third pairs the outer branches are somewhat similar to those of *Leptopsyllus typicus ;* the inner branches, which are rudimentary, are two-jointed, the end-joint being very small (Fig. 10). The fourth pair are similar to those of *Leptopsyllus typicus.* The basal joints of the fifth pair are coalescent, forming a broad lamelliform plate, the end of which is broadly truncate and slightly concave, the obtuse angles being each furnished with two small setæ, and on each side near the base of the joints the outer margin is produced into a broadly rounded lobe terminating in two setæ ; the length of the basal joints is equal to about two-

thirds of their entire width across the broadest part; the secondary branches are very small, obscurely triangular in outline, and furnished each with three small setæ on the outer edge (Fig. 12). The caudal stylets are in the form of elongate-ovate lamellæ; in length they are equal to both the last two abdominal segments together, and their breadth is about equal to two-thirds of their length; they are also each furnished with four terminal setæ, the principal seta being about twice the length of the stylets, but the others are very small. Ovisac small, containing a number of moderately large ova.

*Male.*—The male is similar to the female, except in the following particulars:—The anterior antennæ are each six-jointed; the last four joints are modified and hinged, and form powerful grasping organs. The basal joints of the fifth pair of thoracic feet are coalescent, as in the female, but are much shorter, being only about half the length; the sixth pair of appendages are foliaceous, broadly subtriangular in outline, and not coalescent (Fig. 13).

*Habitat.*—In pools near low water on the shore of the Firth of Forth, at Musselburgh; rather rare.

*Remarks.*—This species is at once distinguished from any others of the same genus by the large, lamelliform caudal stylets, and by the form of the fifth pair of thoracic feet, as also by the structure of the anterior antennæ. We have much pleasure in giving to this species the name of our kind friend Mr. David Robertson of Millport, the veteran Scottish Naturalist, who was one of the first to introduce us to that most interesting study—the study of the Micro-crustacea.

### Leptopsyllus minor, *sp. nov.* (Plate II. Figs. 15-22).

*Description.—Female.*—Length, ·46 mm. ($\frac{1}{54}$ of an inch). Body elongate, very slender. Anterior antennæ short, moderately stout, seven-jointed, somewhat similar in structure to those of *Leptopsyllus robertsoni*. The proportional lengths of the joints are shown by the formula—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Proportional length of joints | 20 | 14 | 11 | 7 | 5 | 9 | 10 |
| Number of the joints | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

.

Posterior antennæ and mouth organs similar to those of *Leptopsyllus robertsoni*. The first pair of swimming feet are also similar in structure to those of that species, but smaller, and the outer branches are considerably shorter in proportion to the inner branches (Fig. 17). Inner branches of the second and third pairs one-jointed and very rudimentary (Fig. 18). Fourth pair similar in structure to those of *Leptopsyllus robertsoni*, but considerably smaller. The fifth pair are also similar in structure to those of that species, but the coalescent basal joints are proportionally longer, being in length equal to about three-fourths of their entire width at the broadest part. They also differ in form, being subconical in outline and with the apex distinctly bifid. Each of the two apical angles bears two short setæ, and the lateral basal lobes are each furnished with a moderately long hair. The secondary joints are very small (Fig. 20). The length of the caudal stylets is scarcely equal to the combined lengths of the last two abdominal segments, while their breadth is nearly equal to half the length. They are each furnished with a few setæ, the principal terminal seta being about twice the length of the stylets; while one of the others, which are very small, springs from near the middle of the outer margin (Fig. 22). The ovisac contains a few very large ova.

*Male.*—The male is very similar to the female, but the anterior antennæ are modified for grasping, and resemble those of the male of *Leptopsyllus robertsoni*. The fifth pair of thoracic feet, which are very small, also resemble those of that species; but the coalesced basal joints are shorter, and scarcely extend beyond the base of the secondary joints, while the secondary joints are proportionally larger. In the sixth pair of appendages the inner margins are sinuated and slope considerably outwards, the outer margins are short and nearly straight, and the broadly rounded apex is furnished with two small setæ on the outer aspect and a small but stout spine interiorly (Fig. 21).

*Habitat.*—On the shore at Musselburgh, in the same pools with *Leptopsyllus robertsoni*.

*Remarks.*—This species is much smaller than the one last described, and is readily distinguished from it by the form of the caudal stylets, which are comparatively shorter

and broader, and by the difference in the structure of the first and fifth thoracic feet. The ovisac of this species appears to contain fewer but larger ova than that of *Leptopsyllus robertsoni*.

## Records indicating an Extension of Distribution.

Cyclops æquoreus, *Fischer*, "Abhandl. der Akad. der Wissenschaft," Bd. viii. p. 654, Taf. XX., Figs. 26-29 (1860). —This, which is one of those curious species that form a link between the truly freshwater and the truly marine Copepoda, was obtained in brackish pools near the head of West Loch Tarbert, Argyleshire, on both the north and south sides of the loch. Though widely distributed, the Scottish localities where *Cyclops æquoreus* has been recorded from are, so far as known to us, few in number. It has been "taken by the Rev. A. M. Norman in the West of Scotland";[1] in pools above high-water mark at Cramond Island, Firth of Forth; in the mussel beds at the mouth of the river Eden, Fifeshire; and Loch Stennis, Orkney.

Tachidius littoralis, *Poppe*. [Tachidius crassicornis, *T. Scott*, "Tenth Annual Report of the Fishery Board for Scotland," part iii. p. 250, Plate VIII. Figs. 14-27 (1892).]

*Tachidius littoralis* was recorded from the Firth of Forth, the first time for Scotland, in 1892. Though as yet known from only a few localities in the British Islands, we believe that it will yet be found distributed all round our shores wherever there is a suitable habitat, *i.e.* brackish water with a muddy and weedy bottom. It was obtained in pools of this description during the month of July last year around the head and north side of West Loch Tarbert.

Delavalia palustris, *Brady*, "Nat. Hist. Trans. Northumb. and Durham," iii. p. 134, Pl. V. Figs. 10-15 (1868).— This species was taken in pools between tide-marks near the head of West Loch Tarbert. Its distribution in Scotland appears as yet to be very limited. The Firth of Forth is

[1] "A Monograph of the Free and Semiparasitic Copepoda of the British Islands," ii. p. 120; no locality is given.

the only other Scottish locality known to us where *Delavalia palustris* has been obtained.

CANTHOCAMPTUS PALUSTRIS, *Brady*, "Mon. Brit. Copep.," ii. p. 53, Plate XXXIX. Figs. 13-23 (1880).—This well-marked species has, like the last, a very limited known distrbution in Scotland; but we believe that, in this case also, it will be found to be more or less frequent when carefully sought for in suitable situations. It has during the last few years been obtained in one or two places in the Firth of Forth, and we have now to record its occurrence in brackish-water pools at the head and on the north side of West Loch Tarbert, Argyleshire.

CLETODES TENUIREMIS, *T. Scott*, "Eleventh Annual Report of the Fishery Board for Scotland," part iii. p. 204, Plate III. Figs. 21-28 (1893).—This interesting and easily distinguished species of *Cletodes* has not been observed beyond the Forth area till last summer, when it was obtained at West Loch Tarbert in brackish-water pools along with *Canthocamptus palustris.*

PLATYCHELIPUS LITTORALIS, *Brady*, "Mon. Brit. Copep.," ii. p. 103, Plate LXXIX. Figs. 15-19 (1880); *T. Scott*, *op. cit.*, p. 205, Plate V. Figs. 11-13 (1893).—The known distribution in Scotland of this curious species is, like that of most of the others recorded here, hitherto very limited, and so far as we know the present record of its occurrence in West Loch Tarbert is the only record for the West Coast. It was obtained in hand-net gatherings from brackish-water pools along with *Canthocamptus palustris* and *Cletodes tenuiremis.*

All the species recorded in the preceding notes have hitherto been obtained only where there was an admixture in greater or less proportions of sea and fresh water. These brackish-water forms frequently exhibit a curious combination of characters interesting to the biologist, but often very troublesome to the systematist. We believe that there is still a rich harvest to be reaped by the study of these peculiar intermediate conditions of habitat and life. It may well be said—

> "The earth is full of Thy riches;
> So is this great and wide sea."

## EXPLANATION OF PLATE II.

LEPTOPSYLLUS ROBERTSONI, *sp. nov.*

Fig. 1. Female, lateral view × 80 dia.
,, 2. Anterior antenna, female . . × 330 ,,
,, 3. Anterior antenna, male . . × 500 ,,
,, 4. Posterior antenna × 380 ,,
,, 5. Mandible . × 380 ,,
,, 6. Maxilla . . × 380 ,,
,, 7. Anterior foot-jaw × 380 ,,
,, 8. Posterior foot-jaw × 380 ,,
Fig. 9. Foot of first pair of swimming feet × 380 dia.
,, 10. Foot of second pair × 380 ,,
,, 11. Foot of fourth pair × 380 ,,
,, 12. Fifth pair of feet, female . × 380 ,,
,, 13. Fifth pair and sixth pair, male . × 380 ,,
,, 14. Abdomen and caudal stylets × 80 ,,

LEPTOPSYLLUS MINOR, *sp. nov.*

Fig. 15. Female, lateral view . × 80 dia.
,, 16. Anterior antenna × 500 ,,
,, 17. Foot of first pair of swimming feet × 380 ,,
,, 18. Foot of second pair . . × 380 ,,
Fig. 19. Foot of fourth pair × 380 dia.
,, 20. Fifth pair of feet, female . × 380 ,,
,, 21. Fifth pair and sixth pair, male . × 380 ,,
,, 22. Abdomen and caudal stylets × 80 ,,

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# NOTES ON THE FLORA OF ELPHIN AND THE ROCKS OF CNOC-AN-T'-SASUNNAICH IN WEST SUTHERLANDSHIRE.

By G. CLARIDGE DRUCE, M.A., F.L.S.

LAST June I paid a visit of a few hours to Ledbeg in West Sutherland, in order to verify records made by Dr. Lightfoot in the "Flora Scotica" (which was published in 1777) of *Dryas octopetala*, *Draba incana*, *Asplenium viride*, and *Polypodium* (*Polystichum*) *Lonchitis*, the former of which he says "he found abundantly for two miles together upon a vast limestone rock called Creg-achnocaen, upon the boundaries of Coygach and Assynt, just on the confines of Ross-shire and Sutherland, about ten miles from Loch Broom, in the road to Ledbeg, upon the western coast." The *Draba* and the two ferns were gathered by him in the same locality. On the faith of these records the four plants were included in "Topographical Botany" for West Ross; but, as the actual occurrence of the plants in both counties was a little uncertain, since the limestone rocks are represented on the geological

map No. 101 as thinning out near the county boundary, it was felt desirable to explore this portion of country, which is situated amidst wild and romantic scenery. The district is sufficiently remote to hinder many botanists from visiting it; and probably but little change has taken place since Dr. Lightfoot explored it. Either the miles are shorter now, or the new road is less direct, for we found the distance from Ullapool to the county boundary to be about 14 miles. This county boundary is marked by an iron railing near a small watercourse on a range of cliffs which, on the Ordnance sheet No. 101, are called Cnoc-an-t'-Sasunnaich, the summit of which is given as 1258 feet in altitude. The county boundary crosses its highest point. From the top the fine hills of Ben More of Coigach, An Stack, Suilven, Canisp, and Ben More of Assynt are to be seen. The high road from Ullapool to Inchnadamph passes at the base of the Cnoc-an rocks, and is between 700 and 800 feet above the sea-level. The rocks are very interesting from a geological point of view, as the fucoid beds are capped with limestone. The limestone beds touch the level of the road at the hamlet of Knockain; but the beds slope upwards to the county boundary, where they have thinned out, and are present only as a small strip at the top of the cliffs. But slightly as they are represented in Ross-shire, the influence of the limestone is shown by the occurrence of *Dryas octopetala*, etc. The flora of the Sutherlandshire portion of the rocks is very interesting. Doubtless it was in this county that Dr. Lightfoot saw the *Dryas*, etc., since the *Dryas* is not only a prominent feature in the vegetation on the rocks, but it is also present by the roadside in Elphin. *Polystichum Lonchitis* occurs in considerable quantity, and *Asplenium viride* is plentiful. Both descend to 800 feet. Both *Phegopteris polypodioides* and *P. Dryopteris* occur; but the latter not in its typical form, since it has somewhat of the facies of *P. Robertiana*. A small form of *Asplenium Ruta-muraria* was seen, which simulated the rare *A. germanicum*. It is the var. *pseudo-germanicum* of Milde. **Adoxa Moschatellina*[1]

[1] The asterisk before the name of a plant denotes that it is not included in "Top. Bot." for Sutherland West, but as considerable work at the botany of the west division of the county has been done since its publication, the present records are not necessarily new to the region.

grew sparingly at the base of an overhanging rock. This appears to be the most northerly station yet recorded for it in Britain. *Draba incana* was scattered about the rocks as the variety *contorta*, Ehrh. *Carex rupestris* was not unfrequent, but rather local; it grew with a form of *C. pulicaris*, and descended to 1000 feet, or even lower. A form of *Carex binervis*, which has much of the aspect of the plant from Glen Callater that has been recorded as *C. frigida*, was noticed. I have elsewhere distinguished it as var. *nigrescens*. **C. flacca*, Schreb., with *C. panicea*, *C. Goodenovii*, and *C. pilulifera* (the latter often as the variety with acute glumes and longer bracts), *C. dioica*, *C. echinata*, *C. fulva*, **C. flava* (both as the type and as the var. *minor*), were also noticed. *Epilobium angustifolium*, which is given for West Sutherland without personal authority, occurred as an undoubtedly native plant. *Silene acaulis*, Jacq., was common, and descended to 800 feet; as did also *Thalictrum alpinum*. *Alchemilla vulgaris* occurred in the hairy, and in the glabrous (var. *glabra*, Wimmer et Grab.) forms. *Rubus saxatilis* was seen in flower, with an odour of hawthorn. *Polygala vulgaris* and *P. serpyllacea* were in beautiful flower. *Habenaria viridis*, **Geum rivale*, and *Luzula maxima* were not unfrequent. **Avena pubescens* was observed in the ordinary, and also as a more glabrous form (*var. *glaberrima*, Borb.), and also another form which bears much the same relation to *A. pubescens* as *A. alpina* does to *A. pratensis*. *Poa pratensis*, var. *subcœrulea* (Sm.), and another *Poa* which shall be noticed later on, *Festuca rubra* and *F. ovina*, **Valeriana officinalis*, **Cardamine sylvatica*, and *Lastrea dilatata* were also noticed.

In the fields at Elphin and Knockain very beautiful plants of **Orchis latifolia* grew in profusion, and *Trollius* was also plentiful. In the corn-fields **Crepis virens*, **Spergula sativa*, *Raphanus Raphanistrum* (the yellow-flowered plant), *Brassica Sinapistrum*, **Sonchus arvensis*, **Veronica agrestis*, **Lamium intermedium*, **Stachys palustris*, **Chenopodium album*, and **Bromus commutatus*, were noticed. Near Elphin and Ledbeg some interesting plants were seen, including *Dryas octopetala*, **Cardamine hirsuta*, **Trifolium minus*, *Prunus Padus*, **Geum urbanum*, **Rosa mollis*, **Ægopodium Podagraria*, **Sambucus nigra* (probably planted), *Valeriana*

*officinalis*, **Crepis paludosa*, **Carduus palustris* and **Myosotis versicolor* (probably in the var. *multicaulis*, Bosch., as Mr. Arthur Bennett points out; the flowers, however, were all pale blue), **Urtica urens*, **Salix cinerea* and *S. repens*, **Orchis mascula* and **O. incarnata*, **Scilla nutans*, **Luzula congesta*, **Alopecurus pratensis*, **A. geniculatus*, **Phalaris*, *Avena pubescens*, **Brachypodium gracile*, **Arrhenatherum avenaceum*, *Festuca sciuroides* **Equisetum palustre* and **E. limosum*. In the river, which at Ledbeg cuts its way through some white marble rocks (which were probably caused by rocks in a state of fusion coming into contact with the limestone), grew *Nitella opaca*, *Chara fragilis*, **Callitriche platycarpa*, and *Myriophyllum alternifolium*.

It may be of interest to the readers of the "Annals" to know that while I was botanising on the Cnoc-an rocks I saw below me a large bird which appeared to be injured; for on climbing down it made no attempt to move. I thought it was a Peregrine Falcon that had been wounded in a fight. On getting close alongside I saw that it was a young bird which was gorged from over-eating, the remains of a white bird being near. My photographer was in the carriage below, so I signalled for him, and a photograph of the bird was secured, but it is not a very successful one. The focussing cloth was next utilised to enwrap the bird, and he was safely conveyed to Ullapool, where we were assured he was a young Golden Eagle. My own knowledge of ornithology is *nil*. The next morning the bird had quite recovered from the effects of his large meal, and was as wild and ferocious as need be; the parrot cage, in which I was very sorry to see him confined, evidently not being quite to his taste. I have suffered many qualms of conscience for bringing into captivity so fine a specimen; but he is still alive at Ullapool.

The *Hieracia* noticed included *H. iricum*, *H. argenteum*, *H. anglicum* var. *longibracteatum*, *H. vulgatum*, etc.

# ON THE NECESSITY FOR A NEW MONOGRAPH OF THE ROSES OF THE BRITISH ISLANDS.

By Francois Crepin.

(Translated from the French in "Bull. Soc. Belg. Bot.," xxxi. part. i. pp. 14-25.)

The Roses of the British Islands have been made the subject of two monographs. The first, by Woods, dates from 1813; the second is that published by Mr. J. G. Baker, in 1870, in the "Journal of the Linnean Society."

Since the publication of this latter monograph the continuous study of the species and varieties of the genus *Rosa* has perfected the knowledge of the very numerous forms of this generic group and of their synonyms, and has thus rendered necessary the revision of the old works. It is to be desired that some young English botanist would take up the work of these predecessors, and prepare a new monograph of the English Roses, brought into harmony with the present state of science.

Except a certain number of varieties or local forms, the English Roses are the same as those of the neighbouring countries, and one can now prepare the list of specific types inhabiting England, Scotland, and Ireland. This list will include:—

*Sect. I.*—**Synstylæ.**
*R. arvensis*, Huds.
*Sect. II.*—**Stylosæ.**
*R. stylosa*, Desv.
*R. glauca*, Vill. (including *R. coriifolia*, Fr.)
*Sub-sect.* Rubiginosæ.
*R. rubiginosa*, L.
*R. micrantha*, Sm.
*R. sepium*, Thuill.
? *R. graveolens*, Gren.
*Sect. III.*—**Caninæ.**
*Sub-sect.*—Eucaninæ.
*R. canina*, L.
*R. obtusifolia*, Desv. (including *R. tomentella*, Lem.)
*Sub-sect.*—Tomentosæ.
*R. tomentosa*, Sm.
*Sub-sect.*—Villosæ.
*R. mollis*, Sm.
*Sect. IV.*—**Pimpinellifoliæ.**
*R. pimpinellifolia*, L.

We do not include in this list *R. rubella*, Sm., which can be nothing but an accidental variation of *R. pimpinellifolia*, and not at all *R. pimpinellifolia* × *alpina*, or *R. hibernica*, Sm.,

and *R. involuta*, Sm., which are hybrids. Among the varieties of *Rosa* included in the eighth edition of the "London Catalogue of British Plants" one sees the names of *R. sylvicola*, Déségl. and Rip., *R. collina*, Jacq., *R. Koscinciana*, Besser, and *R. marginata*, Wallr.; but these should be excluded from the list of the roses of England, since they are hybrids of *R. gallica*, crossed with *R. rubiginosa* and *R. canina*.

Despite the very limited number of species, among which are two of subordinate rank—*R. obtusifolia* and *R. glauca*—the future monographer will nevertheless have a laborious task to fulfil, a task that will demand years of researches out of doors and in herbaria. The geographical distribution will demand on its part much care and circumspection, because of the confusions that have been or may be made between certain species. Thus *R. mollis* has somewhat frequently been confounded with *R. tomentosa*, and certain varieties of *R. glauca* with glandular leaves have even been placed under *R. mollis*. In herbaria it is not uncommon to see certain varieties of *R. micrantha* named *R. rubiginosa*. *R. glauca* in its glabrous forms, or when pubescent (*R. coriifolia*), may be confounded with varieties of *R. canina*. It should be remarked that *R. glauca* presents varieties or sub-varieties parallel to those of *R. canina* that I have classed artificially under the group names *R. lutetiana*, Lem., *R. dumalia*, Bechst., *R. andevagensis*, Bast., *R. verticillacantha*, Merat, *R. scabrata*, Crep., *R. Blondeana*, Rip., *R. dumetorum*, Thuill, and *R. Déséglisei*, Bor. Even *R. arvensis* has not quite escaped this confusion, since we see that its variety *gallicoides* (*R. gallicoides*, Déséglise) has been referred to *R. stylosa*.

To settle the distribution of the species the monographer must then be very careful; he ought to verify everything, under risk of committing such errors.

Watson, in his "Topographical Botany," has endeavoured to determine the geographical distribution of the Roses of England and Scotland; but his work, based especially upon documents printed in floras and in catalogues, cannot inspire very great confidence in presence of the confusions of species that have been grievously fallen into by the authors of the

works quoted. All the sources of information made use of by Watson require to be checked by a monographer perfectly acquainted with the species and their varieties.

*R. pimpinellifolia* and *R. arvensis* are about the only ones that have almost completely escaped being confounded with others.

The experience that I have acquired by a long study of the European Roses, and by the examination of rich materials from the British Islands, warrants me in giving here some advice or explanations as to how certain species liable to such confusion should be examined.

### Rosa canina, *L.*

This species is very common. It inhabits the plains by preference ; its abundance diminishes with altitude, and with latitude northwards. On mountains, and in the more or less boreal regions, it is more or less completely replaced by *R. glauca* (*R. coriifolia*). Its variations are extremely numerous, and a considerable number of them have been raised to the rank of species. To settle the synonymy of the English authors it will be necessary to consult especially herbaria, and not to refer to mere descriptions or even to figures. As regards minor variations, even the study of authentic specimens does not always permit us to recognise exactly what the author had in view under a given name, since under the same name he may have distributed forms very different, though of almost similar aspect. The revision that I have made of the greater number of European herbaria, so far as relates to the Roses, has supplied me with frequent proofs of these errors, made even by the authors of species established on varieties or sub-varieties.

One of the most frequent cases of confusion is between *R. canina* (including *R. dumetorum*, Thuill.) and *R. glauca* (including *R. coriifolia*, Fries), at least when in flower, among the glabrous and the pubescent forms alike. In *R. canina* the sepals remain reflexed after flowering, or raise themselves very little ; they are habitually caducous at an early period,[1]

[1] In some cases of a very rare and quite accidental kind *R. canina* shows itself with sepals erect during part of the ripening period.

while in *R. glauca* they raise themselves more or less rapidly after flowering, and remain habitually erect on the receptacle until complete maturity. It is not absolutely necessary to assure oneself of the condition of the sepals to distinguish *R. glauca* from *R. canina*. In the former the large head of stigmas, tomentoso-whitish in colour, is very different in aspect from that of *R. canina*, which is less thick, with the hairs much less abundant, and sometimes is glabrous. In *R. glauca* the pedicels are usually shorter, more or less hidden by the bracts and dilated upper stipules; the corolla is usually a rather bright red, in place of being pale rose or whitish. The bush of this species is usually more squat than that of *R. canina*. *R. canina*, in the varieties of the group *R. andevagensis*, Bast., and *R. Deseglisei*, Bor., may at times be mistaken for varieties of *R. stylosa*, Desv.; but it is easy to distinguish the latter by its glabrous styles, united into the stylar column, by the narrow upper stipules, and by the constantly smooth receptacles.

In its varieties with the leaflets glandular below (groups *R. scabrata*, Crepin, and *R. Blondeana*, Rip.) *R. canina* may be confounded with *R. Jundzilli*, Besser (= *R. trachyphylla*, Rau), or with *R. sepium*, Thuill. Since *R. Jundzilli* is not found in the British Islands, British botanists need not attend to it in this connection. *R. sepium* is distinguished from the varieties of *R. canina* having glandular leaflets by its styles being almost always glabrous and not shaggy, and by its leaflets being elliptical and more or less strongly narrowed at the base, with glands possessed of a decided scent of a rennet apple, and not odourless.

**Rosa obtusifolia**, *Desv.* (including *R. tomentella*, Lem.)

The true *R. obtusifolia*, Desv., which cannot be confounded among the forms of *R. dumetorum*, Thuill, does not differ from *R. tomentella*, Lem., except in the teeth of the leaves being simple, and not compound-glandular. This single difference will not permit us to separate these two Roses specifically. The subordinate species constituted by them ought to receive the older name—that of *R. obtusifolia*.

The variety with simple teeth appears to be localised

(and somewhat rare) in certain of the southern counties of England, while *R. tomentella* is rather widespread, and appears to reach the south of Scotland. It has not been noted from Ireland, but no doubt both it and *obtusifolia* exist there.

*R. tomentella* presents rather numerous varieties. Its leaflets are rather often glandular below, but with the glands odourless ; its pedicels, usually smooth, may be more or less hispid-glandular.

As in *R. canina*, the sepals remain reflexed after flowering, which character in itself permits one to distinguish it from varieties of *R. coriifolia* with compound glandular teeth.

On the Continent, varieties of *R. dumetorum* are pretty frequently distributed under the name *R. obtusifolia*. I believe that *R. obtusifolia* and *R. tomentella* may occur at times with glabrous leaves.

**Rosa glauca**, *Vill.* (including *R. coriifolia*, Fries).

*R. glauca* is to *R. coriifolia* as *R. canina* (*glabra*) is to *R. dumetorum ;* that is to say, *R. coriifolia* is the pubescent state of *R. glauca*, as *R. dumetorum* is the pubescent state of *R. canina* (*glabra*). It follows that if one unites the two latter as one species, it is equally necessary to unite the two former under one specific name.

English phytographers have not as yet accorded sufficient importance to *R. glauca*, which they are accustomed to rank among the varieties of *R. canina*. It deserves in reality the rank of a subordinate species. It is a Rose of the mountains, which, in Central Europe, rarely descends into the plains. It is only in rather cold latitudes, towards the north, that one sees it inhabiting the plains. It is probable that in the British Islands it rarely occurs in the plains in the southern districts, and that it is only towards the north that one sees it at all common at low levels.

*R. glabra*, in both its glabrous and pubescent states, produces varieties or forms parallel to those of *R. canina*. Several of these forms have given rise to confusions with not only *R. canina* and *R. tomentella*, but also *R. tomentosa*

and *R. mollis*. We reserve our remarks on these errors for another work.

One meets on the Alps with forms which appear intermediate between *R. glauca* (including *R. coriifolia*) and *R. canina* (including *R. dumetorum*). These forms, which have received the names of *R. subcanina* (*R. glauca*, var. *subcanina*, Christ) and of *R. subcollina* (*R. coriifolia*, var. *subcollina*, Christ), should be sought for in England.

### Rosa rubiginosa, *L.*

The "London Catalogue of British Plants" ranks *R. permixta*, Déségl., among the varieties of *R. rubiginosa;* but the plant of Déséglise is unquestionably a variety of *R. micrantha.*

### Rosa micrantha, *Sm.*

The form referred to *R. micrantha* under the name of var. *Briggsii*, Baker, is extremely curious because of its smooth pedicels. It seems indeed to be a variety of Smith's type ; but it will require of the monographer a profound study before it can be definitely accepted as such.

### Rosa sepium, *Thuill.*

*R. sepium*, Thuill (*R. agrestis*, Savi), appears to be rare in the British Islands. On the Continent one see this species become more and more rare in proportion as one advances northwards. Even in Belgium it is extremely rare. In the north of Germany,in Denmark, and in the south of Scandinavia it is replaced by a variety of *R. graveolens*, Gren., known under the name of *R. inodora*, Fries. *R. graveolens* being a mountain species, its existence in the north is naturally explained. Does it exist in the British Islands? It would seem so, if one rely on Mr. Baker's monograph and on the London Catalogue ; but as yet I have no proof of the existence of this species in England.

### Rosa tomentosa, *Sm.*

is widely distributed in England, Scotland, and Ireland. It inhabits the plains rather than the mountains, at least in the

southern counties. Its varieties are very numerous, and several among them have been raised to the rank of species: *R. subglobosa*, Sm., *R. scabrinscula*, Sm., etc. Some have the sepals remaining reflexed after flowering, and more or less early caducous; while others have them erect and crowning the receptacle till complete maturity, then caducous. It is probable that ultimately there will be distinguished among these numerous varieties two or more natural groups, as has occurred among the old varieties of *R. canina*. Up to the present time the classification of the varieties of *R. tomentosa* has been artificial. If the group of varieties or forms with sepals reflexed is always easily distinguished from *R. mollis*, by the single character of the direction of the sepals, it is not the same with the group that have the sepals erect on the receptacle during ripening. Although the erection of the sepals may be less early and less marked in *R. tomentosa* than in *R. mollis*, one must, to distinguish these two types from one another, have recourse to other distinctive characters. These are not wanting; but it is necessary to be able to grasp them well, not to be duped by mere appearances. These appearances, incorrectly appreciated on herbarium specimens, have led many botanists to confound these two types, which are essentially distinct, and thus to render the geographical distribution very uncertain. This confusion has even led, as a consequence of it, to some botanists uniting *R. tomentosa* and *R. mollis* specifically, and to not seeing in them more than one and the same species. At certain places on the mountains of Switzerland and of France one observes a species very near *R. tomentosa*, and which seems to be a mountain race. Its characters have appeared sufficiently remarkable and constant to warrant its separation from Smith's plant as a subordinate species. We speak of *R. omissa*, Déségl., which for a long time Swiss and French botanists have confounded with *R. mollis*. Up to the present time this species does not appear to have been determined from the British Islands, where, indeed, it appears not to exist.

**Rosa mollis**, *Sm.*

is rather abundantly distributed in the north-west of Europe, in Scandinavia, in Finland, in the Baltic districts, and in the

British Islands. It becomes more rare southwards, where it is ultimately replaced by *R. pomifera.* It is a species of the mountains, at least in the centre and the south of Europe, and not of the plain, like *R. tomentosa.* If, in nature, *R. mollis* is always easy to distinguish from *R. tomentosa*, this is not the case with herbarium specimens, and numerous are the confusions that exist in collections. As we have stated above, these two types are essentially distinct, not only in their morphological characters, but also by differences in their biology. Once again I draw the attention of phytographers to the distinctive characters of these two species. *R. pomifera*, Herm. (which is closely related to *R. mollis*, to which one might probably unite it specifically), does not yet seem to have been met with in a wild state in the British Islands, in which it perhaps does not exist, at least in its typical condition.

I come now to hybrids known under the names of *R. hibernica*, Sm., *R. involuta*, Sm., *R. Sabini*, Woods, etc., which for a long time have been admitted as species peculiar to the British Islands. Regarded as autonomous types, these Roses made the rhodological wealth of this country. But at the present day these same Roses have been met with on the Continent, and under conditions such as to give rise to the belief that they are not true species, but rather hybrids. My own study of them has led me to accept this conclusion. While one of the parents of these alleged species is beyond doubt *R. pimpinellifolia*, and for some *R. tomentosa* and *R. canina* is certainly the second, one may conclude with good cause that in the production of others *R. mollis* has intervened, or perhaps even *R. rubiginosa* or *R. micrantha.*

At present *R. involuta*, Sm., is made up, according to the "London Catalogue," of twelve varieties. These are very hard to characterise, or even to distinguish from one another, a thing very naturally explained if they are regarded as hybrids. Their study should be undertaken not on materials in herbaria, but on living plants in their natural habitats. They must be compared carefully with the other Roses that grow near them, and search should be made for the types

with which *R. pimpinellifolia* could have been crossed. It is only by such investigations, made with the greatest care, that one can succeed in discovering the true nature of these varied forms, the origin of which was misunderstood by the older authors.

Having now traced the outlines of the investigations that appear to me indispensable for the elucidation of the genus *Rosa* in the British Islands, I place myself very willingly at the service of British botanists to aid them in their rhodological studies. If they wish to know my opinion on any doubtful forms, I beg them to send to me materials sufficient to allow of their correct determination. Too often it is forgotten that a specimen of a Rose represents only a small fragment of an individual, and that this fragment is often far from giving the information that is indispensable for satisfactory recognition. If in a multitude of herbaceous species one had for their identification only fragments corresponding to those of the Roses, one would experience, as with the latter, great difficulty in naming them, especially in dealing with related species or secondary types.

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## FORMS OF *ALCHEMILLA VULGARIS*.

By Rev. E. F. Linton, M.A.

During the spring of 1894 a number of examples of *A. vulgaris*, Linn., were submitted by me to M. Buser of Geneva, in the hope of settling questions of identification and nomenclature which have been raised from time to time, but not satisfactorily answered. I have not by me the paper by Mr. P. Ewing in the "Annals of Scottish Natural History," for July 1893, in which three or four varieties were discussed. Many botanists will have noticed that we have three forms: a subglabrous plant, a moderately hairy plant, and a small form which is usually more hairy than the last and has often been labelled in herbaria *A. montana*, Willd. Each of these three was well represented in the parcel sent to M. Buser;

and provided that we have no other forms of the aggregate *vulgaris*, there will be no great difficulty in distinguishing them. But M. Buser was surprised at the paucity of British forms, and expressed the belief that the hill-country of the North of England and of Scotland must contain some of the numerous forms that are found in Scandinavia. This may prove to be the case ; but in looking through the Boswell Herbarium (by kind permission of Mr. F. J. Hanbury), and the material at South Kensington and at Kew, I failed to find any forms which were not referable to these three. The following is their distribution in Scotland as at present known to me, the numbers denoting Watson's counties or vice-counties.

1. *A. vulgaris*, L. (*sensu restricto*), (*A. pratensis*, Schmidt). —This appears to be the most widely distributed British form, ranging from the South of England to Orkney. It is very variable in size, with a hairy stem, leaves glabrous above, thinly pubescent beneath, nerves hairy, petioles villous more or less, calyx glabrous.

72. Dumfries (Moffat), *E. F. L.* and *W. R. L.*
83. Edinburgh (" near Edinburgh "), Hb. Brit. Mus.
88. Mid Perth (Killin), *E. F. L.* and *W. R. L.*
89. E. Perth (Glen Shee), Hb. *W. R. L.*
90. Forfar (Clova), *E. F. L.* and *W. R. L.*
92. South Aberdeen (Braemar), *E. F. L.* and *W. R. L.*
99. Dumbarton (Dalmuir), *L. Watt.*
111. Orkney, Hb. Kew.

This form, which is regarded by M. Buser as the type of *A. vulgaris* in a narrowed sense, may be expected to occur in every county for which the aggregate is recorded.

2. *A. alpestris*, Schmidt (1794).—This differs from the last in having the stems glabrous or nearly so, petioles glabrous, leaves thinly hairy on the principal nerves beneath, and silkily ciliate near the tips of the teeth, otherwise glabrous, calyx glabrous, teeth more acute. This is the same plant Mr. G. C. Druce has written upon, in the " Annals of Scottish Natural History," 1893, p. 32, etc., as *A. vulgaris*, L., var. *glabra*, Wimm. et Grab. ; but as a varietal name b. *glabra*, Mert. et Koch, 1823, and Lejeune, 1824, are both earlier.

It is no doubt well distributed in Scotland. I have seen specimens from the following districts :—

72. Dumfries (Moffat), *E. F. L.* and *W. R. L.*
74. Wigtown (Newton Stewart), Hb. *Bailey.*
77. Lanark, Hb. Kew.
86. Stirling, Hb. Brit. Mus.
88. Mid Perth (near Killin), *E. F. L.* and *W. R. L.*
92. South Aberdeen (Braemar), *E. F. L.* and *W. R. L.*
96. Easterness, Hb. Brit. Mus.
97. Westerness (Glen Spean), through *Bot. Ex. Club.*
99. Dumbarton, Hb. Kew, and (Dalmuir) *L. Watt.*
103. Mid Ebudes (Tobermory), Hb. *Bailey.*

3. *A. filicaulis*, Buser.—This is identical with many of the small hairy forms which have (wrongly) been circulated as *A. montana*, Willd. It resembles *A. vulgaris* (as restricted) in the hairy stems and petioles, but differs from it most conspicuously in the upper surface of the leaf being thinly hairy and the calyx clothed with some rather long stiff hairs. I have seen Scotch specimens of this only from—

72. Dumfries (near Moffat), *E. F. L.* and *W. R. L.*
80. Roxburgh, Hb. Brit. Mus. and (Stichill) Hb. Boswell.
89. East Perth (Glen Shee), *E. F. L.* and *W. R. L.*;

but it will no doubt occur in many other counties, especially in the south. It is widely distributed in England, though apparently more local than the two other forms.

I have followed M. Buser in giving these three forms the position of species in this notice. There is little doubt, however, that we in this country shall rather regard them as varieties of the aggregate *A. vulgaris*, and in catalogue they may be expected to stand—

**A. vulgaris**, Linn.
*a.* **pratensis** (Schmidt).
*b.* **alpestris** (Schmidt).
*c.* **filicaulis** (Buser).

## *CYSTOPTERIS MONTANA*, Bernhardi, IN STIRLINGSHIRE.

By A. Somerville, B.Sc., F.L.S.

It is always gratifying to be able to add to the previously known stations in this little country of ours, Scotland, for any local organism, be it plant or animal. Our indigenous ferns—many of them at least—are dainty things, and information as to extension of their range is of interest, more especially when the species happens to be one confined to those higher levels, the flora of which is so linked with that of Scandinavia, and also, in a more distant degree, with the flora of the elevated areas of Central Europe.

*Cystopteris montana* of Bernhardi, the Mountain Bladder Fern, is one of our rarest *Cryptogamæ vasculares*. With what may be termed decidedly arctic sympathies, it usually selects for its habitat a moist situation in "cloud-land," at between 2300 and 3600 feet, with a northern, or, in one case, a north-western exposure, and where it will receive little of the direct rays of the sun.

When on Ben Lomond in August last (1894), in company with Mr. Robert Kidston, F.G.S., Colonel J. S. Stirling of Gargunnock, and Dr. R. Braithwaite, F.L.S., author of the "British Moss Flora," I had the pleasure to meet with this interesting plant, previously unrecorded for Stirlingshire, recognising its deltoid, very compound fronds and long stipes from having seen them on hills north of Glen Lochay, Mid-Perthshire, in 1888. Mr. Arthur Bennett, F.L.S., to whom the plant has been submitted, remarks in connection with it: "I think the *Cystopteris* must be *C. montana*, though certainly the glandular setæ are much less numerous than usual." Fronds only were brought away by me, and it is to be hoped that this local species may spread at its newly found station, viz. the wet grassy ledges of the precipitous cliffs of the northern face of the hill, at about 3000 feet, and in company with its congener *C. fragilis*, Bernh.

It is somewhat remarkable that though Ben Lomond

is but twenty-seven miles distant in a direct line from the "Second City," and is visited annually by many botanists, it should only at this late day be telling us that *Cystopteris montana* belongs to its flora and to the flora of Stirlingshire. Through the kindness of Mr. Bennett, I am in a position to give particulars in full of the other five counties in Britain in which *C. montana* has been found; they are: (69) Westmorland, on Helvellyn; (88) Perth, Mid, on the Breadalbanes; (90) Forfar, in Caenlochan Glen; (92) Aberdeen, South, in Glen Callater; and, lastly, Argyle, Main, on Ben Laoigh, on its north-west side, as I have been kindly informed by Mr. G. Claridge Druce, F.L.S., who was the discoverer of it there. *C. montana* was first found in Britain by Mr. W. Wilson, on Ben Lawers, in 1836. Its foreign distribution, according to Sir J. D. Hooker, is in "arctic and alpine regions in Europe, Asia, and America."

Lowest pinna of *Cystopteris montana* (showing fructification).

The genus *Cystopteris*, of which there are five species known to science, has in Britain (excluding the doubtful *C. alpina* of Desvaux) two representatives, viz. the subject of this communication, and *C. fragilis*, Bernh. The latter, as we know, is common; I have taken it near Glasgow under the shade of a hawthorn hedge, between Possil Marsh and Cadder "Wilderness" in Lanarkshire. Its altitudinal range is from the sea-level to 4000 feet, contrasting in this with *C. montana*, which latter, however, though an "alpine," grows well from its creeping rhizome in our gardens under cultivation.

[For permission to use the figure I am indebted to the courtesy of Messrs. Swan Sonnenschein & Co., publishers of "British Ferns, and where found."]

# ZOOLOGICAL NOTES.

**Recurrence of the Wild Cat in Ardnamurchan.**—Within the recollection of old folk still living, Wild Cats (*Felis catus*) were common in Ardnamurchan; but by 1879, when my more close acquaintance with the district began, they were extinct, the last individual having been killed about 1876 by a gamekeeper who has now retired from active work. It was therefore with an interest not unmingled with doubt that I heard from my keeper in the end of October last (1894) that he had killed one, but when it was sent on to me it proved to be an undoubted female Wild Cat which had been nursing young this season. It weighed 7 lbs. 5 ozs. Two days later came news of the capture and death of the male at the hands of one of the rabbit-trappers; and since then two kittens, one-third grown, have met their end also in the rabbit-traps. The capture of these Wild Cats led me to inquire whether any had been seen on the eastern beat of the same estate; and my good friend Mr. Simon Ross, gamekeeper at Glenborrodale Castle, writes me thus: "With regard to the two Wild Cats trapped in Corrievoulin, I think they went down there some time about April or May last. I had them on Glenbeg early in April, and was after one of them. The Glenbeg shepherd's dogs chased one of them from the middle of the glen till they lost it in Glenmore Burn. . . . I think they came down Loch Shiel way from the upper country. . . . In 1892 the Kintra keeper observed a good many footmarks, which he thought were made either by a small fox or a large cat; and in February that year he got a very large cat high up the hill on Acharacle, which proved to be a very large Mountain Cat. Nothing more was heard of any till last year, when four were caught at different times on Gorsten ground, and other two on Laga, in traps when they had them set for rabbits. Three of these were young ones, and the other three old cats. One of them which I weighed was 11 lbs. The two got at Laga were males, but I cannot say as to the other four." I am very sorry for the total destruction of the family on my beat. For, believing that an unlimited rabbit supply would keep them from harming almost aught else, I would gladly give the race shelter till they required diminution. But the imperative necessity of rabbit-trapping, as carried on by both shooting and pastoral tenants, gives them but a poor chance of survivance. It looks, however, as if in some happy central deer-forest home the species is so far prosperous as to be able to give off emigrants at times.—A. Burn Murdoch, Edinburgh.

**Lesser Rorqual in Scottish Waters.**—A male Lesser Rorqual (*Balænoptera rostrata*) got entangled in the swing rope of a herring-boat this summer, was killed, brought on shore, and landed on the

beach in the North Harbour, Peterhead. It was much swollen when I saw it, and appeared to be over 30 feet long, and from 18 to 20 feet in circumference. The mouth was open, and showed whalebone about 6 inches long of a yellowish colour. It had a long-looking fin with a grayish white bar across it. The Lesser Rorqual is to be met with all over the Northern Ocean, mostly solitary. They are sometimes seen in herds in the early part of the summer north-east from Iceland. In the days of sailing ships, when there was little wind, they often came close to the ship, evidently examining her very closely. A favourite position of theirs was to lie close under the stern with their nose against the rudder. One came alongside the sailing-ship "Eclipse" on the passage home. The whaling gear being still in the boats, a harpoon was fired into it, and a great length of line was run out before being stopped. It was eventually killed and flenched. On opening the stomach, a large tubful of fresh herrings were found and eaten by the crew, who enjoyed the feast very much.—David Gray, Peterhead.

**Wood Mouse in the Outer Hebrides.**—Messrs. Harvie-Brown and Buckley, in their account of the fauna of the Outer Hebrides, do not mention having found this mouse in any of the islands of this group. The Wood Mouse (*Mus sylvaticus*) occurs in the islands of St. Kilda and The Lews, and I was fortunate in obtaining a very nice series of skins on the western side of the latter island during last summer. I failed to catch any examples of the House Mouse (*Mus musculus*). The country people could not distinguish my specimens from the mouse which they told me was so plentiful in and about the houses during winter, therefore I think these mice (*sylvaticus*) must come in from the moors to a great extent; for I do not see how they could lay up much store to support themselves during that season in a place where there is no grain or fruit.—W. E. de Winton, Graftonbury, Hereford.

**Carrion Crow, Hen Harrier, and Eagles in Islay.**—In several recent books on Natural History, Messrs Harvie-Brown and Buckley's "Fauna of Argyll and the Inner Hebrides" is quoted as showing that there was no information as to the Carrion Crow (*C. corone*) being observed in Islay. Though long after date, I propose to supply this deficiency. I came to Islay in 1875, and found this house surrounded by plantations. The place had stood vacant for a year, and the woods around were a perfect paradise for what gamekeepers call "vermin." Close to the house there were several nests of the long-eared owl, three nests of sparrow-hawks, two of gray-backed crows, and one nest of *C. corone*. I of course carefully protected owls, but destroyed the rest. I shot the Carrion Crow off her nest, and found it contained eggs. I have never come across a Carrion Crow since, though every year gray-backed crows nest, and also appear in large numbers in their autumnal migration—chiefly seen on the sea-

shore. I should like to say a few words on the interbreeding of *C. corone* and *C. cornix*. Mr. Gray goes too far when, in his "Birds of the West of Scotland," he says that they do so *invariably*. I have seen in various parts of the country the nests of these birds, from Galloway to Shetland, and yet personally I never met with a single instance of inter-breeding.

I regret to note that, for the first time during nineteen years, I saw no Hen Harriers (*Circus cyaneus*) last August and September. Formerly they were numerous, and, strange to say, the Black Game were utterly absent from that portion of the Rhinns of Islay with which I am familiar. Their sudden disappearance is unaccountable, and no dead birds have been seen.

Some weeks ago a shepherd noticed an odd-looking object on the moor. He found it was a Golden Eagle (*Aquila chrysaetus*) with a rabbit-trap attached to its foot, and very weak and emaciated. The foot being removed, the eagle is rapidly resuming its healthy condition. During nineteen summers in Islay I have only seen three Sea Eagles (*Haliaetus albicilla*), and these were not residents.—R. Scot Skirving, Islay.

**Pied Flycatcher breeding in Inverness-shire.**—The Pied Flycatcher (*Muscicapa atricapilla*) bred this year not far from Inverness, and the eggs were sent me by the man who took them.—T. E. Buckley, Inverness.

**White-Winged Crossbill in Orkney.**—On the 18th of June last I received from North Ronaldshay, Orkney, a specimen of *Loxia bifasciata* in the flesh. It was a male in finest breeding dress, and was secured by the gardener at Holland House on the 13th of June, while sitting on one of the gravel walks. He had seen the bird the previous evening when it was unattended by any of its own or other species. Mr. Eagle Clarke kindly identified it for me as belonging to the European race.—Allan Briggs, St. Andrews.

**Swallows Nesting in Tunnels.**—Reading in the last edition of Yarrell's "British Birds" (vol. ii. p. 343) that the statements of Couch and Edward regarding swallows (*Hirundo rustica*) frequenting and breeding in caves require confirmation, it has occurred to me that a circumstance relating to the Giffnock district of East Renfrewshire, presenting a parallel to the cases referred to, to which my attention was directed by Mr. John Robertson of Eastwood, Thornliebank, may be of interest. There have been in this district for a long period most extensive sandstone quarries. These have been largely worked on the tunnelling system, owing to the superincumbent mass of boulder clay, which has rendered the sacrifice of great pillars of pure sandstone (liver rock as it is called from its homogeneity) to support the roof less expensive than the removal of the tenacious clay. The entrances to these tunnels present some-

what the aspect of great natural caves. The tunnels, which are quite dark at a short distance from their entrances, branch in various directions, the longest being perhaps a quarter of a mile in extent. Some nine years ago swallows were known to nest near the entrances to and within the tunnels, but none have been noticed for a year or two. This year (1894), in the disused tunnels, now flooded with water at Williamwood, close to the Giffnock workings, they have again been found breeding in some numbers. On a visit early in the present month (November) with Mr. Robertson we found that some of the nests had been destroyed, the places occupied by them being plainly indicated by the fresh fractures from the stones which some incorrigibles had used to dislodge them, as they were inaccessible either on account of their height on the tunnel walls or by their position over water. The nests destroyed were, from their situation, easily discerned when the tunnels were entered ; but one at the side, and in a dark corner, with some straws depending from it, still remains at a height of about twelve feet. These tunnels or caves have also witnessed the upbringing of the young of some domestic pigeons which have reverted to the traditions of their ancestors, breeding in holes and caves of the rock.—John Paterson, Glasgow.

**The Shoveller in Wigtownshire.**—In the April number I drew attention to the attraction offered by the Canadian pond-weed to wild-fowl, as evinced by large flocks of widgeon on Myreton Loch, Wigtownshire, which bird I never saw on this loch till about four years ago. This autumn I am glad to see another addition to the species frequenting it, in the shape of two pairs of Shovellers (*Anas clypeata*). Though this bird has been frequently shot in the county, I have never seen it on Myreton Loch until last week. The males are in fine plumage, and not nearly so shy as widgeon. —Herbert Maxwell.

**Ruddy Sheld-Duck, Albino Cormorant, etc., in the Tay District.**—Some rare birds have lately come into my possession, shot on the Tay a few miles below this, and within the county of Perth, viz. three Ruddy Sheld-Ducks in winter plumage, an adult male and two females (one of the latter being a young bird) shot on the 26th of September last. There were four birds in all, but one escaped, though severely wounded. Two of these birds I hope to place in the Perthshire Museum. The other I have presented to the Edinburgh Museum of Science and Art. I am not aware that this species is kept in a semi-domesticated state on any waters in Perthshire, or in the neighbouring counties of Forfar and Fife ; and I believe these specimens to have been truly wild ones, especially as there are three or four instances of this species having been obtained at the mouth of the Tay on Barry Links, where they may

have attempted to breed, one having been trapped in a rabbit's burrow, and the last shot there in April 1877.

The other birds worthy of mention obtained on the Tay about the same time are a Cormorant (*Phalacrocorax carbo*) and a Wild Duck (*Anas boscas*), both approaching albinism. These were both old females, and what is worthy of remark is, that in both cases the ovaries were diseased. The Cormorant had all the upper surface of a very pale fawn colour, head and neck included, darker on the tail and flanks, the under parts pure white, irides pale straw. The duck was also of a palish fawn colour, mottled on the back, the head grayish-brown, under parts pale, the bill and feet paler than in the normal form. Both these birds I also hope to place in the Society's Museum at Perth.

Regarding the specimen of the Hawfinch (*Coccothraustes vulgaris*) now in the Museum of the Perthshire Society of Natural Science at Perth, to which allusion was made in Mr. Eagle Clarke's very interesting note in the last number of the "Annals," it was one of two birds that were shot in the garden at Annat Lodge, Perth, during January of the severe winter of 1860-61. They were shot by the gardener on the wall-trees, and at once taken by him to Dr., now Professor M'Intosh.—H. M. Drummond Hay, Perth.

**Nesting of the Water Rail near Glasgow.**—As the nesting of the Water Rail (*Rallus aquaticus*) appears to be rather a rare occurrence in the West of Scotland, at the request of the editors I send the following note :—On 19th May 1889, whilst walking round the Possil Marsh, Glasgow, some boys brought me a nest and eggs of the Reed Bunting, for which I gave them a few pence. Seeing this, another boy ran off and soon returned with five eggs of the Water Rail. He told me that he had found the nest a day or two before, with nine eggs, out on the marsh, that he had blown four of them and put them back in the nest for the bird to lay to again, and brought the other five to me. On further inquiry, he told me that somebody else had since taken the four eggs he had left in the nest. The five he brought me were unblown, and quite fresh. I may add that I have shot the Water Rail in winter on the Clyde near Bowling, where it is by no means uncommon at that time of year.—Robert H. Read, Westminster.

**Black-tailed Godwit in Orkney.**—A specimen of the Black-tailed Godwit (*Limosa belgica*) was shot on the island of Westray, Orkney, on the 27th of September 1894, and seems to be the first recorded from there on satisfactory evidence.—Lewis Dunbar, Thurso.

**Green Sandpiper in Dumbartonshire.**—On the 8th of December I shot a Green Sandpiper (*Totanus ochropus*) on the pond at Douglaston. The bird was extremely wary, and though I saw it

several times between the 1st and the 8th, it never allowed me to get a shot at it. I have presented the specimen to the Edinburgh Museum of Science and Art. A bird of the same species appeared ten years ago, but I failed to secure it.—J. Ripley Ker, Douglaston.

**Albatross in the Orcadian Seas.**—The specimen alluded to in the "Zoologist" for September as having been seen near the Orkney Islands (*loc. cit.* p. 337), I find is referred to in my journals in the following terms:—July 18th.—By 4 P.M. the log recorded 143¼ miles (*i.e.* from Great Dimon of the Faeroe group), and at 7.30 the captain put our position down at 20 miles from the Orkneys, sighting the Mull Head. At 6.45 P.M., from 200 to 300 yards from the weather bow, and thence to a distance of three miles at least, I watched a big bird. Gannets in several phases of plumage had been seen frequently. This bird was no gannet. The flight petrel- or molly-like, seldom flapping; swinging and skimming from side to side, not flying straight like a gannet; head low, and heavy bill, seen to be thick and short—a bird in what I would judge to be its second year's plumage. The captain, who stood beside me at the time, said he had seen one to-day (or the same) close to the ship, and that it was no gannet." I can say no more, but morally I felt certain it was an Albatross. It was far larger than a gannet, some of which we saw immediately afterwards. We were in a position N. by W.-½-W. and twenty miles from Orkney on our course.—J. A. Harvie-Brown.

**The Fulmar Petrel off Dunbar.**—On 23rd September last (1894), while I was staying at Tynefield, East Lothian, Mr. G. Pow kindly informed me that a Fulmar (*Fulmarus glacialis*) had been captured alive the previous day by a boating party immediately off Dunbar. I at once secured the bird; and, being curious to observe its mode of progression on land, turned it out into the garden, where unfortunately it lived but a couple of days. Owing no doubt to its emaciated and enfeebled condition, it made little or no effort to escape, but remained for the most part in a sitting posture on the lawn or in a flower-border, with the whole of the under parts, including the lower portion of the breast, resting on the ground. Every now and then, however, it would get to its feet, flap its wings, and in a very deliberate manner walk for a distance of five or six yards, then sit down again. When walking its appearance was very similar to that of a gull; but it made no attempt to rest on its legs, as gulls so often do. I mention these facts in view of Mr. G. Gillett's statement ("Notes on the Birds of Novaya Zemblya," "Ibis," 1870, p. 307) that the Fulmar "is easily caught with a baited hook, and when placed on deck is quite unable to rise or even to stand upright, but shuffles along by the help of its wings." Perhaps the birds upon which his observations were made had

merely been endeavouring to effect their escape faster than their legs could carry them. My specimen—the fifth I have seen from the mouth of the Firth of Forth during the past twelve years—is a female apparently nearing maturity.—WILLIAM EVANS, Edinburgh.

[Mr. D. Bruce, of Dunbar, kindly informs us that a Fulmar was captured two miles off Dunbar by some fishermen. This specimen was brought to Mr. Bruce, alive, on the 22nd of September, and may be the identical bird which afterwards found its way into Mr. Evans's hands.—EDS.]

**Fulmar Petrel at Nairn.**—On 8th September a Fulmar Petrel (*Fulmarus glacialis*) was killed by a golf-club on the course at Nairn, at a distance of about 60 yards. The strange thing is that the Fulmar Petrel is a rare bird on the East Coast, and especially on land.—T. E. BUCKLEY, Inverness.

**The Great Crested Grebe in Wigtownshire.**—The late Mr. Robert Gray, in his paper on the "Birds of Wigtownshire and Ayrshire," published in the "Proceedings of the Natural History Society of Glasgow," mentions the Great Crested Grebe (*Podicipes cristatus*) as being very rarely met with in either of these counties, and adds that "few, if any, of the young birds hatched in the Irish loughs find their way to the western shores of Wigtown." One, a young male, has lately arrived on the White Loch of Myreton (Monreith), and I have had several opportunities of watching it through the glass.—HERBERT MAXWELL.

**Retinia resinella, *L.*, in Aberdeenshire.**—This insect has for many years been known to occur in other districts of Scotland, *e.g.* Perthshire; and I would have scarce thought its occurrence in Aberdeenshire worth a paragraph, were it not for a sentence in a "List of Lepidoptera of Aberdeenshire and Kincardineshire," by William Reid, Pitcaple, reprinted from the "British Naturalist" in 1893. In this list, on p. 28, we find "*Retinia resinana* has been reported as occurring in Aberdeenshire ("Entomologists' Record," vol. i. p. 11), this is an undoubted error." I am not acquainted with the record here referred to; but Mr. Reid's contradiction would appear to imply that the insect does not occur in the county. Negative evidence is never trustworthy; and in this case it may be set aside, as I found on 8th September current, on a Scotch fir tree by the roadside near Bridge of Ess, west of Aboyne, three of the unmistakable resinous masses formed by the larvæ. Each of the three was placed just below a whorl of twigs, which seemed little the worse of its presence. Two of the masses were about as large as a walnut. The third was not more than half as large.—JAMES W. H. TRAIL.

**Cladocera from Barra and North Uist.**—This note deals with the occurrence of *Acantholeberis curvirostris*, Müller, *Drepanothrix hamata*, G. O. Sars., *Ilyocryptus sordidus*, Lièvin, and *Monospilus tenuirostris*, Fischer, in fresh-water lochs in Barra and North Uist. These four species of interesting and somewhat rare Cladocera have not previously been recorded from the southern islands of the Outer Hebrides. The first was obtained in three localities in Barra and in three in North Uist: one of the Barra localities (pools near the top of Ben Herval) is about 1200 feet above sea-level. The second was obtained in two localities in Barra and three in North Uist. The third was obtained in five localities in Barra, but was not observed in the North Uist gatherings. The fourth was obtained in two localities in North Uist, but was not observed in any of the Barra gatherings. *Drepanothrix hamata* is usually furnished with a hook-like process on the dorsal edge of the carapace, but some of the Barra specimens were without this characteristic hook.—Thomas Scott, Leith.

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## BOTANICAL NOTES AND NEWS.

**First Records of Scottish Plants.**—In Mr. Wm. A. Clarke's "First Records of British Flowering Plants" in the "Journal of Botany" for October the following are enumerated from Scottish localities:—

*Betula nana*, L., 1777.—"In Breadalbane."—Lightf., "Fl. Scot.," 575, with a figure. Discovered by Sir James Nasmyth ("E. B.," 2326).

*Salix phylicifolia*, L., 1802.—"At Finlarig, Breadalbane, Rev. Mr. Stuart."—Sm. in "Linn. Soc. Trans.," vi. 123.

*S. lanata*, L., 1828.—"On rocks in the Highlands of Scotland."—Sm. "Eng. Fl.," iv. 205.

*S. lapponum*, L., 1777.—"On the Highland mountains, Mr. Stuart."—Lightf., "Fl. Scot.," ii. 604.

*S. arbuscula*, L., 1804.—"In Alpibus Scoticis, D. Dickson."—Sm., "Fl. Brit.," iii. 1050.

*S. Myrsinites*, L., 1777.—"Upon the Highland mountains, as upon Ben Achulader, in Glenurchy, Mr. Stuart."—Lightf., "Fl. Scot.," ii. 599.

*S. reticulata*, L., 1777.—"Upon many of the Highland mountains."—Lightf., "Fl. Scot.," ii. 601.

*Pinus sylvestris*, L., 1540.—"In Scotland, as I have been assured."—Park., "Theatr.," 1540.

*Elodea canadensis*, Mich.—"In the Whitadder and ponds, Dunse Castle, Berwickshire, by Dr. Johnstone, some years ago."—M. Kirby, "Fl. Leicestershire," 148 (published 1850).

*Corallorhiza innata*, R. Br., 1777.—"In a moist hanging wood near the head of Little Loch Broom, on the western coast of Ross-shire."—Lightf., "Fl. Scot.," 523.

*Goodyera repens*, R. Br.—"We found it . . . in an old shady moist hanging birch wood . . . facing the house of Mr. Mackenzie of Dundonald, about two miles from the head of Little Loch Broom on the western coast of Ross-shire."—Lightf., "Fl. Scot.," 520.

**Cochlearia micacea**, *n. sp.*—Under the above name Mr. E. S. Marshall has described and figured a *Cochlearia* found by himself on micaceous débris on Ben Lawers and Am Binnein in Perthshire, and on Ben Dothaidh, in Argyle; in all cases between 3000 and 3700 feet above sea-level. (He had already used the name *C. conferta* in the herbarium, but has discarded it as not distinctive.) Mr. Marshall gives a full description, and enters at considerable length on the discussion of the allied forms of *Cochlearia*, pointing out that "the dark green, glossy foliage and the perfectly smooth fruits mark it off from all other British members of this family. The differences from *anglica*, *officinalis*, and *grœnlandica* are so evident as to scarcely need definition. Dr. Lange, to whom part of the 1891 gathering from Ben Lawers was sent, replied: *Forsan distincta, ob radicem perennem, sed proxime affinis C. danicæ.* The points of divergence in living plants are, however, sufficiently obvious. In *micacea* the root-leaves are more entire, coriaceous, ascending; the inflorescence is less terminal, the flowers being very much larger, with a long claw to the petals, the pods smooth when ripe, the seeds much larger and fewer (2 to 6, usually 4, as compared with up to 12 in *C. danica*). The only British species with which confusion seems likely to arise is *C. alpina*, Watson, which I believe should retain specific (or subspecific) rank. Dried flowering specimens of the two are not always readily separable; but the living material may be differentiated by the following characters:—Root-leaves of *alpina* larger and coarser, with a deeper basal sinus, light green, more flaccid and thinner, more concave, with more evident veins. Petals more gradually narrowed into a shorter claw, not rarely pinkish. Upper stem-leaves with conspicuous auricles. Sepals light green. Pods reticulate-veined when thoroughly ripe. Stems usually more procumbent."

He then compares *micacea* with two smooth-fruited forms, viz.:—

*C. fenestrata*, R. Br., which resembles *C. anglica* in leaf characters, but with fruits terminal and crowded, and seeds small and numerous.

*C. arctica*, Schlecht., with which *micacea* has "much affinity."

The differences stated by Mr. Marshall as observed by him are that *arctica* has seeds smaller, "stem-leaves all sessile (except the very lowest in some plants), much longer, narrower, more numerous and regularly scattered up the stem, nearly or quite entire, the root-leaves withering early, generally ovate, gradually narrowed into the petiole; petals small, broadest at the tips, tapering uniformly to their base, instead of being abruptly clawed. The rootstock is more slender, and the general aspect dissimilar, though it is not easy, especially without having the sheets before one, to put the difference in words."

**British Hieracia.**—To all but the few initiated (if not to them also) the Hawkweeds form a group of plants that few can dare to claim a knowledge of. Varieties and species among them are not as among other groups, and require a very special training for their successful study. Mr. Hanbury, by his "Tentative List of British Hieracia," published in the "Journal of Botany" for July, with the accompanying "Notes on British Hieracia" in the August number, has given a much-needed aid to the ordinary British botanist. The foreboding expressed in his "Notes," when referring to the "nearly one thousand named forms for North Europe," that "such subdivision . . . will render the study of a wonderfully attractive and interesting genus an impossibility, except to the few specialists who may devote their entire lives to its elucidation," is well-founded; and few will feel that life is long enough to undertake such a task. Meanwhile gratitude is due to Mr. Hanbury for his unwearied labours in this very difficult field, and for his placing the results of such labours clearly before us. The "List" gives in tabular form all the named "species" and "varieties" yet recorded from Britain (including a good many described in the "Notes" in August), divided into two great groups (*Pilosella* and *Archieracia*), which are themselves divided into sections and subsections. Each named form is provided with a reference to its original description or record. *Pilosella* includes 3 species only, of which *H. pilosella* has 4 named varieties.

*Archieracia* contains 99 species, with 106 named varieties and 1 subvariety; and in addition several "species" are represented in Britain only by forms differing so much from the usual continental types as to receive varietal names. Many of these forms have been detected and named by British botanists. Thus Backhouse is responsible for 12 species and 5 varieties, Babington for 1 variety, Beeby for 1 species, F. J. Hanbury for 28 species and 37 varieties, and the brothers Linton or W. R. Linton for 7 species and 9 varieties.

In the "Notes" the following Scottish forms are mentioned, with full descriptions of all those named for the first time:—*H. petiolatum*, Elfstrand, from ascent to Ben-na-Muicdhui, from Glen Derry; *H. atratum*, Fr. f., from Stuchd-an-Lochain, in Perthshire, and Ben

Creachan, in Argyle; *H. hyparcticum*, Almg., from Ben More, Assynt, in Sutherland; *H. carenorum*, n. sp., near Cashil Dhu, in Sutherland, in 1888; *H. Oreades*, Fr., var. nov. *subglabratum*, to include the British form of *H. Oreades; H. argenteum*, Fr., var. nov. *septentrionale*, about Betty Hill and Naver, in Sutherland, in 1887; *H. aggregatum*, Backh., var. nov. *prolongatum*, from mountains south of Glen Lochay, in Perth; *H. rivale*, F. J. Hanb., var. nov. *subhirtum*, on various hills in Perth and Argyle; *H. murorum*, L., *pro parte*, var. nov. *camptopetalum*, on Ben Hope, in Sutherland, in 1888; *H. duplicatum*, Almq., from Kincraigie Burn, found in July 1891 by Dr. F. B. White; *H. orarium*, Lindeb., var. nov. *fulvum*, from east bank of the Naver, in Sutherland, in 1886; *H. gravestellum*, Dahlst., var. *rhomboides*, Stenstr., on some of the high mountains of Perth, Argyle, Aberdeen, Forfar, and Sutherland; *H. subramosum*, Lönnroth, from Fife, near Burntisland, found in 1876 by Dr. Syme, and distributed by him as "*H. pallidum*, Fr."; *H. rigidum*, Hartm., var. nov. *longiciliatum*, by the Clunie, Braemar, in 1887; *H. Dovrense*, Fr., var. nov. *Hethlandiæ*, found by Mr. Beeby in Shetland in 1891; *H. strictum*, Fr., var. nov. *amplidentatum*, from Perth and Argyle, from Crook of Devon, Kinross, and from Hoy in Orkney; *H. auratum*, Fr., var. nov. *thulense*, found by Mr. Beeby in Shetland in 1889.

**Note on the Occurrence of Linnæa in Ross-shire.**—In reference to Mr. Bennett's note on Linnæa in the July "Annals," I fear I must own to the soft impeachment of telling Dr. Joass that this plant "grows in Novar Wood in Ross." The original Novar locality is rather mythical—at least no one seems to know anything about it. The locality from which the accompanying specimens are sent, although on the Novar estate, is not, as far as I can learn, the same place as that indicated by former records. It is most likely that the note regarding its extinction "near Dingwall" applies not to the Novar station, but to one in the wood around Loch Ussie which was cut down some years ago. This is also the "Brahan Castle" locality. Kingsmills is an Inverness station.

The discovery of the present Novar station is due to Mr. Hugh Miller of the Geological Survey, who towards the end of 1888, or thereabouts, brought me some of its long trailing stems which he had gathered in a fir wood on a hill some two miles from Novar (I am not anxious to be too definite as regards locality). It was not till after two seasons' futile search that I came upon it in the end of June 1890, forming an extensive patch (some forty paces in circumference), in excellent condition and flowering profusely, at a height of 800 feet above sea-level. It grew along with Vaccinium (Myrtillus and Vitis Idæa), Trientalis, Tormentil, short heather, Hypnum, and Lomaria Spicant.

In July 1891 I visited, along with Dr. Joass, the Golspie station, where we observed several thriving plots of Linnæa in a pine wood

scarcely raised above sea-level, near sandy flats, and full of open spaces with free circulation of air. The Linnæa was here growing in company with heather, Empetrum, Aira, and Hypnum (loreum, triquetrum, etc.), and mingling its flowers with the whitish purple waxy bells of Erica Tetralix. It had to fight for its footing with tall heather; and, adapting itself to circumstances, grew more upright than in its Novar habitat. In one place a heap of dry pine branches occupied the middle of a plot, and the Linnæa crept and climbed up among the loose branches till it clothed and overflourished the dead twigs with beauty and verdure.

Not far distant in the same wood Pyrola uniflora grew in fair abundance—"beautiful exceedingly." Its companions were Hypnum triquetrum, Luzula, Goodyera, heather, and whin,—under the last two of which it frequently found shelter.

Just on the outside of the wood, on the close turf, great quantities of the little pink shore centaury occurred in company with brown plants of Bartsia, little white Spergula, sea-pink, and Spergularia,—a very pretty collocation.—ARTHUR SUTHERLAND, M.B., Invergordon.

*P.S.*—The day after the above note was written (12th September) I made my annual pilgrimage to the Novar station for Linnæa. I found that the gales of November had stripped half the hillside of its pines, and that the Linnæa patch was in the path of the destructive north wind. Every tree in the neighbourhood for a quarter of a mile went down. Among the confusion of prostrate trunks, upturned roots, and broken and scattered boughs, it was not easy to spot the plant, but when discovered, though buried under pine branches, it was found uninjured; the plot, considering the condition of the surrounding soil, having escaped disruption in a wonderful manner. One plant was still in flower. The Hypnaceæ that grew in company were Hypnum Schreberi and Hylocomium splendens.—A. SUTHERLAND.

**I. On the various Divisions of British Carboniferous Rocks as determined by their Fossil Flora** (opening address delivered before the Royal Physical Society, November 1893);

**II. On some new Species of Fossil Plants from the Lower Carboniferous Rocks of Scotland** (read December 1893), both by Robert Kidston, F.R.S.E., F.G.S.—In these papers Mr. Kidston has done valuable service to the progress of Vegetable Palæontology, as well as to a more general and correct appreciation of the methods useful in the determination of the age of the strata and of the reliance to be placed on the different kinds of fossils. He has shown excellent reasons for ranking the fossil flora as very reliable, owing to the narrower limits within which the species are restricted when compared with Mollusca; while the preservation in the Carboniferous strata is often such as to give the utmost certainty in the

results, when these are guarded by reference to a sufficiently wide assemblage of species for each formation, giving a characteristic facies. The flora of the various divisions of British Carboniferous rocks is treated in several pages, the more important species in each being enumerated; and a chart is given to show the extent of the geological distribution of certain plants, and their relative abundance in each formation. A table follows, in which are noted the geological range of all the plants known to occur in Carboniferous strata in Britain.

In the second paper Mr. Kidston describes and figures (on Plates IV. to VI.) six new species, of which one fern is referred to a new genus.

**The Set of British Willows**, of which Messrs. E. F. Linton and W. R. Linton have issued the first fascicle (Nos. 1 to 25), will be a very valuable aid to botanists who desire to become more intimately acquainted with the forms of a genus most interesting to the evolutionist, but most difficult to determine without actual examples accurately named for reference. It is expected that about 100 numbers will complete the set. Those already issued are represented by very carefully selected and prepared specimens, many of which have been taken from cultivated examples. The original localities of the plants are in all cases stated, seven coming from Scotland. Ten of the whole number illustrate forms of hybrids; and two others at least are suspected to be hybrids. The labels of all bear bibliographical references; and on many there are also interesting and valuable notes.

**The Sea Spleenwort (*Asplenium marinum*) in the Island of Barra, Outer Hebrides.**—This pretty fern was growing in considerable profusion among rocks above Sinclair Loch on the west side of the island. The plants were in dense clusters in the crevices of the rocks, but the fronds were not very large: one of the larger size taken as a specimen measures scarcely 6 inches in length. *Asplenium marinum* has been recorded from Little Barve, Harris (also one of the Outer Hebridean islands), but I do not know of any previous record of its occurrence in Barra.—Thomas Scott, Leith.

**Topographical Botany: Wigtownshire.**—At. p. 159, *Geranium sylvaticum* is recorded, on the authority of Mr. J. M'Andrew, as occurring in Wigtownshire. Now I am fairly well acquainted with the phanerogamous flora of that county, and I have never yet seen *G. sylvaticum*. Mr. M'Andrew has told me that he did not find the plant in flower, but recognised the leaves on the shores of the White Loch of Myreton. It is not *G. sylvaticum* which grows there, but *G. phæum*, which I have known in that place for 25 years, probably a wanderer from neighbouring gardens.—Herbert Maxwell.

FRANCIS BUCHANAN WHITE, M.D.

From a photo taken in 1890.

# CURRENT LITERATURE.

**The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October-December 1894.**

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

## ZOOLOGY.

White-beaked Dolphin in Kilbrannan Sound, Arran. John M. Campbell. *Zoologist* (3), vol. xviii. p. 424 (November 1894).—An account of a female captured on 1st September, off Dongarie, and measuring 9 ft. 8 in. in length.

The Bird Collection in the Smith Institute. By James Sword. *Trans. Stirling Nat. Hist. and Arch. Soc.* (1893-94), pp. 139-204.—Gives a chatty account of the birds of the Stirling district, and a list, with localities, of 121 species represented by local examples in the Institute collection.

Contributions to the Life-Histories and Development of the Food and other Fishes. By Professor M'Intosh, M.D., F.R.S., etc. *Rep. Fish. Board Scot.* (1893), part iii. pp. 218-229, Plates II.-IV.—Deals with additional observations on the eggs of the "Saithe," the ova and larva of the Turbot, Lumpenus lampetriformis (figured), and the Norwegian Topknot (figured).

List of some of the Pelagic Ova, Larvæ, and Young Fishes obtained in 1894. By H. C. Williamson, M.A., B.Sc. *Rep. Fish. Board Scot.* (1893), part iii. pp. 298-301.

A Monograph of the Fishes of the Old Red Sandstone of Britain. Part II. No. 1. The Asterolepidæ. By R. H. Traquair, M.D., LL.D., F.R.S. *Palæontographical Society*, 1894.—This is a continuation of the monograph on British Old Red Sandstone Fishes commenced many years ago by Powrie and Lankester, and of which only one part, that on the Cephalaspidæ, written by Professor Lankester, has hitherto been published. The present contribution is almost entirely occupied with the description and illustration of *Asterolepis maxima* (Ag.), a large *Pterichthy*-like fish from the Upper Old Red of Nairn, the true generic position of which the author was the first to point out, and of which only the anterior median dorsal plate had previously been figured. The series of specimens here depicted in the four plates drawn by Mr. F. H. Michael give at last a very complete idea of the exoskeleton of the creature, and the arrangement of its various parts is rendered still more clear by restored outline-figures printed in the text. It is to be noted, as the author remarks, that this creature has nothing to do with Hugh

Miller's "*Asterolepis* of Stromness," which is a large Coccostean which Miller, misled by a mistake on the part of Agassiz, erroneously identified with the *Asterolepis* of Eichwald.

Notes on Palæozoic Fishes. No. 1. By R. H. Traquair, M.D., LL.D., F.R.S. *Ann. and Mag. Nat. Hist.* (6), vol. xiv. pp. 368-374, Plate IX. (November 1894).—Includes descriptions and figures of Euphyacanthus semistriatus, gen. and sp. n., and Harpacanthus major, sp. n., from the Lower Carboniferous of the Edinburgh district.

A Monograph on Carbonicola, Anthracomya, and Naiadites. Part I. Carbonicola (Anthracosia). By Wheelton Hind, M.D. *Palæontographical Society*, 1894.—Contains descriptions and figures of 16 species of *Carbonicola*, M'Coy, better known as *Anthracosia*, King, from British Carboniferous rocks, and of these 8 are recorded from Scotland. The descriptions are amply illustrated by 11 lithographic plates drawn by Mr. A. H. Searle.

An Entomological Trip to Forres, N.B. J. P. Mutch. *Ent. Record*, vol. v. p. 270 (November 1894).—Records of Lepidoptera captured from 3rd August to 22nd August 1894.

Collecting at Douglas, Lanark. Rev. J. A. Mackonochie. *Entomologist*, vol. xxvii. p. 352 (December 1894).—A list of about 50 species of Lepidoptera collected during July and August 1894.

Collecting in Kincardineshire. A. Adie Dalglish. *Entomologist*, vol. xxvii. p. 353.—A list of 115 species of Lepidoptera collected at Stonehaven in July 1894.

Collecting in West Ross-shire. W. M. Christy. *Entomologist*, vol. xxvii. p. 355 (December 1894).—A list of 73 Lepidoptera taken at Strathcarron.

Random Notes on Zygæna exulans and its Variations. By J. W. Tutt. *Ent. Record*, vol. v. pp. 258-267 (November 1894).—In this paper Scotch specimens are compared with others from the Alps.

Cirrhœdia xerampelina in South Argyleshire. W. M. Christy. *Entomologist*, vol. xxvii. p. 297 (October 1894).—Records the occurrence of this species in the Kyles of Bute.

Cirrhœdia xerampelina in Ayrshire. William C. S. Ferguson. *Entomologist*, vol. xxvii. p. 297 (October 1894).—Taken on 4th September.

Tapinostola elymi in Scotland. Montague Gunning. *Entomologist*, vol. xxvii. p. 295 (October 1894).—Taken this year at Montrose.

Charœas graminis in Southern Scotland. By Robert Service. *Entomologist*, vol. xxvii. pp. 278-282 (October 1894).—A short history of the late plague of "hill-grubs" in the southern uplands.

Charæas graminis in Southern Scotland.—A. Adie Dalglish. *Entomologist*, vol. xxvii. p. 317 (November 1894). Note on specimens found at Moffat, Dumfriesshire, in July 1894.

Phibalapteryx lapidata at Glen Messin, Argyleshire. James J. F. X. King. *Ent. Mo. Mag.* (2), vol. v. p. 275 (December 1894).—Specimen taken on 9th September 1892.

Phibalapteryx lapidata, Hb., in South Lanarkshire.—Kenneth J. Morton. *Ent. Mo. Mag.* (2), vol. v. p. 257 (November 1894).—Other species are also recorded.

Phibalapteryx lapidata in Stirlingshire. J. J. F. X. King. *Ent. Mo. Mag.* (2), vol. v. p. 257 (November 1894).

Phibalapteryx lapidata in South Argyleshire. W. M. Christy. *Ent. Mo. Mag.* (2), vol. v. p. 275 (December 1894).—Two specimens taken (24th September and 3rd October) near the head of Loch Striven.

Hymenoptera in Shetland and Orkney. F. D. Morice. *Ent. Mo. Mag.* (2), vol. v. p. 259 (November 1894).—Bombus Smithianus, B. moalis, and Myrmica ruginodis recorded for Shetland, and Psithyrus vestalis, Bombus distinguendus, and B. Smithianus for Orkney.

A Monograph of British Braconidæ. Part V. By the Rev. Thomas A. Marshall. *Trans. Ent. Soc. Lond.*, 1894, part iv. (December), pp. 497-534, Plates XI. and XII.—This part deals with a portion of the Alysiides, and gives the Scottish localities for the various species.

Palæarctic Nemouræ. By Kenneth J. Morton. *Trans. Ent. Soc. Lond.*, 1894, part iv. (December), pp. 557-574, Plates XIII. and XIV.—Scottish localities are mentioned.

Additions to the Fauna of the Firth of Forth. Part VI. By Thomas Scott, F.L.S. *Rep. Fish. Board Scot.* (1893), part iii. pp. 231-270, Plates V.-X.—These include 43 species of Copepoda, 1 of Ostracoda, 10 of Amphipoda, 1 of Annelida, and 1 of Mollusca. Of Copepoda 17 species are described and figured for the first time, and one is new to Britain. A useful summary of Mr. Scott's work during the past few years on the Copepoda of the Forth is also given.

The Invertebrate Fauna of the Inland Waters of Scotland. Part IV. By Thomas Scott, F.L.S. *Rep. Fish. Board Scot.* (1893), part iii. pp. 284-290.—Treats of Loch Tay, Perthshire; Loch Mullach, Corrie; Loch Awe, and Loch Assynt in Sutherlandshire.

Contributions to our Knowledge of the genus Cyclus, from the Carboniferous Formation of various British Localities. By Henry Woodward, LL.D., F.R.S. *Geol. Mag.*, Dec. IV. vol. i. pp. 530-539, Plate XV. and Figs. 1-3 (December 1894).—Several references to Scottish specimens are given.

## BOTANY.

La Recapitulation et l'Innovation en Embryologie Vegetale. By Jean Massart. *Bull. Soc. Belg. Bot.*, xxxi. part i. pp. 150-247, Plates 1-4, and 54 woodcuts.—Though not on the botany of Scotland, this paper contains much information regarding the life-histories and development of numerous plants that form part of the flora of Scotland.

Regular Peloria of Perianth of Orchis maculata (sexual organs normal).—Found at Alness, Caithness-shire, by Miss Munro. *Trans. Bot. Soc. Edin.*, xx. part i. p. 83.

Notes from the Royal Botanic Garden, Edinburgh—Reports on Temperature and Vegetation during July 1893 to June 1894. By Robert Lindsay. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 7-15, 40-41, 90-94, 171-173, 179-182, 214-217, 222-224, 230-232, 264-266.—An enumeration of the species in flower in the rock-garden, and a statement of meteorological observations made in the garden.

—— The Plants in the Palm House and Temperate House. By R. L. Harrow (*l.c.* pp. 17-19, 42-44, 95-97, 174-175, 182-183, 218-220, 225-226, 233-235, 267-269).

—— On Ribes subvestitum, Hooker and Arnott. By A. D. Richardson (*l.c.* pp. 16-17).

First Records of British Flowering Plants. Compiled by W. A. Clarke, F.L.S. *Journ. Bot.*, Oct.-Nov.—Includes from *Asarum* to *Goodyera*. See p. 59 of this journal.

Notes on British Plants. By Arthur Bennett, F.L.S. *Journ. Bot.*, Dec.—Some introductory remarks call attention to how much remains to be done in British botany, and to the aid to be gained from observation of the relation of plants to their environments. Mr. Bennett then discusses the genus *Statice* in the British flora. The paper is a very valuable one.

Records of Scottish Plants for 1892. By Arthur Bennett. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 35-37.—This is a brief notice of some of the more interesting records, all having been already included in our pages (1893, pp. 95-101).

Notes on the Flora of Stirlingshire [Fourth Paper]. By Colonel Stirling of Gargunnock and Robert Kidston, F.R.S.E., F.G.S. *Trans. Stirling Nat. Hist. and Arch. Soc.*, 1893-94, pp. 88-92.—Gives the results of the excursions made during the last season, and brings the total number of species recorded for the county up to 773.

A List of Wigtownshire Plants, by Mr. James M'Andrew, pp. 1-41.—In this brochure the author, after a brief historical sketch of the extension of information in regard to the flora of Wigtownshire, enumerates all Vascular Plants and *Characeæ* known to him in the county. Very noteworthy is absence of alpine plants. Some of those marked as "introduced" appear peculiar in this connection, *e.g. Dianthus deltoides*. A few printer's errors will call for correction when another issue is required.

Botanical Notes for the Moffat District, 1893. By J. Thorburn Johnstone. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 37-39.—Several new stations for plants already known from the district are noted, and a list of *Hieracia* of the district is given.

An Old List of "Stations of Rarer Plants ascertained to grow round Inverkeithing and North of the Forth. By A. Robertson." Communicated by Professor Bayley Balfour. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 84-90.—This is an alphabetical list found by Professor Balfour among some old papers of his father, and is believed to be the work of a former parish minister of Inverkeithing, in the earlier half of this century. It appears to omit only very common plants, and notes several plants as "decidedly introduced."

Notes on the Flora of Fife and Kinross. By Charles Howie. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 39-40.—Includes nine species of mosses not recorded in the author's "Moss-Flora," and a statement of total number of plants known to occur in the counties.

Excursion of the Scottish Alpine Botanical Club to Clova. By Rev. David Paul, M.A. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 3-7, Nov. 1893.—Records finding a number of the rarer species of plants of Clova.

Contributions towards a Flora of West Ross. By G. Claridge Druce, M.A. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 112-171.—This is a catalogue of all the Vascular Plants of West Ross (very many of them first recorded from there by Mr. Druce himself), preceded by a historical summary of the progress of botanical research in that district.

On an apparently Undescribed Cochlearia from Scotland. By Rev. E. S. Marshall, M.A., F.L.S. *Journ. Bot.*, Oct. 1894, pp. 289-292, Plates 345-346.—See p. 60 of this journal.

Sur la Nécessité d'une Nouvelle Monographie des Roses de l'Angleterre. By François Crepin. *Bull. Soc. Belg. Bot.*, xxxi. part ii. pp. 14-25.—This paper is so important to British botanists that we give a translation of it in our present issue (see pages 39-47).

Rosæ Hybridæ. By François Crepin. *Bulletin de la Société Royale de Botanique de Belgique*, xxxiii. part i. pp. 7-153.—This is a very valuable monograph on the hybrid roses of Europe by the leading authority on the genus at present. The following are noticed from Scotland:—*R. pimpinellifolia* × *tomentosa*. *R. pimpinellifolia* × *mollis* is regarded as the origin of a rose gathered in 1888 on sandhills near Betty Hill of Farr, in Sutherlandshire, by Mr. J. Cosmo Melvill, and distributed under the name *R. Sabini*. *R. pimpinellifolia* × *canina* (*dumetorum*) is assigned as the probable parentage of examples (under *R. hibernica* in the herbarium of Edinburgh Botanic Garden) gathered by Gorrie in 1866 between Melvill Hall and Bellyford Burn.

Scottish Utricularias. By Rev. E. F. Linton. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 110-112.—This calls attention to probable occurrence in Scotland of *U. Bremii*, Heer. (Loch of Spynie and Moss of Inshoch, "near Glen Luce," Culdoch Moor, Kirkcudbright, and Loch Feoir, Assynt), and *U. neglecta*, Lehm. (Gordon Moss, Rannoch Muir, Argyle, and Long Moss in Selkirkshire).

Cystopteris montana, Bernh., in Stirlingshire. By A. Somerville. *Journ. Bot.*, Oct. 1894.—On Ben Lomond.

British Algæ.—In the seventh fasciculus (25 species) of his *Algæ Britannicæ rariores exsiccatæ* Mr. E. M. Holmes includes the following from Scottish localities:—*Capsosiphon aureolus*, Gobi, found at Sea Mill, Ayrshire, in September 1894, by Mr. D. A. Boyd; *Delesseria angustissima*, Griff., at Cromarty, in April, by Mrs. M. Farquharson; *Ectocarpus distortus*, Harv., at Cumbræ, in August 1891, by Mr. E. A. Batters; *E. ovatus*, Kjellm., *E. tomentosoides*, Farlow, var. *punctiformis*, Batt., *Haplospora globosa*, Kjellm., and *Phyllophora Traillii*, Holm. and Batt., all four at Cumbræ, in April 1894, by Mr. Holmes; *Urospora collabens*, Holm. and Batt., at Cumbræ, in May 1894, by Mr. D. Robertson; and *Vaucheria coronata*, Nordst., at Arbroath, in May 1894, by Mr. Jack.

Halicystis ovalis. *Journ. Bot.*, Nov.—Found two years ago by Mr. G. Murray and Dr. Schmitz in the Clyde Area, has been found at Lamlash, Arran, in seven fathoms water, by Mr. David Robertson.

On Acrosiphonia Trailii, a new British Alga. By Edward A. L. Batters, B.A., LL.B. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 213-214, Plate 2, Figs. 1-7.—Found at Joppa, near Edinburgh, by Mr. G. W. Traill, after whom it is named.

Obituary Notice of Charles Jenner. By Robert Lindsay. *Trans. Bot. Soc. Edin.*, xx. part i. pp. 23-29.—An appreciative account of a most estimable man, with strong botanical tastes, very characteristically shown in his fine garden at Portobello.

# REVIEWS.

A Monograph of Lichens found in Great Britain, being a Descriptive Catalogue of the Species in the Herbarium of the British Museum. By the Rev. James Crombie, M.A., F.L.S., etc. Published by order of the Trustees of the British Museum. Vol. I., 8vo, 519 pages, 74 woodcuts (by W. G. Smith), each containing several figures.

The third edition of the "Lichen Flora of Great Britain, Ireland, and the Channel Islands," published in 1879 by the Rev. W. A. Leighton, is admittedly an admirably accurate work; but it has not taken the place in ordinary use among British botanists that its merits might have been expected to gain for it. The cause is probably to be found in the style and terminology of its descriptions, which are scarcely suited for easy and habitual use. It thus leaves room for a more popular manual; and the need of such a work is rendered greater by the information acquired since 1879. Mr. Crombie has spent not a few years in the study of British Lichens, and has been in close correspondence with Nylander, the renowned lichenologist, by whom so many new species have been recorded. He has had access to the types of the most important herbaria of British Lichens, and has used his opportunities perseveringly. He is thus peculiarly fitted to produce a work of authority on British Lichens; and the circumstances attending the publication of this monograph increase its importance. We rejoice to see such monographs issuing from the British Museum Department of Botany. May this be but the forerunner of numerous others on our native plants. The woodcuts give excellent representations of the characteristics of genera, and are thus very helpful to the student. The descriptions are necessarily somewhat technical (too often containing terms, *e.g.* lecideoid, of only comparative meaning); and, in consequence of this, a fuller glossary than the short one at the beginning of the volume would be very useful for beginners who wish to use the book. Mr. Crombie does not indicate in definite terms his views regarding the dual-lichen controversy, though a remark about *Nostoc* might almost imply at least a partial acceptance of the dual nature. The present volume contains the families *Ephebacei*, *Collemacei*, *Lichenacei*, and *Myriangiacei* (one species). A second volume is promised in 1895, to contain all other British Lichens, comprised in the families *Lecidei*, *Graphidei*, *Pyrenvcarpei*, and *Peridiei*. Only constant use for a time can fully disclose the merits or defects of any work on plants; but, so far as an opinion may be hazarded, it seems probable that the "Monograph of Lichens found in Britain" will supply a felt want, and will stimulate new students to apply their labours to our native Lichens.

A Pocket-Flora of Edinburgh and the Surrounding District: A Collection and Full Description of all Phanerogamic and the principal Cryptogamic Plants, classified after the Natural System, with an Artificial Key and a Glossary of Botanical Terms. By C. O. Sonntag. 1894. (Williams & Norgate.)

We fear that any one who may be induced by the somewhat pretentious title of this little book to turn to it for information will lay it down with the conviction that there is not much to be gained from it save disappointment. The *Vascular Cryptogams* alone are referred to in it. Several of the additional records of localities are inaccurate. East Linton is not a new station for *Papaver dubium*, or Linlithgow for *Lepidium campestre*, both being given in Balfour's "Flora of Edinburgh." Many plants recorded as still growing in certain localities have long been extinct there. *Hyoscyamus niger* has not been found by this generation on Salisbury Crags, and it is long since *Anagallis tenella* bloomed in the Hunter's Bog. *Bunium flexuosum*, one of the commonest plants around Edinburgh, is not even mentioned; whilst *Carum Bulbocastanum*, a plant which does not occur in Scotland, is recorded as common everywhere in the neighbourhood. The general get-up of the book is good as regards paper and type, and its form and size render it convenient for the pocket. The vexed question of the use of capitals in specific names is set aside by commencing *all* specific names with capital letters.

Stirling Natural History and Archæological Society Transactions, 1893-94.

It is again a pleasure to express our appreciation of the useful and highly appropriate work accomplished by this flourishing Society. The volume recording the past year's proceedings contains the fourth part of the valuable paper on the "Flora of Stirlingshire," by Colonel Stirling and Mr. Robert Kidston; and an interesting and pleasantly written account of the Birds of the Stirling District, based upon the collections in the Smith Institute, by Mr. James Sword. There are other meritorious contributions of a geological and archæological nature, the whole forming a volume of 206 pages.

# The Annals
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# Scottish Natural History

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## THE LATE FRANCIS BUCHANAN WHITE.

With Portrait.

Francis Buchanan White was the elder son of Dr. Francis I. White, who was for years one of the leading physicians in Perth, where he still lives, though retired from medical practice. F. Buchanan White was born in Perth on 20th March 1842. He was educated there for a time at St. Ninian's College, and subsequently by a private tutor. Going to the University of Edinburgh, he entered on the study of Medicine, and graduated as M.D. in 1864; receiving commendation for his thesis, which bore the title of "On the Relations, Analogies, and Similitudes of Insects and Plants." His love for the pursuits to which he largely devoted himself in later years showed itself about the age of twelve, when he commenced to collect Lepidoptera and to study Botany. His earliest contribution in print appeared in the "Entomologist's Weekly Intelligencer" about 1857; but his notes in this journal are all very brief.

After his marriage in 1866, he and Mrs. White spent a year travelling on the Continent, during which they visited France, Italy, and Switzerland, and he added largely to his collection of Lepidoptera. His experiences are narrated in "Lepidoptera observed during an Excursion in Italy and

Switzerland" ("E.M.M.," iv., 1867-68, pp. 57-60). After his return to Scotland he made his home in Perth; and having no desire for medical practice, and being independent of his profession, he devoted himself almost entirely to advancing the knowledge of the Natural History of Scotland, and to awakening a stronger interest in its progress, not only in Perth, but also throughout Scotland.

In order to acquaint himself with the distribution of the animals and plants of Scotland by actual observation, he spent about six months of each year, until 1875, in the country, usually in a district not previously visited by him. Thus in 1867 he visited Rannoch, in 1868 Achilty in Ross-shire, in 1870 Colvend in Wigtownshire on the Solway Firth, in 1871 Braemar, in 1872 Dunkeld, and in 1873 he returned to Braemar.

Powerfully built, and of great physical endurance, he delighted in active exercise; and he was accustomed to spend long days among the Scottish mountains, in the investigation of their fauna and flora. On such expeditions he scarcely seemed to feel fatigue; and his attention was always on the alert. He thus gained a knowledge, founded on personal investigation, of many districts of Scotland so thorough as has perhaps never been attained by any other man. To this minute acquaintance with the animals and plants of his native land in their natural habitats, and amidst the environments most favourable to their healthy development, he added the systematic study of various groups, both of animals and of plants, and was recognised as an authority on widely different divisions, *e.g.* on Willows and on Hemiptera as to classification, and on Lepidoptera, as to structure, habits, and effects of environment.

A considerable number of new species were named and described by him, especially among the Hemiptera. The wide range of his contributions to various scientific journals will be best appreciated by a reference to the subjoined list of papers and notes from his pen. For several of the later years of his life, however, his labour was largely devoted to the preparation of a thoroughly reliable work on the Botany of Perthshire. With this aim, he spared no labour to become thoroughly familiar with the plants of all parts of Perthshire;

and many excursions were made by him to those districts of the county from which his information was defective, and which he thought it necessary to investigate more fully than had previously been done.

To naturally keen powers of discrimination he added a close study of the leading "floras" of the European Continent, and sought to determine more minutely than had hitherto been attempted the relation of the plants of Scotland to the same species as they exist on the Continent. He was thus able to detect species and varieties not previously recognised in Scotland; and he published some of the results of his studies in the "Scottish Naturalist," the "Journal of Botany," and the "Proceedings and Transactions of the Perthshire Society of Natural Science." In 1879-82 he published in the "Scottish Naturalist" "Preliminary Lists" of the Fungi, and of the Flowering Plants and Ferns of Perthshire, together extending to upwards of eighty pages. Until his death he never ceased to aim at rendering the work more accurate and complete; and, fortunately, he has left it in such a condition that it can be published with very little alteration. It is hoped that it will be issued this year, on behalf of the Perthshire Society of Natural Science, in whose prosperity Dr. White was at all times so keenly interested. The "Flora of Perthshire" will, it is believed, prove a worthy memorial of a life spent in the study of the Natural History of his native country, and in assisting others to gain that knowledge.

His investigations led him to recognise the unsatisfactory treatment accorded to the difficult genus *Salix* in British Floras, with the result that he gave his attention very specially to this genus, and acquired a very minute knowledge of its species, both in nature and in the works of systematists. He accepted very fully the view that many of the puzzling intermediate forms in the genus are hybrids, and that the species hybridise most freely, even where, from their aspect, one might not at first anticipate such a connection. As will be seen below, he published several papers on the genus; but the most important is that entitled "A Revision of the British Willows," extending to considerably over 100 pages of the Linnean Society's Journal, in vol. xxvii. This is, and will remain, a work of high value.

Such papers as those "On the Characters of the Flowers of Silene maritima and S. inflata," "Winter Fertilisation by Agency of Insects," "The Influence of Insect Agency on the Distribution of Plants," "The Flora of River Shingles," "On the Origin of the Perthshire Flora," and "Local Names and Uses of Perthshire Plants," illustrate the width of his interest in Botany. This is shown still further by short notes on the structure of various monstrous forms, on white-flowered varieties, etc.

In Zoology, as in Botany, all that could advance our knowledge of the Natural History of Scotland was welcomed by him; and his papers show the width and accuracy of his information, though chiefly devoted to Entomology. As with many other students of nature, the Lepidoptera first attracted him; and throughout his life they never lost their interest for him, though displaced to some extent in later years by other studies. In the subjoined list will be found evidence of the success with which he pursued this branch of Entomology, alike in the discovery of additions to the species known to occur in Scotland, and in the investigation of the origin of the Scottish Lepidoptera and of their life-histories. "Insecta Scotica,—Lepidoptera," compiled by him to show the distribution of the Lepidoptera in the river-basins of Scotland, is a most valuable record. It extends to almost 150 pages of the "Scottish Naturalist," in which it appeared during the years 1872-79. "Fauna Perthensis,—Lepidoptera" is a similarly accurate list for Perthshire; and such papers as those on "The Mountain Lepidoptera of Britain," "Some Thoughts on the Distribution of the British Butterflies," "Variation in British Lepidoptera," "Melanochroism and Leucochroism," and most of the shorter ones dealing with the insects of the South-West of Scotland, Strathglass, Rannoch, etc., will be found well worth perusal. Nor did he neglect structural investigations, as evinced by important papers on the terminal abdominal segments in the males of European Rhopalocera, of French Zygænidæ, and of Eupithecia. Articles from his pen deal also with the distribution and habits of Scottish Insects of other groups, such as Beetles, Flies, and Hemiptera.

After a time he turned his attention more especially

to the Hemiptera, which he studied from the point of view of a systematist; but, though he published a few articles on British Hemiptera, among which "Notes on Corixa, with Analytical Key to British Genera and Species," is of much value, most of his papers relate to exotic species, and are contained in journals to which students of Scotch Entomology need not often refer. Most of these papers consist of descriptions of new genera and species; but two of them afford scope for a wider treatment of biological problems, and deserve study from this point of view also. These are "Contributions to a Knowledge of the Hemipterous Fauna of St. Helena, and Speculations on its Origin," and the "Report on the Pelagic Hemiptera collected by H.M.S. 'Challenger.'"

Another and even more important side of the work done by Dr. White in furthering the study of Natural Science in Scotland, more especially in Perthshire and the surrounding counties, must be noticed. This lay in his eager desire to interest others in those pursuits that were so great a pleasure to himself, and in the success with which he awakened such interest, and induced those in whom it was awakened to provide for its extension and continuance in future. His influence in this direction is abundantly shown by the share that he took in the initiation of the Perthshire Society of Natural Science in 1867, the Cryptogamic Society of Scotland in 1874, and the East of Scotland Union of Naturalists' Societies in 1884. Of the Cryptogamic Society he was for a time the Secretary; while of the Union he was the first President. With the Perthshire Society his connection was naturally very close. He was throughout an active member of the Council; during a number of years as President, during part of the time as Secretary. He edited the publications of the Society from their commencement; indeed it may be said that to him was due the commencement of these "Proceedings and Transactions" that have done much to advance the study of the Natural History of the county and to strengthen the Society. Recognising the very great value to a local society of a well-organised museum conducted on proper lines, he set himself to the endeavour to originate such a museum in Perth. The Society took up the scheme heartily, with the result that the Perth-

shire Museum is already in the front rank of local museums, and is a model of what such an undertaking should be.

Alike in his reports as Secretary and in his addresses as President, of which latter he was accustomed to give two each year, in March and in November, Dr. White was accustomed to select as his theme subjects of direct practical bearing on the work of the Society ; either the results already attained, or work yet to be done, very frequently forming the topic. The Reports on the Excursions of the Society, of which several are made each year to districts in and round the basin of the Tay, and of the Perthshire Alpine Club, a branch formed for the special exploration of the Perthshire mountains, were always furnished by him ; and while his health allowed he was seldom absent from any of these excursions. The progress of the Museum was a constant aim ; and he spared himself no labour in the endeavour to render it more complete and more instructive. To it he frequently recurs in his numerous contributions to the publications of the Society. Of the sense entertained by the Society of his services, the following resolution, passed at the first meeting after his death, bears witness: "The Society records with profound regret its sense of the irreparable loss which it has sustained by the death of Dr. F. Buchanan White, F.L.S., F.E.S., who was one of its founders, and who, during all the years of its existence, has guided its affairs with untiring devotion. In the service of the Society he spared neither time nor labour, and his large store of scientific knowledge was ever at the disposal of its members. To his energy and skill are mainly due both the reputation which the Society and its museum have acquired, and the popularity which the study of Natural Science has gained in our city and county."

In 1870 he induced the Perthshire Society to undertake the publication of a magazine for Scottish Natural History, he himself undertaking the work of editor. He was able to secure sufficient co-operation to ensure the financial independence of the new journal. In this way originated the "Scottish Naturalist"; which has done much to promote the objects for which it was commenced. In a few years it was found necessary that the Society should issue a special publication of its own, but the "Scottish Naturalist" was con-

tinued on an independent footing, Dr. White continuing to be the editor until the close of 1882. After an interval of six months, it was resumed under another editor; but he continued to give his hearty support to it, and to this journal, in which the "Scottish Naturalist" is merged. Dr. White acted as Examiner for Degrees in Medicine in the University of Aberdeen, during five years, in the subjects of Botany and Materia Medica. As an examiner he was most fair, and acquitted himself well.

Some years ago he suffered severely from rheumatism; and, though he was able to a considerable degree to throw off its effects, he never again was wholly free from it. It did not, however, prevent his taking active exercise, or continuing his excursions, though making it necessary to avoid the more exhausting excursions, such as he had previously been accustomed to undertake. But during 1894 a change for the worse in his health showed itself. Exertion of every kind became burdensome to him, and other symptoms indicated that the heart was affected. Despite care and medical treatment, his state continued to become worse until his death in his house, Annat Lodge in Perth, on 3rd December 1894.

He did not take any prominent part in municipal life in Perth, but he was much liked personally in his native city, and exercised no small influence for good there indirectly, as well as in the promotion of a love for Natural History and for higher education, to which his efforts were more especially directed. His favourite amusement was curling; and he was usually present at the competitions and meetings of the Scone and Perth Curling Club, of which he was a skip for a time. He was an attached member of the Scottish Episcopalian Church, being a member of the congregation of St. Ninian's Cathedral, in which it is proposed to place a brass to his memory. He found that the acceptance of revealed religion did not conflict with the freest inquiry into scientific problems.

He is survived by Mrs. White, two sons, and several daughters.

Endeavouring to sum up briefly Dr. White's character and work, we must recognise in him excellent ability, keen

powers of observation and of discrimination, great physical power and endurance, strong love of all branches of Natural History in the wide sense, strong desire to impart to others the pleasure that he himself experienced from such pursuits, unwearied industry in these pursuits, clear views as to the best methods to be followed in securing public support towards the provision of whatever would extend a truer appreciation of scientific studies in the general community, and perseverance in employing the means within his reach. To his thorough integrity and unselfish devotion to the advancement of the public interest in these lines must be attributed the success that attended his efforts.

As a naturalist his point of view was more that of the past generation, with its wide range of interests, than of the specialists of the present day. He found a far greater pleasure in becoming familiar with plants and animals in their natural environments, and in the study of the interactions between them and their surroundings, than in their dissection in the laboratory; but he fully recognised the value of the labours of the anatomists and physiologists, and he shows in several of his writings that he had devoted careful study to structural details and appreciated clearly their importance in classification.

By all students of the Natural History of Scotland his memory will be cherished as that of a true-hearted and earnest naturalist, than whom few have done more for the advancement of their favourite pursuits in Scotland; while those who had the privilege of his personal friendship will in addition cherish the memory of an honourable and much esteemed friend.

He joined the Entomological Society of London in 1868, and the Linnean Society in 1873; and he was a member of several other scientific societies both in the British Islands and abroad.

### List of Published Articles by Dr. Francis Buchanan White.

In the following list the papers have been arranged as far as practicable under the several subjects, though it has not been possible to adhere absolutely to this arrangement in regard to all of them. Those of a more general nature have been placed first; then those

more closely connected with the work of the Perthshire Society. The Botanical papers follow; and after them come the Zoological, divided under the different groups of animals, from the Vertebrata downwards. Under each division or head those papers that relate to Perthshire are placed first, then those that relate to other localities in Scotland, beginning with the southern localities; and papers on foreign examples bring up the rear. A few papers are added of a popular kind, as well as three obituaries of Scottish naturalists known to be by him. A reference has been added to the place of publication of each article, and the number of pages is stated as an indication of its extent. In a few cases a brief indication has been added of the nature of the papers.

The following contractions have been employed in the names of the journals referred to: *Ann.S.N.H.* = "Annals of Scottish Natural History"; *E.B.S.Tr.* = "Edinburgh Botanical Society's Transactions"; *E.M.M.* = "Entomologist's Monthly Magazine"; *Ent.* = "Entomologist"; *E.W.I.* = "Entomologist's Weekly Intelligencer"; *J.B.* = "Journal of Botany"; *Pres. Addr.* = "Presidential Addresses to the Perthshire Society of Natural Science," published in the *P.P.S.* = "Proceedings of the Perthshire Society of Natural Science"; *Tr.P.S.* = "Transactions" of the same Society. The designations of any other journals referred to are intelligible without explanation in the forms in which they stand in the list. The references are in many cases given only to the year of issue, as the most convenient (and sufficient) mode, but where it appeared desirable the volume also has been quoted.

I have to offer my thanks to Mr. H. Coates and to Mr. Frank H. White for assistance in the compilation of this list.

"Scientific Nomenclature," *S.N.*, 1873, pp. 104-109.

"Suggestions for the Federation of Scottish Scientific Societies," *S.N.*, 1883, pp. 49-51.

"On the Work of Local Naturalists' Societies," *S.N.*, 1885, pp. 98-106.

"Proposed Combination of Natural History Societies," *P.P.S.*, 1884-85, pp. 200-205.

In the "Reports" presented at the meeting of the E.S. Union of Naturalists' Societies held in 1884 (and printed for the Union in 1885) are the following communications from Dr. White :—

"Presidential Inaugural Address," pp. 3-21. (On the work of the Union, the preparation of lists of the fauna and flora of the counties within the Union, and the distribution, with consideration of its probable causes, of the flowering plants within these counties.)

"Preliminary Reports (each about a page in length) on the following groups within the district": *Mammalia; Insecta, Arachnida, and Myriapoda; Flowering Plants and Vascular Cryptogams; Mosses and Hepaticæ; Lichens.*

### Perthshire Society of Natural Science.

"Inaugural Address" on 7th March 1867, separately printed in 1867.

"Presidential Addresses in 1869, March and November 1885-91, and March 1892, in *P.P.S.* in the respective years," dealing with subjects specified under subject heads below, and also with—

"History of the Society" up to 1888, and "Retrospects of Work of the Society" to 1892; also with "Subjects suitable for study by the Society."

"Annals of P.S.N.S. from Foundation to November 1881," *P.P.S.*, 1881, pp. 43-47.

"Excursions of P.S.N.S.," Reports of Excursions in summers of 1883-92 (in 1883-86 and 1892 as editor of *P.P.S.*, and in 1887-91 in Presidential Addresses). They contain many notes on Botany and some on Zoology of Perthshire. Contained in "Proceedings" of Society for these years.

"Report of Excursion of Perthshire Alpine Club to the Breadalbane Mountains in 1886" (*Pres. Addr.*), *P.P.S.*, 1887, i.-viii.

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J. W. H. Trail.

# THE STARLING IN SOLWAY.

By Robert Service.

Mr. Harvie-Brown's account of the increase and distribution of the Starling throughout Scotland given in the January "Annals" forms a very valuable and interesting chapter in Caledonian Ornithology. It was not to be expected that the subject could be treated in such detail as to satisfy students of the lesser faunal areas. And it is with a view to filling up several blanks in the history of the species in Solway that I venture to string together a few items that I find in my note-books, and offer them for permanant record in the pages of the "Annals."

I am not convinced that there is sufficient evidence to prove that the Starling was at any time during the last century more than a transient migrating visitor north of the Borders. These transient visits, probably caused by a succession of two or more years of plenty, or favourable meteorological influences, seem to have been getting more frequent towards the end of the last century. It is interesting to note that most of these earlier records given by Mr. Harvie-Brown are at places along the fly-line with which observers in Solway are so familiar; and which was first, I think, pointed out by Mr. Mitchell in his "Birds of Lancashire." The birds in their vernal migration come straight up the Irish Sea from the coasts of France and Spain, brushing along the outlying headlands of Wales and N.W. England; and coming on to the coasts of Galloway in vast flocks, strike across country, or, as is most usual, continue their journey up the western shores. Not once, but many scores of times, I have seen these migrating flocks arrive from the sea; and far oftener, in wild, moist, dark spring nights, have had the evidence of my ears that great multitudes of twittering, piping, whistling birds were passing overhead. Almost at any time during the latter half of September and in early October can the same phenomena be noted in the return direction.

My own experience and recollection of the Starling

extends back to about 1862 or 1863. At that time the Starling as a breeding species was very scarce indeed, and an egg was a prize for a boy with the collecting mania at fever heat. While Starlings were thus rare as breeders, they were not at all uncommon during the spring and autumnal migrations. I mean by that statement, that during a walk of say three or four miles one might have seen one or two flocks, somewhere or other in the grass fields, of perhaps a score of birds. I have no doubt that the present resident Starling population has descended from an odd pair left by these migrating flocks from time to time.

I have now to note a few of the earlier instances in which the Starling was known to breed in Solway. But first let me point out that Mr. Harvie-Brown's reference to Roxburgh should have gone under "Tweed." Further, the second paragraph under "Clyde" should go under "Solway." The Castle Loch, Lochmaben (not Lochmaidon) is a well-known Dumfriesshire locality.

On 4th June 1813, as I find on reference to the files of the "Dumfries Courier," a boy was killed on the island on Loch Doon while climbing the ruins of the old castle in search of a Starling's nest. The stones gave way and fell upon him. In reference to this record, I have often wondered if it was not the case, when the Starling was thus shown to be breeding at a locality away amongst the hills and moorlands, that the bird was of necessity generally distributed and common over the arable and lower lands?

In the Dumfriesshire volume of the "N. S. A." Sir Wm. Jardine, writing in 1832 of the avifauna of the parish of Applegirth, said: "The Starling is found in flocks during autumn and spring, but few in number, having diminished much in numbers of late years. In 1819 and 1820 flocks of many hundreds frequented the holms on the Annan, but of late not more than from ten to twenty have been seen together." The late Mr. Hastings, so long known as a taxidermist in Dumfries, used often to tell me how, when he was employed as an under gardener at Closeburn Hall, Sir James Stuart Menteth, Bart., his employer, had sent from somewhere or other a pair of young Starlings to be brought up and liberated. Hastings got them in charge, reared them

successfully, and they were then set at large. The following year a Starling was shot, and no one knew what the bird was until it was shown to Hastings. Soon afterwards, Hastings used to say, Starlings became comparatively numerous. I do not know the exact date of this occurrence, but it can be fixed approximately from the fact that Hastings left Closeburn Hall in 1837. For some years later Starlings were rare enough lower down in Nithsdale. Along one of the old walls of the beautiful ruins of Lincluden Abbey there remains to this day a row of spikes. These were inserted in May 1842 by a lad named John Mackenzie, who was then an apprentice blacksmith. A pair of Starlings had built in the old walls, and Mackenzie took this means of climbing up to get the nestlings, which were subsequently reared to adult featherhood. These particulars I have just learned from Mr. Hastings (no relation of the taxidermist), Nithbank, who was Mackenzie's companion on that memorable evening now more than half a century backwards in the mists of the past.

Mr. John Maxwell, Registrar in Maxwelltown, tells me that when he was a boy, in May 1844, he, with a companion, having heard there was a nest of these rare birds, Starlings, at Long Beoch in Irongray Parish, went to get the young birds. The nest was in the gable wall of the barn. The boys did not get their birds, but to their great delight the farmer brought them with him to Dumfries next market-day, and this brood was successfully reared. Mr. Maxwell says his Starlings were the talk of all the cage-bird fraternity, and fanciers came from long distances to see them.

In the issue of the "Dumfries Courier" for 1st January 1840, the then editor (Mr. John M'Diarmid), in reviewing the twenty-fourth volume of the "N. S. A.," thus alludes to Starlings :—

"They also breed close adjoining (*i.e.* Borthwick Castle), and we would esteem it a favour could Mr. W. contrive to send us a pair, or even an odd one. It is true the same curious bird is partial to Kirkbean in our own neighbourhood, but with all our art we never could manage to secure a nestling, whether from the favourite sea-fanned Arbigland,

or the delightfully violet-pied woods adjoining which rejoice, and justly, in the name of Cavens."

Here may be given the only two notices of the bird in the "New. S. Acc. of Kirkcudbrightshire": "The Starling exists here" (Kirkcudbright Parish, May 1843); and "A few years ago exceedingly rare; now abundant" (Balmaclellan Parish, January 1844).

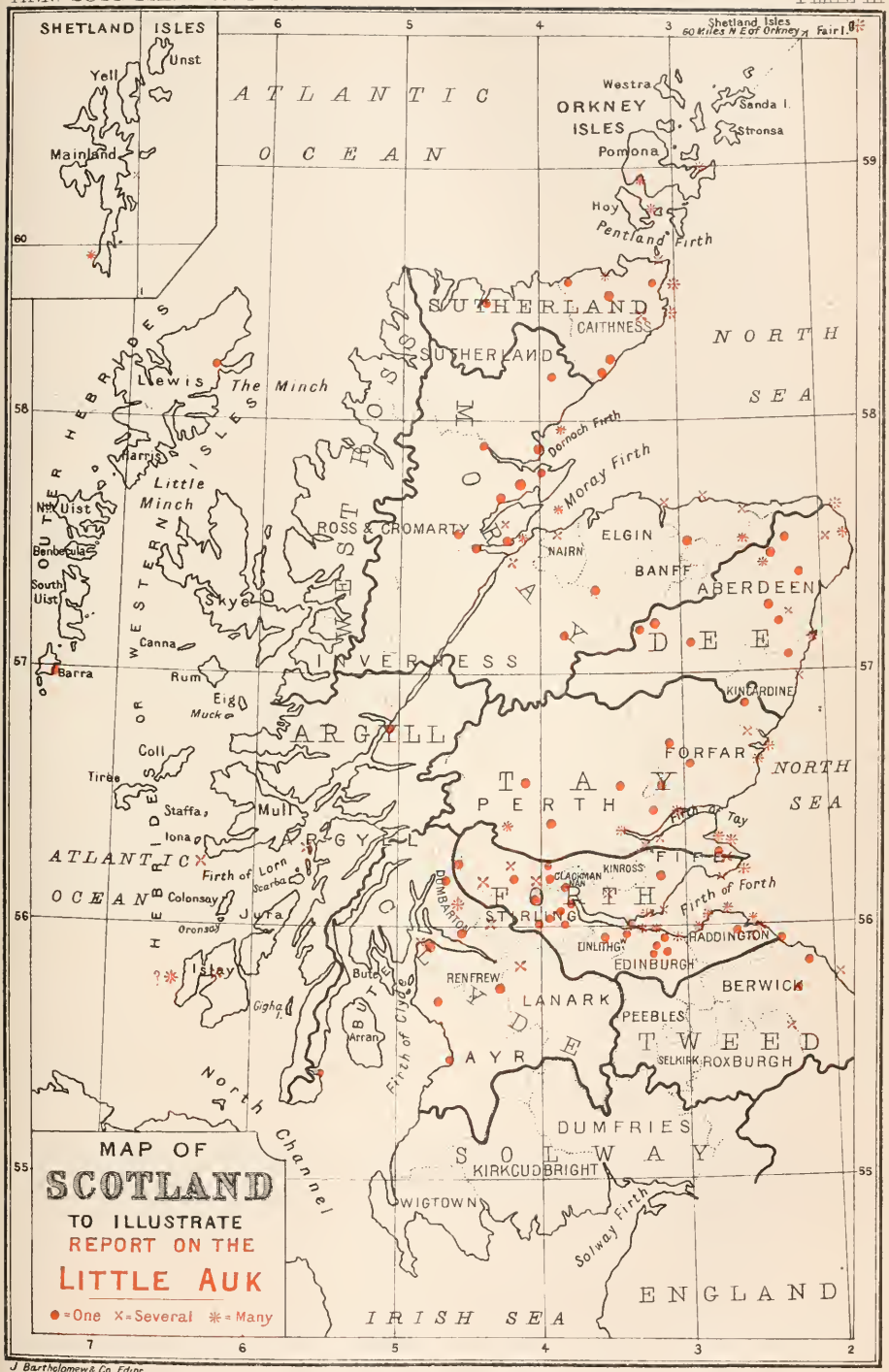
I had an interesting letter a few weeks ago from Mr. William Thomson, Kirkcudbright (so widely known for his knowledge of the botany and zoology of the district around that old romantic town), on the subject of the increase of the Starling and kindred topics. Mr. Thomson says: "The first appearance of the Starling in our district was in 1848—not later at all events. Have often heard it stated that it was the lighthouse on the Ross that was the means of attracting them. Some of them had been killed on the lantern about that time. The first nest I ever knew was about 1850. At that time they were becoming common. At first they came in flocks and spread all over the district."

I have one more quotation to make, and it is from a charming account of the birds seen in and about his garden by the late Thomas Aird, poet and litterateur, published in the "Dumfriesshire and Galloway Natural History Society's Transactions" (the old society, not the present one) for 1863-64. Mr Aird wrote: "When I went to live at Mountainhall, eight years ago, not a Starling was to be seen thereabouts; but now they breed with us, and I see large flocks of them in our fields in autumn. Now, such sudden and sweeping changes of habitat are not governed by the usual laws of inner migration—that is, of migration from one part of the island to another. The gradual changes of tillage, modifying the supplies of food for the bird, cannot account for such violent changes of habitat. I myself have no way of accounting for them."

Since then the Starling has every year become more and more abundant, always excepting such times as that during the long protracted and severe winter of 1878-79, when for nearly eighteen months later they became very scarce. Their habits seem to be annually undergoing modifications, for now they will breed like a blackbird, amongst the ivy

against a tree trunk, or in a laurel bush like the sparrows, and with a domicile exceedingly sparrow-nest-like in structure. Birds of the fields and meadows as they once were, now they make themselves at home amongst the thrushes and sparrows in suburban gardens ; and in one notable instance in the outskirts of Maxwelltown during the terrible week of cold from 6th to 12th February last, they, to the number of forty or fifty, went to roost every evening along with the fowls in a low wooden hen-house, ranging themselves along the roosting poles in rows like ordinary domestic poultry.

Within the last half dozen years or more their great roosting-places have become very conspicuous. There are two such places within this parish (Troqueer), at Cargen and Terraughtie respectively. The numbers roosting at each varies much with the seasons, and of course during the breeding months these places are completely deserted. I have seen as many as about 7000 birds at each of these places, which are only about three miles apart. There is a greatly frequented roosting-place in Dumfriesshire in a plantation called Wintersheugh on Kinmount estate. It gets the name of the "Starling Wood," and it is said that 10,000 or 12,000 birds often roost there at certain seasons. But there are many other and smaller rendezvous for these birds scattered over the country, which need not be particularised. Interesting as these nightly haunts are, and fascinating as it is to watch their evening evolutions before the birds dive into the bushes, often maiming each other by coming into collison in doing so, it is a greater and more absorbing interest to me personally to watch one of the great migrating flocks that gather from all parts of the compass, congregating into one huge mass before quitting our shores in autumn. The business-like air they seem to possess, as if fully aware of the long and exciting journey before them, and the questions of "why" and "wherefor" that come up in the observer's mind when he sees such a flock of Starlings 20,000 strong, make the sight one of intense interest to the ornithologist. In the mysterious impulses that govern such movements is to be found the secret of the increase and distribution of the Starling not only in Solway, but in Scotland.


SHETLAND ISLES
Yell
Unst
Mainland
ATLANTIC OCEAN
Shetland Isles 60 Miles N E of Orkney
Fair I.
ORKNEY ISLES
Westra
Sanda I.
Stronsa
Pomona
Hoy
Pentland Firth
SUTHERLAND
CAITHNESS
NORTH SEA
SUTHERLAND
Lewis
The Minch
OUTER HEBRIDES
WESTERN ISLES
Harris
North Uist
Little Minch
Benbecula
South Uist
Barra
Skye
Canna
Rum
Eig
Muck
Coll
Tiree
Staffa
Mull
Iona
ATLANTIC OCEAN
Firth of Lorn
Scarba
Colonsay
Oronsay
Jura
Islay
Gigha I.
Arran
Bute
North Channel
Firth of Clyde
ROSS & CROMARTY
Dornoch Firth
Moray Firth
NAIRN
ELGIN
BANFF
ABERDEEN
INVERNESS
KINCARDINE
ARGYLL
FORFAR
TAY
PERTH
NORTH SEA
Firth of Tay
ARGYLL
FIFE
CLACKMAN
KINROSS
Firth of Forth
DUMBARTON
STIRLING
LINLITHG.
HADDINGTON
EDINBURGH
RENFREW
BERWICK
LANARK
PEEBLES
TWEED
AYR
SELKIRK
ROXBURGH
DUMFRIES
SOLWAY
KIRKCUDBRIGHT
WIGTOWN
Solway Firth
ENGLAND
IRISH SEA
MAP OF
SCOTLAND
TO ILLUSTRATE
REPORT ON THE
LITTLE AUK
● = One × = Several ✳ = Many
J Bartholomew & Co Edinr
Faunal Areas thus ____ County Boundaries thus .....
Scale of English Miles
0 10 20 30 40 50 100

## ON THE OCCURRENCE OF THE SUB-ALPINE WARBLER IN THE OUTER HEBRIDES.

At the meeting of the British Ornithologists' Club held in London on the 19th of December 1894, "Dr. R. Bowdler Sharpe exhibited a specimen of a bird new to the fauna of Great Britain. This was an example of the Sub-alpine Warbler (*Sylvia subalpina*), which had been forwarded to him for exhibition by Mr. J. S. Elliott, of Dudley, who had shot it himself on the island of St. Kilda on the 13th of June 1894, after a heavy gale from the south-west."[1]

This Warbler is rather smaller than the Lesser Whitethroat. The male has the upper parts slate gray; the wings brown, with paler edges to the inner secondaries and the coverts; the chin, throat, and breast chestnut; the flanks pale chestnut; and the centre of the abdomen nearly white. The female is brown above, and has the chin, throat, breast, and flanks buffish white.

The home of this bird is in the basin of the Mediterranean, but it appears to be absent from Turkey and South Russia. In Europe it is a summer visitor, but in Northern Africa it is a partial resident.

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## ON THE RECENT VISITATION OF THE LITTLE AUK (*MERGULUS ALLE*) TO SCOTLAND.

By Wm. Eagle Clarke.

Plate III.

The winter of 1894-95 will be memorable in the annals of British ornithology as a Little Auk season—one which witnessed the wreck of this species in vast and, perhaps, unprecedented numbers for a prolonged period, during which disaster followed disaster.

The visitations of the Little Auk to our shores in unusual numbers are more or less phenomenal, since they appear to

[1] "Bulletin of the British Ornithologists' Club," No. xxii. vol. iii. p. ix.

be the direct result of particular weather conditions, usually severe northerly gales. These storms drive the birds from their accustomed boreal winter quarters,[1] perhaps off the polar ice, first into the British seas, and then on to our inhospitable isles, where they perish miserably, either as hopeless wrecks upon our shores, or, being swept far inland, among hedges and ditches, moor and woodlands, and even in our villages, towns, and cities. It is in such a Little Auk year, and then only, that our ornithologists have an opportunity of seeing the species as a British bird, except here and there and now and then in autumn and winter among the Scottish Islands.

In the Orkney Islands Mr. Moodie-Heddle tells us that a few occur almost every season, and that he has several times known them to come ashore dead in scores along with Puffins and Cormorants. "When the wind is westerly we get more Puffins and Razorbills, and when it northers and easters there are fewer of these species and more Little Auks. But when the wind gets southward of east we get few sea-birds of any kind after a gale."

It has been thought desirable that such a record visit as that of 1894-95 should not pass without special notice, so far as Scotland is concerned, in our pages. To this end a mass of useful data has been collected by Messrs. T. E. Buckley, Wm. Evans, J. A. Harvie-Brown, and John Paterson. This has been placed in my hands to report upon, and, along with my own collected notes, forms the basis of this contribution. It must be borne in mind, however, and of this I am quite convinced, that a mere tithe only of the total number of Little Auks which have recently occurred in Scotland have come under observation; and of these, again, a mere tithe have been reported to us.

The whole of the records received have been duly delineated on the map which accompanies this report, and are also precisely tabulated in chronological sequence in its final pages.

The winter of 1894-95 had been remarkably mild, calm, and fine, until the early hours of the 22nd DECEMBER, when

[1] Sir John Richardson states, in his "Polar Regions," p. 278, that this bird "keeps the sea in the high latitudes all the winter, wherever open water exists, but numbers of the species migrate southward."

the spell was rudely broken by a gale of great severity. On the East Coast of Scotland, north of the Firth of Forth, the wind blew with great strength from the north and north-east, while to the southward it was blowing equally hard from the west and south-west. The centre of the cyclone passed a little to the north of Edinburgh on its way to Scandinavia, which explains the difference in the direction of the winds in the areas north and south of that city.

As the result of this initial storm, indeed on the very day on which it prevailed, a Little Auk was picked up at East Linton, a village a few miles inland from Dunbar. On the day following numbers were observed in the Orkney Isles. We have here, it is thought, some evidence that this species may have pelagic winter quarters, perhaps resorted to by small numbers, in the North Sea. If not, these birds could hardly have occurred on our shores while the gale was actually in progress. Many of us, no doubt, remember that the late Mr. Robert Gray long ago held the opinion that such was the case, and the above mentioned facts seem to substantiate in a remarkable manner the correctness of that most excellent ornithologist's views on this subject.

The weather remained in a more or less unsettled condition during the remainder of the month, and on the 30th there was a strong gale from the northwards experienced in the north of Scotland, and the wind was still strong from that quarter on the last day of the year. The weather-conditions during this period resulted in some small disasters to the Little Auks, which will be found duly indicated in the schedule of occurrences which forms the concluding portion of this communication. This tabulation has been arranged chronologically, and may be consulted with advantage in connection with the above and the following observations of a similar nature.

On the 6th JANUARY the weather again became changeable and unsettled in Scotland, with strong gales from the N. and N.-N.E. On the 7th the wind was northerly and strong to a gale in force. This second, but short, period of storm resulted in considerable disaster to this little bird along the entire east coast of Scotland, and it was just afterwards that the greatest numbers were observed to come ashore dead

and dying in the Orkney Islands. This series of northerly gales had, without doubt, driven before it vast numbers of Little Auks, and the North Sea had now become quite a rendezvous of the species. That such was the case is indeed proved by the events which followed.

On 12th JANUARY another cyclonic period was ushered in by a gale from the S.E. affecting all parts of our Islands, and which is specially chronicled as blowing with great force on the north-east coast of Scotland, and with the temperature below freezing-point over the northern parts of Britain. On the 13th the gale still prevailed, and the sea was very rough. On the 14th the gale was still blowing with moderate force in the north of Scotland. From this date until the early days of February weather of a very unsettled type prevailed, with the temperature below the mean. Latterly the cold was very severe; the sea was often rough; the wind often fresh from the N. or E., sometimes very strong; and there was some snow. A reference to our tabulated statistics shows that a great disaster overtook the Little Auks sojourning in the North Sea from the 13th January onwards. The period of strong winds, rough seas, low temperatures, and snowstorms which prevailed during these three weeks made great havoc in their ranks and wrecked them in vast numbers among the Northern Isles, and along the entire East Coast and its Firths, indeed throughout the length and, in some areas, the breadth of Scotland. The following are a few incidents of the storm and its results which are worthy of special mention.

Some numbers were driven as far west as Loch Lomond, where they appeared after "the gale and snowstorm from the east" on the 13th.

One was found as far from the eastern seaboard as Fort William, also after that same storm.

Considerable numbers appeared in the Firth of Forth, and 70-80 were observed on the 13th of January close off Aberdour, at the mouth of the harbour, seeking shelter from the high sea running outside.

Mr. G. Pow says that in every sheltered bay along the Haddington coast from Prestonpans to Cockburnspath they sought refuge from the raging sea, and that doubtless many escaped in this way.

At the end of January Mr. D. Bruce watched a small party about three hundred yards off the shore at Dunbar. A blinding snowstorm prevailed at the time, and a strong easterly wind had been driving the birds into broken water. After being buffeted for some time a few of them took wing and endeavoured to fly seaward, but the wind gradually lifted them high into the air, when some of them seemed suddenly to be turned quite over, and were driven back and inland before the gale; the others were driven on to the beach. The remainder of the party made their way out to sea, diving through the waves when just about to break upon them.

Lastly, Mr. Dunbar, Thurso, tells us that a party of from 50-60 flew from the sea over the rocks and made their way inland.

In FEBRUARY the weather remained very wintry until the closing week of the month. During this period the cold was intense, the coldest experienced in Scotland for forty years, as many as 40° of frost being registered. There was much ice in all the Firths on the East Coast; and heavy snowstorms were experienced. Many Little Auks were found dead, some of which had, no doubt, fallen victims to the past storms; but many also succumbed to the severe cold, which must have told upon numbers of them in their low condition, the result of the many and great hardships experienced among the winds and waves of the previous month. All that were shot, so far as we know, were in a more or less lean condition, with little or nothing in their stomachs. Dr. Ogilvie found the same to be the case with the specimens examined by him. Mr. Small, however, reports that the gullet of one received from Orkney was crammed with small, transparent, shrimp-like Crustaceans, half an inch long, probably a species of *Mysis;* while the stomach and gullet of one shot at Aberdour, and examined by Mr. Evans, was full of a fleshy substance, probably fish. Mr. Wm. Evans saw ten specimens, all recently dead,—several of them were still afloat among the broken ice drifting in with the tide,—near South Queensferry on the 9th of February, a calm day with intense frost. Examples, mostly old and mummified, continued to come under the notice of our observers; but a few fresh specimens were sent to the taxidermists, for preservation, until the end of the month, indicating that death was still thinning their ranks.

The data for the WEST COAST are not very voluminous, nor are they sufficiently complete to permit us to say *how* the birds found their way there. It is significant, however, that only two specimens are recorded for the Outer Hebrides: one of these by Dr. MacRury, who remarks concerning it, "the only one seen this winter"; while Mr. Peter Anderson, writing from Tiree, says that he has not seen a single Little Auk, dead or alive, during the winter, though a few come ashore there nearly every year at that season. If these birds had been numerous on the north-west coast of Scotland, I hardly think that they could have escaped the notice of these excellent observers. As our map indicates, the great majority of the West Coast records are for the Clyde area and the adjacent districts; and I think it highly probable that the birds occurring there may have found their way from the East Coast. The distance between the Firths of Forth and Clyde is only some forty miles, over low country; and we have the important testimony of Mr. James Lumsden that they arrived at Loch Lomond, or practically in the Clyde, *after the severe gale from the east*, which is pretty conclusive evidence in favour of the opinion just expressed. Indeed, from the Firth of Forth we have a complete chain of records extending right through to the Clyde (see map). They would appear to have been most abundant, according to the information furnished, on the coast of Islay.

The information for SHETLAND is also deficient, for, as the Messrs. Henderson justly remark, the East Coast would receive the great mass of wrecked Auks driven ashore. It is to be regretted that we have practically no information for that important coast-line.

As to the TOTAL NUMBER of Little Auks that perished on the Scottish coasts, it is quite impossible to venture any computation. Mr. A. Laird, writing of the Kirkwall district, Orkney, says that "they have been destroyed by the thousand." Dr. Ogilvie, writing of the Long Hope district of the same Islands early in January, tells us that these birds, even at that early date, lay dead and dying on the surface of the water and along the shores "in hundreds." Great numbers were cast up along the entire east coast of the mainland and its

firths. A slight indication of the multitudes destroyed may perhaps be gleaned from the numbers sent for preservation to various taxidermists. Thus Mr. Sim, Aberdeen, received 122; Mr. Small, Edinburgh, 70-80; Messrs. M'Leay and Son, Inverness, 70; Mr. M'Culloch, Glasgow, 30; and Mr. Bisshopp, Oban, 26. Mr. Evans's death-roll for the Forth area alone amounts to 270.

The wreck of the Little Auk in 1894-95 was not confined to Scotland. It extended along the entire east coast of Britain, and often far inland. As giving some indication of the extent of the disaster in England, it may be stated that Mr. J. H. Gurney registered nearly 300 for Norfolk alone. Numerous Guillemots, Razor-bills, Gulls, and other seabirds, likewise succumbed to the severity of the weather on both the Scottish and the English coasts.

Regarding the records, it must be remarked that the date given is in some cases not the exact day of the actual finding of a particular specimen, but the date on which it came into the taxidermist's hands for preservation. In a few cases, too, the localities given may not be the precise ones. These little irregularities, which are few, cannot be avoided in connection with data rapidly collected, as in this case.

The map affords a graphic illustration of the widespread nature of the wreck of the Little Auk, also some indication of its abundance in the various districts in which it has come under observation and has been reported to us.

The thanks of the four gentlemen who have so kindly placed their data in my hands, and of myself, are due to the great number of observers whose names appear in the last column of the tabulated record. To all of these we desire to express our sense of the obligation we are under, and tender to them the thanks and acknowledgments they all so justly deserve. My thanks are also due to Mr. R. C. Mossman, Edinburgh, for affording me access to valuable meteorological data.

In concluding, I would again express the opinion that this report gives a mere indication of the extent of the visitation and wreck of the Little Auk in Scotland during the winter of 1894-95. Much more is known concerning them than appears here; but more, far more, has happened unwitnessed.

## Chronological Summary of the Reported Occurrences of the Little Auk in Scotland, 1894-95.

| Date. | Locality. | Numbers. | Authority. |
|---|---|---|---|
| 1894. | | | |
| Dec. 22 . | Near E. Linton, E. Lothian | One . . | Geo. Pow. |
| Dec. 23 and 24 to Jan. 3 and 4 | Hoy, Orkney . . . | Many . . | J.G.Moodie-Heddle. |
| Dec. 26 . | North Berwick, E. Lothian | One . . | R. Small. |
| Dec. 29 . | Crail, Fife . . . | ,, . . | ,, |
| Dec. 31 . | Elie, Fife . . . | ,, . . | Oswin Lee. |
| ,, . | Bay of Spiggie, Shetland . | First seen . | R. & T. Henderson. |
| ,, . | Mearns, Renfrew . . | One . . | J. Paterson. |
| Dec., end of 1895. | Hoy, Orkney . . . | A few . . | J.G.Moodie-Heddle. |
| Jan. 4 . | Hoy, Orkney . . . | Fourteen seen | ,, |
| ,, . | Nairn . . . . | One . . | Douglas Brodie. |
| ,, . | Tullichewan, Dumb't'nshire | ,, . . | J. Paterson. |
| Jan. 6 to 12 | Hoy, Orkney . . . | Many . . | J.G.Moodie-Heddle. |
| Jan. 7 . | Wick Bay . . . | Twelve . | Lewis Dunbar. |
| Jan. 7 to 24 | Fyvie, Aberdeenshire . | ,, . | G. Sim. |
| Jan. 7 . | Gourock . . . . | One . . | Chas. Berry. |
| Jan. 8 . | Brims, Orkney. . . | ,, . . | Dr. T. W. Ogilvie. |
| ,, . | Portobello, Edinburgh . | Two . . | R. Small. |
| ,, . | North Berwick . . | ,, . . | ,, |
| Jan. 9 . | Longhope, Orkney . . | Many in flocks | Dr. T. W. Ogilvie. |
| ,, . | Kirhope, Orkney . . | Numerous after 9th | ,, |
| ,, . | Dunbar, East Lothian . | Several . . | D. Bruce. |
| Jan. 10 . | Logie, Aberdeenshire . | One . . | G. Sim. |
| ,, . | Ellon, ,, . | Two . . | ,, |
| ,, . | Edenmouth, Fife . | ,, . . | Allan Briggs. |
| ,, . | Anstruther, ,, . . | Three . . | R. T. Inglis. |
| Jan. 10 to 20 | St. Andrews, ,, . . | Seven . . | Allan Briggs. |
| Jan. 11 . | Prestonkirk, E. Lothian . | One . . | R. Small. |
| Jan. 11 or 12 | Near Dunbar . . . | One shot . | G. Pow. |
| Jan. 12 . | Near Skene, Aberdeenshire | One . . | G. Sim. |
| ,, . | Pitmarthen, ,, | ,, . . | ,, |
| ,, . | Nairn . . . . | ,, . . | M'Leay & Son. |
| Jan. 12, about | Prestonpans, E. Lothian . | ,, . . | G. Hay. |
| Jan. 13 . | Peterhead . . . | Many driven ashore | Rev. W. Serle. |
| Jan. 13 *et seq.* | Mouth of Lunan, Forfarshire | A flock . . | "Scotsman." |
| Jan. 13 . | Newbigging, ,, | One . . | ,, |
| ,, . | Bankfoot, Perthshire . | ,, . . | ,, |
| ,, . | Dunbar . . . . | Many . . | D. Bruce. |
| ,, . | Dalmeny, West Lothian . | Ten picked up | Chas. Campbell. |
| ,, . | Close to Aberdour, Fife . | Flock of 70 to 80 seen . | W. Evans *fide* — M'Lauchlan. |
| Jan. 14 . | Fair Isle . . . . | Many . . | J. Anderson. |
| ,, . | Fraserburgh . . . | ,, . . | A. G. Gavin. |
| ,, . | About Aberdeen . . | Four . . | G. Sim. |
| ,, . | St. Andrews . . . | One . . | Allan Briggs. |
| ,, . | Strathkinness, Fife . | ,, . . | ,, |
| ,, . | Granton, Edinburgh . | ,, . . | R. Small. |
| Jan. 15 . | Thurso . . . . | ,, . . | Lewis Dunbar. |
| ,, . | Sauchie, Stirlingshire . | ,, . . | Crockart & Co. |

| Date. | Locality. | Numbers. | Authority. |
|---|---|---|---|
| 1895. | | | |
| Jan. 15 . | Killearn, Stirlingshire . | Two . . | J. Paterson. |
| ,, . | Rowardennan, ,, . | ,, . . | ,, |
| ,, . | Dunmore, ,, . | One . . | Crockart & Co. |
| ,, . | Stronachlacher, Stirlingsh're | ,, . . | ,, |
| ,, . | Stirling . . . . | ,, . . | ,, |
| ,, . | Campbeltown, Argyleshire | ,, . . | J. Paterson. |
| Jan., mid . | Banff . . . . | Several . . | J. Lemmon. |
| ,, . | West coast of Banff . . | ,, . . | ,, |
| ,, . | Corgarff, Aberdeenshire . | One . . | ,, |
| ,, . | Deveron Valley . . | A good many | ,, |
| ,, . | R. Ugie, Aberdeenshire . | Many . . | Rev. R. Cushory. |
| ,, . | Auchter-Ellon, ,, . | Several . . | Rev. W. Serle. |
| ,, . | Old Meldrum ,, . | One . . | ,, |
| ,, . | Loch Earn, Perthshire . | Several . . | D. Robertson. |
| ,, . | ,, ,, . | Eighteen . | A. M'Ewan. |
| ,, . | Liberton, Edinburgh . | One . . | J. Dewar. |
| ,, . | Prestonpans, E. Lothian . | Ten . . | Henry Fraser. |
| Jan. 16 . | Thurso . . . . | Three . . | Lewis Dunbar. |
| ,, . | Kinbrace, Sutherlandshire | One . . | ,, |
| ,, . | Forss, Caithness . . | ,, . . | ,, |
| ,, . | Fort William . . . | ,, . . | M'Leay & Son. |
| ,, . | Banffshire . . . | ,, . . | R. Small. |
| ,, . | Longside, Aberdeenshire . | Two . . | Rev. R. Cushory. |
| ,, . | Callander, Perthshire . | One . . | Crockart & Co. |
| ,, . | Blairdrummond, S. Perthshire | ,, . . | ,, |
| ,, . | St. Andrews, Fife . . | Three . . | Allan Briggs. |
| ,, . | Loch Lomond . . . | Several washed up | J. Lumsden. |
| Jan. 17 (before) | Invergowrie Bay, near Dundee | Many . . | C. Heron Watson. |
| Jan. 17 . | Tongue, Sutherland . | One . . | Lewis Dunbar. |
| ,, . | Kirkwall . . . . | Four . . | R. Small. |
| ,, . | Dunipace, Stirlingshire . | One . . | J. A. Harvie-Brown. |
| ,, . | Denny, ,, . | ,, . . | ,, |
| ,, . | Leith . . . . | Two . . | R. Small. |
| Jan. 18 . | Thurso . . . . | Three . . | Lewis Dunbar. |
| ,, . | Berridale, Caithness . | One . . | ,, |
| ,, . | Near Tongue . . . | ,, . . | ,, |
| ,, . | Inverness . . . | ,, . . | M'Leay & Son. |
| ,, . | Inchwayrack, Forfarshire . | ,, . . | W. Duncan. |
| ,, . | Stonehaven, Kincardinesh'e | ,, . . | R. Small. |
| ,, . | Leslie, Fife . . . | ,, . . | ,, |
| Jan. 18, etc. | Thurso District . . | Many obtained | Lewis Dunbar. |
| Jan. 18 & 19 | Montrose, Forfarshire . | Many on shore | W. Duncan. |
| Jan. 19 . | Thurso . . . . | Two . . | Lewis Dunbar. |
| ,, . | Strathmore . . . | One . . | ,, |
| ,, . | Beauly . . . . | ,, . . | M'Leay & Son. |
| ,, . | Nairn . . . . | ,, . . | ,, |
| ,, . | Granton-on-Spey . . | ,, . . | ,, |
| ,, . | Clacknaharry, Invernessshire | ,, . . | ,, |
| ,, . | Kininylies, ,, | ,, . . | ,, |
| ,, . | North Kessock ,, | ,, . . | ,, |
| ,, . | Kirriemuir, Forfarshire . | ,, . . | W. Duncan. |
| ,, . | Fettercairn, Kincardineshire | ,, . . | ,, |

| Date. | Locality. | Numbers. | Authority. |
|---|---|---|---|
| 1895. | | | |
| Jan. 19 | Brechin, Forfarshire | Several | W. Duncan. |
| ,, | Letham Moss, Forfarshire | Two | A. Nimmo, jun. |
| Jan. 20 | Kirkwall | One | R. Small. |
| ,, | Kingussie, Inverness-shire | ,, | M'Leay & Son. |
| ,, | St. Andrews | ,, | Allan Briggs. |
| ,, | Montrave, Fife | Two | R. Small. |
| ,, | North Berwick | ,, | ,, |
| ,, | Crieff, Perthshire | One | David Bisset. |
| ,, | Granton, Midlothian | ,, | R. Small. |
| ,, | Old Killearn, Stirlingshire | ,, | J. Paterson. |
| ,, | Kelso, Roxburghshire | Three | R. Small. |
| ,, | Near Dennistoun, Glasgow | One | J. Paterson. |
| Jan. 21 | Reay Forest, Sutherlandshire | ,, | M'Leay & Son. |
| ,, | St. Andrews | ,, | R. Small. |
| Jan. 22 | Kildonan, Sutherlandshire | ,, | M'Leay & Son. |
| ,, | Invercarron, Ardgay, Ross-shire | ,, | ,, |
| ,, | Balnagown, Ross-shire | ,, | ,, |
| ,, | Fearn, ,, | ,, | ,, |
| ,, | Alness, ,, | ,, | ,, |
| ,, | Black Isle, ,, | ,, | ,, |
| ,, | Reymore, Inverness-shire | ,, | ,, |
| ,, | Monicur, Perthshire | ,, | ,, |
| ,, | Ellon, Aberdeenshire | Two | G. Sim. |
| ,, | Gartincaber, Perthshire | Several | Lieut.-Col. Duthie. |
| ,, | Dunfermline, Fife | Two | R. Small. |
| Jan. 23 | Kirkwall | ,, | ,, |
| Jan. 24 | Black Isle, Ross-shire | One | M'Leay & Son. |
| ,, | Haddo House, Aberdeenshire | ,, | G. Sim. |
| ,, | Aberdeen | Two | ,, |
| ,, | Portlethan, Kincardineshire | One | ,, |
| ,, | Maryculter, ,, | ,, | ,, |
| ,, | Portobello, Midlothian | Two | R. Small. |
| ,, | Cramond, near Edinburgh | One | ,, |
| ,, | Dreghorn, Edinburgh | One alive | W. Evans. |
| ,, | Near North Berwick | One | "The Field." |
| Jan. 25 | Portobello, Midlothian | Three | R. Small. |
| Jan. 26 | Loch Spiggie, Shetland | One | R. & T. Henderson. |
| ,, | Prestonpans and Port Seton, East Lothian | Two — one alive | W. Evans. |
| Jan. 27 | Stornoway | One | M'Leay & Son. |
| ,, | Parkhill, Ross-shire | ,, | ,, |
| Jan. 28 | Loch Spiggie, Shetland | One | R. & T. Henderson. |
| ,, | Nairn | ,, | M'Leay & Son. |
| ,, | Aberdeen | ,, | G. Sim. |
| ,, | Off Aberdour, Fife | About twenty seen—four shot | P. Adair. |
| ,, | Callander, Perthshire | One | Crockart & Co. |
| Jan. 29 | Loch Spiggie, Shetland | ,, | R. & T. Henderson. |
| Jan. 30 | Carbrook, Stirlingshire | ,, | Crockart & Co. |
| Jan. (?) | Dunrossness, Shetland | A good many | R. & T. Henderson. |
| ,, | John o' Groats | Three | Lewis Dunbar. |
| ,, | Sinclair's Bay, Caithness | Many | ,, |
| ,, | Dunbeath, ,, | One | ,, |
| ,, | Freswick, ,, | Two | ,, |

| Date. | Locality. | Numbers. | Authority. |
|---|---|---|---|
| 1895. | | | |
| Jan. (?) | Stirkoke, Caithness | Two | Lewis Dunbar. |
| ,, | Sutherland, East Coast | Many | T. E. Buckley. |
| ,, | Inverness District | Three | Hugh Snowie. |
| ,, | Beauly Firth | Many | T. E. Buckley. |
| ,, | Port Gordon, Banff | Three | G. Thomson. |
| ,, | Portsoy, ,, | One | A. Donaldson. |
| Jan. (?) and Feb. | East Lothian coast—Tantallon to Cockburnspath | Many—handled forty-six | G. Pow. |
| Jan. (?) | Forth District | Over twenty for preservation | W. Hope. |
| ,, | Stravithie, Fife | One | Allan Briggs. |
| ,, | Gourock, Renfrewshire | Two | J. Paterson. |
| ,, | Berwick-on-Tweed and Kelso | Several | J. L. Campbell-Swinton. |
| Feb. 1 | Dunrossness, Shetland | One | R. & T. Henderson. |
| Feb. 2 | Loch Spiggie, ,, | ,, | ,, |
| ,, | Dunbar | One seen | T. G. Laidlaw. |
| ,, | Off Aberdour, Fife | Flock of 20-30 seen | W. Evans *fide*—Mr. M'Lauchlan. |
| ,, | Cambo, Fife | One | W. Erskine. |
| ,, | Rossdhu, Dumbartonshire | ,, | J. Paterson. |
| Feb. 3 | Aberdeen Shore | Five | G. Sim. |
| ,, | Aberdeen | One | ,, |
| Feb. 4 | Cambo, Fife | ,, | W. Erskine. |
| ,, | Dunbar | ,, | R. Small. |
| ,, | North Berwick | Three | ,, |
| ,, | Musselburgh, near Edinr. | One | ,, |
| ,, | Granton, Edinburgh | ,, | ,, |
| ,, | Portobello, ,, | ,, | ,, |
| ,, | Aberdour, Fife | ,, | Crockart & Co. |
| ,, | Near Maryhill, Glasgow | ,, | J. Paterson. |
| Feb. 5 | St. Andrews | ,, | R. Small. |
| ,, | Cockburnspath, Berwick. | ,, | ,, |
| ,, | Prestonpans, E. Lothian | ,, | ,, |
| ,, | Off Aberdour, Fife | Two seen alive | W. Evans. |
| ,, | Donibristle, Fife | One, remains of | ,, |
| Feb. 6 | Dunbar | One | R. Small. |
| ,, | Kinghorn, Fife | Two | ,, |
| ,, | Cockenzie, East Lothian | One | ,, |
| ,, | Cramond, near Edinburgh | ,, | ,, |
| Feb. 8 | Aberdour, Fife | One shot | W. Laidlaw. |
| ,, | Fairburn, Ross-shire | One | M'Leay & Son. |
| ,, | St. Andrews | ,, | Allan Briggs. |
| ,, | North Berwick | ,, | R. Small. |
| Feb. 9 | Riverdale, Inverness | ,, | M'Leay & Son. |
| ,, | St. Andrews | Two | Allan Briggs. |
| ,, | Portobello | One | R. Small. |
| ,, | South Queensferry | Ten—fresh | W. Evans. |
| Feb. 10 | Queen's Park, Edinburgh | One | J. Laurie. |
| Feb. 11 | Portobello | ,, | R. Small. |
| ,, | Old Killearn, Stirlingshire | ,, | J. Paterson. |
| Feb. 12 | Meiklewood, near Stirling | ,, | Crockart & Co. |
| Feb. 13 | Forth | A dozen | R. S. Anderson. |
| Feb. 14 | Prestonkirk, East Lothian | One | R. Small. |
| Feb. 16 | Falkirk, Stirlingshire | ,, | Crockart & Co. |
| Feb. 17 | Aberdeen | ,, | G. Sim. |

| Date. | Locality. | Numbers. | Authority. |
|---|---|---|---|
| 1895. | | | |
| Feb. 17 . | Aberdeen Shore . . | One . . | G. Sim. |
| Feb. 22 . | Loch Lomond . . . | ,, . . | R. Small. |
| ,, . | North Berwick, west of . | 17, mostly been dead considerable time | W. Evans. |
| Feb. 23 . | Ayr . . . . | One . . | J. Paterson. |
| Feb. 24 . | Orkney, outer sounds . | Many . . | J. G. Moodie Heddle. |
| ,, . | Kingsbarns Shore, Fife . | Eleven . . | W. Erskine. |
| Feb. 25 . | Rowardennan, Stirlingshire | One . . | J. Paterson. |
| ,, . | Portobello . . . | ,, . . | R. Small. |
| Feb. 26 . | Near New Deer, Aberdeenshire | ,, . . | J. M. Campbell. |
| Feb. 27 . | Aberdeen Harbour . . | ,, . . | G. Sim. |
| Feb., early in | Edinburgh, south side . | ,, . . | W. Evans. |
| Date (?) . | Lerwick . . . . | Two . . | Thos. Bowie. |
| ,, . | Kirkwall . . . . | Thousands destroyed | A. Laird. |
| ,, . | Botriphnie, Banff . . | One . . | A. G. Gavin. |
| ,, . | Near New Pitsligo, Aberdeenshire | ,, . . | ,, |
| ,, . | Peterhead . . . | Sixteen . | G. Sim. |
| ,, . | Loch Tay . . . | One . . | "The Field." |
| ,, . | Perth District . . . | 30 picked up. | Lieut.-Col. Drummond Hay |
| ,, . | South of Callander . . | One . . | Arthur Potts. |
| ,, . | Gartincaber. Perthshire | Two . . | J. Stirling. |
| ,, . | Lindores, Fife . . . | One . . | J. R. W. Cooke. |
| ,, . | Newburgh, Fife . . | Three . . | Allan Briggs. |
| ,, . | Markinch, Fife . . | One . . | R. Tullis. |
| ,, . | Linlithgow . . . | ,, . . | W. H. Henderson. |
| ,, . | Airthrey, near Stirling . | ,, . . | J. Stirling. |
| ,, . | Foulden, Berwickshire . | ,, . . | Dr. Stuart. |
| ,, . | Whitsome, ,, . | ,, . . | ,, |
| ,, . | Loch Screidan, Mull . | (?) | C. H. Bisshopp. |
| ,, . | Barra, Hebrides . . | "One only". | Dr. MacRury. |
| ,, . | Oban and Mull . . | Twenty-three | C. H. Bisshopp. |
| ,, . | Islay . . . . | Many at sea and inland | Dr. Gilmour. |
| ,, . | Campbeltown . . . | (?) | Chas. Berry. |
| ,, . | Dalry, Ayrshire . . | One . . | C. E. Eaton. |

Mr. Evans tells me, since the above table was set up, that one was picked up at Aberlady Bay, Firth of Forth, in a fresh condition, on the 24th of March.

# A LIST OF SPIDERS COLLECTED AT OBAN, ARGYLLSHIRE.

By George H. Carpenter, B.Sc., and William Evans, F.R.S.E.

[Introductory Note by W. Evans.—The following is a list of spiders collected by me in the immediate neighbourhood of Oban, during a short sojourn there—namely from 13th April to 4th May—in the spring of last year.

That the district is rich in spiders can scarcely be doubted, though I cannot say that they were as much in evidence at the time of my visit as I had expected to find them. The weather, however, was not so favourable as could have been wished for, and very probably to this cause may be attributed the somewhat scanty signs of both spider and insect life.

Of the seventy species collected, only one, namely *Enoplognatha thoracica* (Hahn), is new to the Scottish list. Several others, however, are of very considerable interest, and even the commonest are worthy of record in view of the imperfect state of our knowledge respecting their distribution in North Britain.

No section of the Scottish fauna will better repay investigation than the spiders; and our hope is that the present fragmentary list from Oban may be the means of inducing some naturalist resident in Argyllshire to turn his attention to the group. Experience gained in other districts justifies us in predicting as the reward of say a year's well-directed research, the discovery not only of species new to Scotland and to Britain, but also of some new to science. A systematic examination of suitable spots from base to summit of one of the higher mountains, Ben Cruachan for instance, would be certain to yield most interesting results.

As on former occasions, Mr. Carpenter has kindly overhauled the collection for me, and from his memoranda and my own field-notes the subjoined list has been drawn up. The identification of a few of the less easily recognised species has been confirmed by the Rev. O. P. Cambridge.

The arrangement and nomenclature are, with a few slight exceptions, the same as in our Lists for Edinburgh and

Aviemore recently published in the Royal Physical Society's "Proceedings" and in the present journal respectively.]

## Systematic List of Species.

### DYSDERIDÆ.

Harpactes hombergii (*Scop.*)—Dunolly and Ganavan Bay, a good many; ad. imm. and very young.

Segestria senoculata (*L.*)—Common; four ad. ♂s (on 25th April) and several ad. ♀s (one full of eggs); numerous imm. examples, some of them quite young.

Oonops pulcher, *Templ.*—Dunolly and among the hills behind Oban, a few ad. ♀s and several imm.

### DRASSIDÆ.

Drassus troglodytes, *C. L. K.*—Two only—an imm. ♂ and an ad. ♀—detected.

Drassus lapidosus (*Walck.*)—Common; five ad. ♂s (on 25th and 27th April), a few ad. ♀s, and a number of imm. and young examples.

Clubiona compta, *C. L. K.*—Ad. ♀ (Dunolly, 21st April) and a few young.

Clubiona trivialis, *L. Koch*—A few on heather in end of April.

Chiracanthium carnifex (*Fabr.*)—A few imm. ♂s and ♀s on heather in fir plantations behind Oban.

Zora spinimana (*Sund.*)—Several imm. examples among moss and heather.

Agroëca proxima, *Cambr.*—One imm. ♀ at same time and place as the last.

### DICTYNIDÆ.

Dictyna arundinacea (*L.*)—Common on heather; first adults (both sexes) observed on 26th April.

Amaurobius fenestralis (*Str.*)—Common among stones, etc.

Amaurobius similis (*Blackw.*)—A few ad. ♀s on wall of house.

### AGELENIDÆ.

Tegenaria derhamii (*Scop.*)—Common in houses.

Textrix denticulata (*Oliv.*)—Several ad. ♀s and a number of others of various ages among stones at foot of cliffs Ganavan Bay and at Dunstaffnage Castle.

HAHNIA ELEGANS (*Bl.*)—One ♀ among rushes in moist spot among the hills behind Oban, 25th April.[1]

HAHNIA MONTANA (*Bl.*)—A number of ♀s (some ad.) and an imm. ♂ among stones on hills behind Oban, end of April.

## THERIDIIDÆ.

ERO FURCATA (*Vill.*)—A number of ♀s, mostly ad.

THERIDION LINEATUM (*Clerck*).—Young examples common on furze in end of April and beginning of May.

THERIDION SISYPHIUM (*Clk.*)—Common, but very few yet adult.

PHOLCOMMA GIBBUM (*Westr.*)—An ad. ♂ and a number of ♀s among heather.

ENOPLOGNATHA THORACICA (*Hahn*) = *Neriene albipunctata*, Cambr. "Spid. Dorset."—Two ad. ♀s of this addition to the Scottish list were found on a bank by the side of the Glencruitten road on 1st May. One of them has been shown to Mr. Cambridge.

PEDANOSTETHUS LIVIDUS (*Bl.*)—Adults of both sexes—some beside egg-cocoons—common.

BOLYPHANTES LUTEOLUS (*Bl.*)—Not common, an ad. ♂ and an ad. ♀ being all that were detected.

DRAPETISCA SOCIALIS (*Sund.*)—A few young examples.

LINYPHIA CLATHRATA, *Sund.*—One ad. ♂ and several imm. ♀s.

LINYPHIA PUSILLA, *Sund.*—One ad. ♂, 27th April, and a few imm. ♀s.

LABULLA THORACICA (*Wid.*)—Several imm. ♀s among stones on the Maiden Isle.

LEPTYPHANTES OBSCURUS (*Bl.*)—A good many among heather, etc.

LEPTYPHANTES BLACKWALLII, *Kulcz.*[1] = *Linyphia zebrina*, Cambr. "Spid. Dorset."—A few.

LEPTYPHANTES TENUIS (*Bl.*)[2] = *Linyphia tenebricola*, Cambr. "Spid. Dorset," nec. Wid.—Common; a few ad. ♂s.

LEPTYPHANTES ERICÆUS (*Bl.*)—A few among heather.

BATHYPHANTES VARIEGATUS (*Bl.*)—Common; adult.

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[1] The first recorded Scottish examples were taken by me in Fifeshire in September 1893.—W. E.

[2] See Rev. F. O. P. Cambridge's "List of the Araneidea of the Cumberland Lake District," "Naturalist," February 1895, p. 37.

Bathyphantes concolor (*Wid.*)—Ad. ♂ and several ♀ s.

Bathyphantes nigrinus (*Westr.*)—Two ♀ s in marshy spot near Cleugh Inn.

Bathyphantes gracilis (*Bl.*)—Ad. ♂ and several ♀ s.

Tmeticus bicolor (*Bl.*)—A few ♀ s.

Microneta fuscipalpis (*C. L. K.*)—One ad. ♂ on wire fence, 25th April.

Gongylidium fuscum (*Bl.*)—A pair, ♂ and ♀, ad.

Erigone atra (*Bl.*)—Adults common among shingle, etc.

Erigone dentipalpis (*Wid.*)—An ad. ♂ and several ♀ s.

Lophomma punctatum (*Bl.*)—Four ad. ♀ s in marshy spot, 25th April.

Gonatium rubens (*Bl.*)—Ad. ♀ s common.

Gonatium bituberculatum (*Wid.*)—Ad. ♂ and ♀ in marshy spot near Loch Nell, 28th April.

Dismodicus bifrons (*Bl.*)—Ad. ♂ s and ♀ s not uncommon on heather, etc.

Diplocephalus cristatus (*Bl.*)—Ad. ♂ under stone, 17th April.

Savignia frontata, *Bl.* = *Walckenaëra frontata*, Cambr. "Spid. Dorset."—Only one example—an ad. ♂—detected.

Araeoncus crassiceps (*Westr.*)—Ad. ♂ s and ♀ s were found in abundance among shingle at high-water mark immediately to the south of Oban on 18th April. A specimen since taken by us at Loch Leven, Kinross-shire, has been the subject of the first Scottish record. This spider seems to have been found in Great Britain nowhere else than in Dorset. On the Continent it has occurred in Bavaria and in Sweden.

Peponocranium ludicrum (*Cambr.*)—Adults common on furze.

Walckenaëra acuminata, *Bl.*—One ♂ and about a dozen ♀ s, all adult.

Ceratinella brevis (*Wid.*)—Several ♀ s about roots of heather.

## EPEIRIDÆ.

Pachygnatha clerckii, *Sund.*[1]—An ad. ♀ in marshy spot near Cleugh Inn, 28th April.

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[1] In our previous papers the genus *Pachygnatha* was placed at the end of the *Theridiidæ*, but I now think M. Simon is right in moving it to *Epeiridæ*.—G. H. C.

Pachygnatha degeerii, *Sund.*—Common on furze, etc.; adults of both sexes.

Meta segmentata (*Clk.*)—Abundant, both ad. and imm.—some very young.

Meta merianæ, *Scop.*—A few adults of both sexes and a number immature.

Zilla x-notata (*Clk.*)—Numerous young examples on shed in centre of Oban; end of April.

Epeira diademata (*Clk.*)—Abundant on cliffs at Ganavan Bay, etc., but all immature; several cocoons of last year's eggs on point of hatching.

Epeira cornuta (*Clk.*)—One ad. ♂ (3rd May) and a number of imm. ♀s on heather in several localities.

Epeira quadrata (*Clk.*)—A good many on heather; all immature.

## THOMISIDÆ.

Xysticus cristatus (*Clk.*)—Common, a few of the ♀s adult.

Oxyptila atomaria (*Panz.*)—Several ♀s, one ad.

## LYCOSIDÆ.

Pirata piraticus (*Clk.*)—Immature examples common.

Trochosa terricola, *Thor.*—♂ and two ♀s ad. and a good many imm.

Trochosa pulverulenta (*Clk.*)—Abundant, both in the ad. and imm. states.

Lycosa amentata (*Clk.*)—Very common, especially among shingle on the beach; many adult.

Lycosa pullata (*Clk.*)—Very common; many ad.

Lycosa nigriceps, *Thor.*—Common among heather; a few ad.

Lycosa herbigrada, *Bl.*—One ♀, Glencruitten, 1st May.

Lycosa palustris (*L.*)—Common; numbers adult.

## ATTIDÆ.

Neon reticulatus (*Bl.*)—A good many (including several ad. ♂s) on stony slope among hills immediately behind Oban, 26th April.

# RECORDS OF SCOTTISH PLANTS FOR 1894, ADDITIONAL TO WATSON'S "TOPOGRAPHICAL BOTANY," 2nd Ed. (1883).

By Arthur Bennett, F.L.S.

The present series of additions to county lists makes the tenth I have been enabled to publish by the kindness of correspondents. In these ten papers the additions are about 4870; or, allowing for personal confirmations, corrections of errors, etc., say 4500: a sufficiently large number, perhaps, to show that they have been of some use.

It has been my wish and desire to more particularly notice the commoner species, as the rarer ones are generally recorded.

As this may be my last, I should like to thank most cordially all those who have so kindly helped to make these lists possible.

The abbreviations, etc., are the same as in former records, viz. "Ann. S. N. H." = "Annals of Scottish Natural History"; "J. B." = "Journal of Botany"; "Trans. E. B. S." = "Transactions of the Edinburgh Botanical Society"; *sp.* denotes that a specimen was sent me, and ! denotes that I have seen a specimen from the county.

## 74. Wigtown.

(Records by and *sps.* from *J. M'Andrew.*)

Ranunculus circinatus.
" Lenormandi.
Arabis Thaliana.
Mentha piperata (officinalis).
Calamintha Acinos.
Utricularia intermedia.
Carex filiformis.
Bromus sterilis.

## 75. Ayr.

Carlina vulgaris, *J. Smith*, Sept. 1894, *sp.*
Pulicaria dysenterica, *Dr. Fullarton*, Oct. 1894, *sp.*
Utricularia neglecta, *L. Watt*, 1892, *sp.*

## 77. Lanark.

Hieracium auratum, Fr.
" strictum
} Johnstone, "*Trans. E. B. S.*," 1891.

### 85. Fife.

Hieracium subramosum, Lönnr.

### 86. Stirling.

(Records by and *sps.* from *Col. Stirling* and *R. Kidston.*)

Ranunculus trichophyllus.
Nuphar intermedium.
Myriophyllum spicatum.
Andromeda Polifolia.
Vaccinium Oxycoccus.
Veronica persica (Buxbaumii).
Potamogeton Zizii.
„ undulatus.
„ lucens.
„ nitens.
Potamogeton rufescens.
„ Sturrockii.
„ Bennettii, Fryer.
„ pectinatus.
Typha angustifolia.
Zannichellia palustris.
Juncus tenuis, Willd.
Carex distans.
Festuca sylvatica.

### 88. Mid-Perth.

Cochlearia micacea, Marshall, "J. B.," 1894, p. 289.
Hieracium duplicatum, Almq., "J. B.," 1894, p. 229.

### 92. Aberdeen, South.

Hieracium petiolatum, Elfstr., "J. B.," 1894, p. 226.
„ dissimile, Lindeb., "J. B.," 1894, p. 230.

### 94. Banff.

Scirpus rufus, pers. auth., *L. Watt.*
Carex extensa, *L. Watt.*
„ vulpina, *L. Watt.*

### 96. Easterness (East Inverness).

Hieracium dissimile, Lindeb., "J. B.," 1894, p. 230.
Juncus alpinus, Vill., *Druce*, "Ann. S. N. H.," 1894, p. 122.

### 97. Westerness (West Inverness).

(*Sps.* from *S. M. Macvicar.*)

Rubus pyramidalis, Kalt.
„ infestus.
Ajuga pyramidalis (confirmed).
Utricularia neglecta.
Salsola Kali.
Potamogeton perfoliatus.
„ prælongus. (In the 1893 record *P. pusillus* appeared instead of *prælongus;* but Mr. Macvicar having sent *pusillus* also, the latter may stand.)
Cladium Mariscus.
Kœleria cristata.
Sclerochloa loliacea.

### 98. Argyle.

(All, except *Rubus*, recorded by *Rev. E. S. Marshall*, and *sps.* sent by him to me.)

Cochlearia micacea, Marshall.
Rubus dumnoniensis, Bab., } *Macvicar* t. *M. Rogers.*
„ pulcherrimus, Newm., }
Hieracium reticulatum, Lindeb.
„ flocculosum.
„ atratum, Fr.
Hieracium Langwellense, Hanb.
Utricularia neglecta.
Juncus alpinus, Vill.

### 99. Dumbarton.

Utricularia intermedia, *L. Watt, sp.*
„ neglecta ? *L. Watt, sp.*

### 100. Clyde Isles.

Sparganium affine, *A. Somerville, sp.*
Cladium Mariscus, *Ballantyne*, "Glasgow. N. H. Soc.," 1894.

### 103. Ebudes, Mid.

Rubus plicatus.
„ dumnoniensis, Bab.
„ carpinifolius, W. and N.
„ villicaulis, *var.*
„ mucronatus.
„ Radula, Weihe.
} *S. M. Macvicar* t. *M. Rogers.*

### 105. West Ross.

The majority of this large number of records was sent to me by Mr. Druce before publication of his papers in "Trans. B. S. Ed.," 1894, and "Ann. S. N. H.," 1895.

"Caltha radicans."
Fumaria Boræi.
„ officinalis.
Barbarea vulgaris.
Cochlearia "grœnlandica"
Sisymbrium officinale.
Coronopus Ruellii.
Stellaria graminea.
Sagina nodosa.
Spergularia rubra.
Erodium cicutarium.
Vicia angustifolia.
Lathyrus maritimus.
Prunus spinosa.
Rubus suberectus.
„ fissus.
„ plicatus.
„ rhamnifolius.
„ incurvatus.
„ leucostachys.
„ villicaulis, *var.*
„ macrophyllus.
„ pulcherrimus, Neum.
„ mucronatus.

Rubus Radula.
„ corylifolius.
Potentilla Fragariastrum.
Epilobium angustifolium.
†Chærophyllum temulum.
†Scandix Pecten-Veneris.
†Æthusa Cynapium.
Adoxa Moschatellina.
Gnaphalium uliginosum.
Petasites vulgaris.
Hieracium iricum.
„ rubicundum, Hanb.
„ Eupatorium, Griseb.
†Lycopsis arvensis.
Mertensia maritima.
Scrophularia nodosa.
†Veronica polita.
„ arvensis.
„ Anagallis.
Utricularia minor.
Mentha hirsuta.
„ sativa.
Glechoma hederacea.
Stachys ambigua.
Lamium amplexicaule.
Atriplex hastata.
Rumex acutus.
„ domesticus.
„ conspersus.
†Ulmus suberosa.
†Salix viminalis?
„ Smithiana.
Juniperus nana.
Listera ovata.
Habenaria albida.
Sparganium minimum.
Scirpus fluitans.
Carex rupestris.
Festuca elatior.
Bromus giganteus.
„ racemosus.
„ commutatus.
Triticum caninum.
Asplenium viride.
Polypodium Phegopteris.
Equisetum arvense.

### 107. Sutherland, East.

Pyrola rotundifolia (*Mrs. Wahab*), *Mr. Kidston*, *sp.*

### 108. Sutherland, West.

Adoxa Moschatellina } *Druce*, "Ann. S. N. H.," p. 36, 1895.
Alopecurus pratensis }
Hieracium hyparticum, Almq. } "J. B.," 1894.
„ Carenorum, Hanb. }

### 109. Caithness.

Cochlearia "grœnlandica, L.," *Marshall*, "J. B.," 1894, p. 114.
Hieracium dissimile, Lindeb., "J. B.," 1894, p. 230.
„ Farrense, Hanb., *Shoolbred* herb.!

### 110. Outer Hebrides.

(All records and *sps.* from *Mr. Schoolbred*, except *Chrysosplenium.*)

Ranunculus Flammula, *v.* petiolaris, *Marshall.*
Nuphar luteum (confirmed).
Brassica campestris.
Lychnis alba.
Spergularia marginata.

Rubus rusticanus, Merc.
„ gratus, Focke.
„ Radula, Weihe.
„ mucronatus.
„ carpinifolius, ? W. and N.
„ rosaceus, ? W. and N.
} t. *M. Rogers.*

Chrysosplenium oppositifolium, *W. S. Duncan, sp.*

Epilobium angustifolium.
Œnanthe Lachenalii.
Valerianella dentata
Galium sylvestre.
Petasites vulgaris (confirmed).
Anthemis Cotula.
Gnaphalium sylvaticum.
Veronica persica (1 stunted *sp.*)
Utricularia neglecta ?
Suæda maritima.
Salsola Kali.
Polygonum Raii (confirmed).
„ lapathifolium.
Euphorbia Peplus (one stray *sp.*, on rubbish).
Alisma ranunculoides.
Zannichellia pedicellata.
Carex paniculata.
„ xanthocarpa, Degl.
Phalaris arundinacea.
†Poa nemoralis.
Aira caryophyllea (confirmed).
Festuca sciuroides (confirmed).
Triticum junceum ? "acutum."
Elymus arenarius (confirms Macgillivray's record).

As yet no Scottish specimens of supposed *Utricularia neglecta* have been seen in flower.

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## ON *RANUNCULUS FLAMMULA*, ETC.

By the Rev. E. S. Marshall, M.A., F.L.S.

I READ with great interest Mr. Ewing's recent paper (No. 12, pp. 235-239), which shows that he has studied these plants with much attention. Detailed criticism is impossible for me, as I have never visited Loch Leven, upon the plants of which his observations are mainly based; nor have I had an opportunity of seeing his specimens. As, however, I cannot agree with some of his inferences, I will venture upon a few remarks.

In the first place, the method adopted of writing all the nine forms discussed as "*R. Flammula*," "*R. pseudo-reptans*," etc., is open to grave objection. "States," varieties (?), and species or subspecies, are here put side by side as if of equal rank, which obviously will not do.

Secondly, it is asserted, with regard to the plants treated of (excepting *R. reptans*), that "situation has no more to do with these forms than it has with the forms of other plants."

Perhaps not ; but then, with other polymorphic species, such as *Epilobium obscurum* and *E. parviflorum*, situation has a great deal to do with the forms assumed. The inference drawn by Mr. Ewing is that the variations do not depend upon situation. Mr. Beeby found that var. *radicans*, Nolte, from Shetland, perhaps the most marked of our *Flammula* forms, immediately became good average type under pot-culture ; and I have myself observed considerable alteration in the same individuals during successive seasons, according as the year was a wet or a dry one.

If botanists were to subdivide the species on Mr. Ewing's lines, I think that we might distinguish from twelve to twenty British forms about as strongly marked as those which he enumerates ; but most of us are likely to feel that such a result would not benefit science. Nor does it seem either desirable or possible for any authority, however skilful, to set up a kind of photographic "type," as he suggests. Judging by the descriptions given, I am disinclined to separate permanently from type, as varieties, any of the eight proposed forms, feeling entirely sceptical as to their stability under altered conditions.

Here it is necessary to say that Mr. Ewing's *R. petiolaris* is evidently not my *R. petiolaris*. That was described (and very well figured) as a *species* in the "Journal of Botany" for 1892, pp. 289-290—a fact which seems to have escaped Mr. Ewing's notice. That it is a "critical" species, perhaps the result of a gradual evolutionary process, is beyond question ; but it has retained its striking peculiarities unimpaired, ever since 1888, in ordinary garden ground—a situation about as different from the original one as could be desired. It is not a strong-stemmed plant,—rather more slender, in fact, than average *Flammula* of the same height,—nor have I ever found it in muddy situations or on peat. It prefers gravelly or stony lake-sides ; and I have seen no specimens as yet from the East of Scotland (Loch Gainamheach, Argyle, although draining to the Tay basin, is far west), though I have carefully searched for it in several likely localities. I have, however, gathered on mud beside Cauldshields Loch, Selkirkshire, a form of *R. Flammula* which agreed very well with Mr. Ewing's description, and which is probably the same

thing; its resemblance to true *R. petiolaris* is purely superficial. Only the other day a small and slender *Flammula* form which I have noticed in West Sutherland and elsewhere was sent to me as *R. petiolaris*, which it does not at all closely approach, by an accomplished Scottish botanist.

I think that "var. *radicans*" is better entitled to bear the name of *pseudo-reptans* than what Mr. Ewing describes under (*b*), judging both from Syme's description and from the mimicking of *R. reptans* by the former. The suggestion that "var. *radicans*" is a hybrid scarcely calls for serious examination.

*R. reptans* I have never had an opportunity of seeing alive in Britain; but I found it some years ago by a mountain lake in the Upper Valais, Switzerland, growing on mud, in the greatest profusion, at 6500 feet above sea-level, since which time I have never felt much real doubt about its specific distinctness. Mr. Ewing's experience of its brittle nature exactly agrees with my own. There was no "shading-off" towards *R. Flammula* that I could detect (and I made a long and careful search in order to arrive at a definite conclusion, if possible). In the solitary fruit on my Loch Leven specimen, collected by Boswell Syme, the beak is almost exactly as represented in "E. B.," ed. iii. t. xxx, though rather more slender, and crowned with the persistent stigma. I should hardly have called it "short," but shrinkage in drying probably makes some difference.

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## ZOOLOGICAL NOTES.

**Pine Marten in Aberdeenshire.**—A full-grown specimen of the rare Pine Marten (*Mustela martes*) was caught here in a vermin trap on the 19th November last. It was very ferocious and dangerous to approach, and showed much fight to the last. It was in full winter pelage, and of the cream or pale yellow-throated variety. The limbs were short and remarkably strong, the body lean and thin. The extreme length was 32½ inches, and the breadth between the tips of the ears 5 inches. It was handed over to me by the keeper who caught it, and it now forms part of my collection. —George Sim, Gourdas, Fyvie.

[We examined a fine female which had also been obtained near Fyvie during the second week of November last.—Eds.]

**Pine Marten in Inverness-shire.**—In some recent correspondence with Mr. Cecil H. Bisshopp, Taxidermist, Oban, he informs me that last year he received two Pine Martens (*Mustela martes*) from Mamore Forest, Kinlochmore (Inverness-shire), and in the previous year three from the same locality. As this mammal is becoming scarcer every year, it is desirable to place these occurrences on record. —Charles Campbell, Dalmeny Park.

**Wild Cat in Renfrewshire.**—A fine mature male Wild Cat (*Felis catus*) was killed on the 26th of January last on Gleniffer Braes by Mr. Frank Lowe, gamekeeper to James Coats, Esq., of Ferguslie. It weighed 10 lbs. 5 ozs., and measured 2 feet from the nose to the root of the tail, and the tail 12½ inches. The animal's footprints betrayed its lair, which it is believed to have occupied for a number of years. It has been acquired for the Paisley Free Museum.—Morris Young, Paisley.

**Wild Cat in Argyleshire.**—The January number of the "Annals" contained a notice of the recurrence of the Wild Cat (*Felis catus*) in Ardnamurchan. I have now, on the authority of Mr. Ross, head-gamekeeper there, to report the capture in January last of two more specimens on the same estate; one being got at Gorsten and the other at Glenborrodale, places about eight miles apart. Both seem to have been caught in the rabbit-traps.—A. Burn Murdoch, Edinburgh.

**Recurrence of the Wild Cat in Morvern, Argyleshire.**—In the January number of the "Annals," Mr. A. Burn Murdoch gave some recent records of the occurrence of the Wild Cat in Ardnamurchan, and concluded his note by remarking, "It looks, however, as if in some happy central deer-forest home the species is so far prosperous as to be able to give off emigrants at times." This last sentence seems to receive confirmation from, and perhaps to account for, what has recently come under my notice. About the end of February I received information that two Wild Cats (*Felis catus*) had been killed by one of the gamekeepers on Ardtornish Estate, near the ruins of the old Castle of Ardtornish, bordering on the Sound of Mull. Their weight was given as 11½ lbs. and 12 lbs., and length 34 inches from tip to tip. As far as I can find out, it is nearly twenty years since the last authentic occurrence of the Wild Cat in this district; and wishing to receive additional evidence regarding these last captures, I wrote to Mr. Bisshopp of Oban, to whom they had been sent for preservation. In his reply he states: "I received a male Wild Cat from Ardtornish Estate on the 18th of February, and again on the 22nd a female Wild Cat. Without a doubt these are the genuine Wild Cat. I get a few from time to time, but from places farther north."—Chas. Campbell, Dalmeny Park.

**The Missel Thrush in Shetland.**—A specimen of this bird was shot near Lerwick in November last. Dr. Saxby says of this species: "The very few Missel Thrushes which do visit us appear in hard weather, doubtless for temporary shelter; but they are as shy here as elsewhere."—"Shetland News," 17th November 1894.

**Whitethroat and Ring Dove in Shetland.**—On the 13th of June 1894 I saw a Whitethroat (*Sylvia cinerea*) searching for insects in a cottage garden in Mid Yell. On the 4th of the same month I put up a Ring Dove (*Columba palumbus*) from a little watercourse on the top of the cliffs in the very north of Yell, almost opposite the Gloup Holm. It was not wild, and soon alighted, and I had a good look at it through my binoculars. The dates on which these birds were observed may be considered of sufficient interest to warrant me in placing these occurrences on record.—NORMAN RAEBURN, Edinburgh.

**The Tree-Sparrow in Aberdeenshire.**—A Tree-Sparrow (*Passer montanus*) was killed here on the 2nd November last by a boy of mine. He had seen it occasionally about the house for some time previous, but it always kept aloof from the common species. This is the first authentic proof of it occurring here.—GEORGE SIM, Gourdas, Fyvie.

**Mealy Redpoll in Kirkcudbright.**—In January last a bird-catcher who had been plying his vocation a few miles out of Dumfries, on the Stewartry side of the Nith, informed me that he had captured two large Redpolls, which on inspection proved to be undoubted Mealy Redpolls (*Linota linaria*), a species which only very rarely occurs so far to the westward as the Solway region.—ROBERT SERVICE, Maxwelltown.

**Waxwings in the South-East of Scotland.**—The appearance of the Waxwing (*Ampelis garrulus*) in the south-eastern counties of Scotland is too common an event to be always associated with a severe winter. Nevertheless, long spells of frost and snow seldom occur without some of these birds being observed, and the protracted storm which characterised the first two months of the present year has proved no exception. The first example that came under my notice was captured near Gifford in East Lothian on 10th January by Mr. D. King; on 7th February another, which I had an opportunity of examining in the flesh, was shot at Shielshaugh, Bowhill, Selkirkshire, by Mr. Martin, gamekeeper; and on 8th February a third was picked up by a surfaceman on the railway near Earlston. All proved on dissection to be males.—WILLIAM EVANS, Edinburgh.

**The Shorelark near Dunbar.**—On 15th January 1895 a Shorelark (*Otocorys alpestris*) was shot on the beach near the "Vaults," about two miles east of Dunbar. Only two birds were seen. The specimen secured was a female. Its companion hung about the

place for fully a week, but would not allow a near approach. It was evidently a male, as its colours were better defined than were the colours of the specimen secured.—D. Bruce, Dunbar.

**Shorelarks near Aberlady, East Lothian.**—On 9th February last (1895) I went along the shore from Longniddry to Gullane Ness, with the express purpose of looking for shorelarks (*Otocorys alpestris*), and was lucky enough to find two, both of which I secured. They were feeding at tide-mark in a small bay a mile or so to the east of the rocks known locally as "Jovie's Neuk," that is, about three miles east of the village of Aberlady. The taxidermist to whom they were sent for preservation states that one is a male, but the sex of the other he could not make out.—D. Percy Aitken, Dunbar.

**Hoopoe in Peeblesshire.**—Some time ago I saw, in the hands of Mr. Hope, taxidermist, George Street, a Hoopoe (*Upupa epops*) which he had received in the flesh from Peeblesshire in the spring of 1893. On inquiry I have since ascertained that the bird was shot at Edston Farm Pond, about two miles from Peebles, on 22nd April in the year mentioned, by Robert Gilchrist, gamekeeper.—William Evans, Edinburgh.

**Roller in Aberdeenshire.**—A fine specimen of the Roller (*Coracias garrulus*) was shot in the parish of Cruden, four miles from Peterhead, on June 1893, and was mounted by a local taxidermist. I had heard about this specimen some time ago, but have only recently been able to obtain particulars of its capture.—William Serle, Peterhead.

**Barn Owl in Caithness.**—A female Barn Owl (*Strix flammea*) —a rare bird in North Caithness—was shot by the Forss keeper at Crosskirk, on the 5th of January. It was "bolted" from a rabbits' burrow by a ferret.—Lewis Dunbar, Thurso.

**On the Tufted Duck in South-West Scotland.**—Mr. R. H. Read's contribution to the October number of the "Annals," on the nesting of the Tufted Duck (*Fuligula cristata*) in East Renfrewshire, I have read with much interest. My excursions to the lochs in that district, though numerous, have hitherto been confined almost entirely to the winter and spring months; and though the occurrence of this duck had not been overlooked, it had been mixed up (not for the first time) with the Golden-eye. As Mr. Read indicates, the Tufted Duck abounds even in the breeding season, and is now one of the most common birds of the district. There are many localities, however, in the South-West still not colonised by this species, and in illustration of this, I may say that I visited, in June 1893, Loch Moan in Ayrshire and Loch Trool in Kirkcudbrightshire without seeing it; while in June of 1894 I was at Lochs Ken, Harrow, Dungeon,

and Minnoch in Kirkcudbrightshire, and Mochrum and Castle Lochs in Wigtownshire, and in only one instance, referred to in the July number of the "Annals," did I find any evidence of its presence. This is a great contrast to what obtains among the lochs of East Renfrewshire. It would be interesting if the extension of the Tufted Duck's range was carefully chronicled, not only in the South-West but throughout Scotland. This can be done more satisfactorily when the process is going forward than after it has become a thing accomplished. It becomes of importance now to know where it does not breed.—JOHN PATERSON, Glasgow.

**The Pintail, Great Grey Shrike, and Jay in Renfrewshire.**—On Saturday, 22nd December last, after the great storm, a drake Pintail (*Dafila acuta*) was shot on one of the Mearns lochs. This duck is of rare occurrence in East Renfrewshire. I only know of another one shot a number of years ago on a small pond in Nether Pollok. On the 12th of February of this year a Great Grey Shrike (*Lanius excubitor*) was observed on the loch side near to Castle Semple, by George M'Arthur (Mr. J. W. Shand-Harvey's keeper), who shot one near the same place fifteen years since in May. I am not aware of any record of the occurrence of the Jay (*Garrulus glandarius*) in Renfrewshire, and Mr. Lumsden in his "Notes on the Distribution of the Common Jay in Scotland" ("Scot. Nat.," iii. p. 233) says he has no note of it ever having occurred in this county. In the course of some inquiries on the birds of this district, I am informed by Mr. Allan Gilmour Yr. that he remembers one being shot in the Stonebyres wood about twenty-five years since.—JOHN PATERSON, Glasgow.

**Smew in Midlothian.**—It may interest your readers to know that a friend of mine shot a Smew (*Mergus albellus*) on the Water of Leith, in Redhall Grounds, near Slateford, on 9th February. The specimen is a young male.—DAVID CHALMERS, Slateford.

[We are informed that an adult male Smew was shot on the river Earn, near Crieff, on Tuesday, the 5th of February, by Mr. H. Kelsall.—EDS.]

**Brent and Pink-footed Geese on the Solway.**—The Brent Goose (*Bernicla brenta*) is sufficiently scarce on the Solway to deserve a note. One was shot on the Ken, above New Galloway, at the end of December last, which had evidently been blown inland by the gales. Three others were obtained at about the same time, two at Carsethorne. The Pink-footed Goose (*Anser brachyrhynchus*) has also put in an appearance in large numbers this winter. One very curious bird was sent to me from Kirkconnell for examination. It was much larger in its dimensions than the largest birds of the species I had previously seen; was, in fact, fully larger than an average Bean Goose. Its coloration was in all respects the same

as an ordinary Pink-foot, except that round the base of the upper mandible there was a broad band of white feathers.—R. SERVICE, Maxwelltown.

**Hybrid between Red and Black Grouse.**—A very fine specimen of a hybrid between Grouse and Black-game was shot in December of last year near Ardgay, Ross-shire. The bird is a male, very dark, and showing the Red Grouse feathers here and there on its glossy black breast. The head and tail are distinctly those of a Grey-hen, and the plumage is much spotted with white. Perhaps the most curious part of the bird is the foot. The toes are feathered half-way to the claws, the rest quite bare; and they show the pectinations distinctly, though not to such an extent as a true Black-game. The legs are well feathered.—T. E. BUCKLEY, Inverness.

**Black-tailed Godwit in Orkney.**—A male Black-tailed Godwit (*Limosa belgica*) was shot at Westray, in Orkney, on the 21st of September 1894, by Mr. G. Ellis, of Barrow-on-Soar, and sent to me for preservation. Mr. T. E. Buckley tells me that this specimen seems to be the first recorded for the Orkneys on satisfactory evidence.—LEWIS DUNBAR, Thurso.

**Little Gull at St. Andrews.**—A Little Gull (*Larus minutus*) was picked up alive on the Links Burn on the 20th of January last. It was a bird of last year—*i.e.* about six months old.—ALLAN BRIGGS, St. Andrews.

**Ivory Gull in Aberdeenshire.**—An immature Ivory Gull (*Pagophila eburnea*) was shot at Rosehearty in November 1894. During the storm of the 13th January last, an old bird in good plumage was captured at Fraserburgh. This latter bird I examined while in the hands of the local bird-stuffer.—WILLIAM SERLE, Peterhead.

**Great Crested Grebe in Wigtownshire.**—Sir Herbert Maxwell tells us in the last number of the "Annals" that a young male of this species had been observed at the White Loch of Myreton. In the first week of June last year, with two friends, I had the pleasure of walking round this interesting loch. One of the first birds we saw was a Great Crested Grebe (*Podicipes cristatus*) in full plumage, and we all had ample opportunity of watching it through our glasses. We supposed it would be breeding there, but in our brief visit we only saw one bird.—JOHN PATERSON, Glasgow.

**Red-necked Grebe at Dunbar.**—On 19th February last a Red-necked Grebe (*Podicipes griseigena*) was shot near Dunbar Harbour by A. Main, fisherman, from whom I got it. The bird was a male in winter plumage. Several have been seen about the district.—D. BRUCE, Dunbar.

**Red-necked and Eared Grebes near Dunbar.**—During January and February last I obtained the following Grebes between Dunbar and Skateraw, namely: an Eared Grebe (*Podicipes nigricollis*), male, shot on 12th January; and two Red-necked Grebes (*P. griseigena*), female and male, shot on 5th and 18th February respectively.—D. Percy Aitken, Dunbar.

**Red-necked Grebes in the neighbourhood of Dunbar.**—On 17th February last I found a dead Red-necked Grebe (*Podicipes griseigena*) on Peffer sands, a few miles to the west of Dunbar; and on the 23rd a very fine male, almost in full summer plumage, was sent here from Cockburnspath to be stuffed: it had been shot.—G. Pow, Dunbar.

**Red-necked Grebes on the East Lothian Coast.**—The stormy weather of January and February last seems to have told somewhat severely on the Red-necked Grebe (*Podicipes griseigena*), if we may judge by the following instances of examples washed up on the shores of East Lothian. On 26th January I found one half-buried, but quite fresh, among the *rejectamenta* on the beach a mile or so to the east of Port Seton. On 17th February Mr. Pow picked up another, which he kindly sent me, on the sands at Peffer Burn, between Tynemouth and Tantallon. Then on 22nd February I saw the remains of a third among cast-up seaweed, etc., on the Dirleton shore, and found a fourth (a male with the occipital tufts well developed) newly left by the tide in Gullane Bay. Several, I hear, have been shot in the neighbourhood of Dunbar. Examples of this Grebe are usually to be seen cast up on our shores after a series of easterly gales during the winter months, and individuals are occasionally found miles inland. Numbers were obtained during the winter 1880-81, and in the beginning of March 1888 I examined several which had been washed ashore at Largo, North Berwick, and Granton.—William Evans, Edinburgh.

[Several other Red-necked Grebes have been reported to us. The Rev. Wm. Serle tells us that one was shot at Peterhead during the first week in February. One shot on Loch Earn early in February was presented to the Edinburgh Museum of Science and Art by Mr. Tom Speedy. Two were shot off Aberdour, in the Firth of Forth, on 8th February, by Dr. Badger and Mr. W. Laidlaw.—Eds.]

**Sand Smelt or Atherine in Scottish Waters.**—From a recent correspondence there seems to be some misunderstanding as to the range of this fish—the *Atherina presbyter* of Cuvier. I am surprised to learn that the Messrs. Anderson, fishmongers, Edinburgh, have never seen this fish before from Scotland. Parnell was acquainted with the fish as from the Forth, where he seems to say that it was formerly more plentiful than in his time. It is not uncommon, although probably local and uncertain, in the West of Scotland. I first met it at the mouth of a stream entering Loch Creran, where

quite a shoal of them had entered the estuary at low water. The following year, about the same time,—July-August,—they were again frequenting the same place, when I obtained a number of them without difficulty. I have no doubt, if suitable nets were in use throughout the west, we should hear of this fish far oftener. Mr. M'Lean of Carsaig informs me that they are plentiful to the west of Mull. They have also been obtained from Loch Linnhe. The term "Argyleshire" is so general that it is of little value as a locality. The specimen in the Edinburgh Museum is, I believe, labelled Argyle, as this locality is also given by Messrs. Anderson for their supply received in February last. Now, as this term includes the Clyde area to some extent, it is very misleading. I am disposed to conclude that it was from this area that the parcel referred to came, as they were said to be taken by *Sparling* fishers, and no such fishers, to my knowledge, work north of the Clyde. Indeed I have no reliable record of the true Smelt (*Osmerus eperlanus*) being ever taken north of the Mull of Cantyre, in the Hebrides. The Hebridal Smelt (*Argentina sphyræna*) here takes its place. It is necessary to bear this in mind when dealing with these several species, and to make certain that they are not mistaken the one for the other. The Hebridal Smelt is apparently a deep-water species, taken by Dr. Murray in the Clyde and by me in some quantity around Skye. They are much larger than the Atherine, and can scarcely be mistaken by a trained observer, but would undoubtedly be termed *Smelts* by an ordinary fisherman. A full-grown true smelt is also larger than the Atherine, and a more delicate fish ; besides lacking the peculiar cucumber smell. While most common in the English Channel, the little Atherine cannot be considered a Scottish fish. — W. Anderson Smith, Ledaig.

**Electric Ray on the East Coast of Scotland.**—A female specimen of the Electric Ray (*Torpedo nobiliana*) was caught by trawl sixteen miles off Wick, on the 27th December 1894, and brought into Aberdeen market. The fish measured 3 feet 9 inches long, and 2 feet 8 inches broad. So far as I can ascertain, this is the first undoubted specimen for our East Coast. In the "Life of a Scottish Naturalist," p. 426, Thomas Edward says: "A specimen of this fish is said to have been taken about six miles off Loggie Head, near Cullen, in 1817. Others are stated as having been caught." In Day's "Fishes of Great Britain and Ireland," vol. ii. p. 332, Edwards's "*said to have been taken*" is turned into "*was taken*," which is rather unfortunate. In Dr. Howden's "Report on the Fishes of the North-East of Scotland," p. 62, this form is marked as one of the "species observed in the district"; but no information is given as to who saw it, or when it was taken. —G. Sim, Aberdeen.

**Large Greenland Shark captured off the South-East Coast of Scotland.**—During the second week of January last, a large female specimen of the Greenland Shark (*Læmargus borealis*) was captured twenty-five miles to the north-east of the Isle of May. This example was twenty-one feet in length and weighed twenty-seven and a half hundredweights. In its stomach was found a seaman's boot containing a portion of a human leg. This fish was examined by several naturalists.—EDS.

**On some Coleoptera from the Island of Rum.**—Mr. Symington Grieve has recently submitted to me for identification a small collection of insects from the island of Rum, obtained by him in July 1884. Amongst them are representatives of four species of Coleoptera, which perhaps should be placed on record. These are: (1) *Dytiscus lapponicus*, Gyll. (female), which Sharp in his "Coleoptera of Scotland" says is very local, mentioning only the Moray, Clyde, and Argyle areas for its occurrence; (2) *Pterostichus striola*, Fab., a species, so far as I can ascertain, hitherto recorded in the west of Scotland for the Solway and Clyde areas and St. Kilda only; (3) *Staphylinus erythropterus*, Linn. and (4) *Geotrupes sylvaticus*, Panz. The two latter, though common species, do not appear to have been previously recorded for the west of Scotland north of the Clyde area. The collection also contained the larva of a Dytiscus, presumably belonging to the same species as that mentioned above.—PERCY H. GRIMSHAW, Museum of Science and Art, Edinburgh.

**Scottish Newts Wanted.**—With a view to ascertaining the distribution of the various species of Newts in Scotland, I desire to receive specimens for examination from all parts of the country. All assistance will be fully and gladly acknowledged. They travel well alive in a little damp moss.—WILLIAM EAGLE CLARKE, Museum of Science and Art, Edinburgh.

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## BOTANICAL NOTES AND NEWS.

**Poa humilis, *Ehrh.*, in West Ross and West Sutherland.**—This is the grass referred to in my paper on the Cnoc-an rocks, which appeared in the "Annals" of Jan. 1895, as being under consideration, and which I found growing on both sides of the gully which forms the boundary of the above counties on the Cnoc-an rocks. When I saw it growing I was convinced from the runners that it was distinct from the *alpina* section, which its close panicle and habit rather suggested.

Dried specimens were submitted to two well-known English experts, who both thought it might prove to be a form of *P. glauca*.

Professor Hackel, to whom I sent specimens, refers it to the above name. He considers it to be a variety of *P. pratensis*. The close compact panicle distinguishes it from mountain forms of *P. pratensis*, var. *subcœrulea* (Sm.) It appears to be a fairly distinct variety, as is evidenced by the opinions expressed. G. Claridge Druce.

**First Records of Scottish Flowering Plants.**—Mr. W. A. Clarke, in his "First Records of British Flowering Plants" in the "Journal of Botany" for January and February, enumerates the following from Scotland:—

*Polygonatum verticillatum*, All., 1793.—"Arthur Bruce, Esq., Secretary to the Natural History Society of Edinburgh, first found it, 1st July 1792, in the Den Rechip, a deep woody valley four miles north-east of Dunkeld in Perthshire."—"E. B.," 128.

*Allium Schœnoprasum*, L., 1777.—"By Faste-Castle, on the borders of Berwickshire, Dr. Parsons."—Lightfoot, "Fl. Scot.," 180.

*Juncus trifidus*, L., 1777.—"I found it upon the summits of the Highland mountains to the south of Little Loch Broom in Rossshire," etc.—Lightfoot, "Fl. Scot.," 184.

*J. tenuis*, Willd., 1810.—"Found by Mr. G. Don in 1795 or 1796 by the side of a rivulet, in marshy ground, among the mountains of Angusshire,"—"E. B.," 2174 (as *J. gracilis*).

*J. balticus*, Willd., 1821.—"Sands of Barry, near Dundee, Mr. Drummond."—Hook, "Fl. Scot.," 104 (as *J. arcticus*).

*J. diffusus*, Hoppe, 1843.—Notice of a specimen sent to Mr. W. Sonder of Hamburg, from Kincardineshire.—"Ann. Nat. Hist.," xi. 78.

*J. castaneus*, Sm., 1798.—"Primus in Scotia invenit D. Dickson" (*J. Jacquini*).—Symons's "Synopsis," 87.

*J. biglumis*, L., 1777.—"On the top of Mal-Ghyrdy, etc., in Breadalbane, Mr. Stuart."—Lightfoot, "Fl. Scot.," 1100.

The fourth fascicle of the **Set of British Rubi**, issued by the Revs. E. F. Linton, Wm. R. Linton, R. P. Murray, and W. Moyle-Rogers, and the second fascicle of the **Set of British Willows**, issued by the Revs. E. F. Linton and Wm. R. Linton, have just been issued. They are marked by the same care as the earlier fascicles have manifested, alike in the selection and preparation and in the adequate representation of the several forms included in them. An inspection is sufficient to demonstrate the great value of such sets of critical forms, and the impossibility of expressing by any description the differences in such a manner as to enable one, from a description or even from figures, to make certain of recognising the exact forms denoted under the names given by specialists. Hence the aid afforded by such sets as the above is very important to students of local floras. The present fascicle of *Rubi* includes Nos. 76-106, all from English localities. Eight of these are well-marked

forms not known to occur out of Britain. It was anticipated that a hundred numbers would include all the British forms of *Rubus*, but information has extended so much since the issue was begun that it is found that at least another fascicle will be required. The *Salices* extend over Nos. 26-50, and include a large proportion of Scotch alpine species, and of their intermediate forms.

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# CURRENT LITERATURE.

**The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—January-March 1895.**

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

## ZOOLOGY.

Recent Zoological Additions to the Kirkcudbright Museum. By Mr. John M'Kie. *Trans. and Proc. Dumfries and Galloway Nat. Hist. and A. Soc.*, No. 10 (1893-94), pp. 56-59.—A male Shoveller (Spatula clypeata) shot in Twynholm in February; a hog-backed Trout (S. fario) from Loch Whinyeon; a tailless Trout from Loch Enoch; a Bonito (Thynnus pelamys) near Kirkcudbright; a Thresher Shark (Squalus vulpes) at Burnfoot Fishery, River Cree; a Topper Shark (Galeus vulgaris) in the Solway; Gasterosteus spinachia from Solway; and a Kingfisher (Alcedo ispida) from near Kirkcudbright.

Ornithological Notes for 1893. By Mr. Hugh Mackay. *Trans. and Proc. Dumfries and Galloway Nat. Hist. and A. Soc.*, No. 10 (1893-94), pp. 137-139.—Enumerates several uncommon birds taken in the district.

Notes on the Habits of some Common Birds. By D. A. Boyd. *Trans. Nat. Hist. Soc. Glasgow*, vol. iv. (N. S.), part i. (1892-94), pp. 50-60.

A Mountain Breeding-Haunt of the Raven. By Lieut.-Col. W. H. M. Duthie. *Trans. Perthshire Soc. Nat. Sci.*, vol. ii. part i. (1893-94), pp. 17-21.

Eared Grebe in the Hebrides. H. A. Macpherson. *Zoologist* (3), vol. xix. p. 66 (February 1895).—A specimen shot in Skye in January 1895.

Notes from the St. Andrews Marine Laboratory (under the Fishery Board for Scotland), No. xv. By Professor M'Intosh, M.D., LL.D., F.R.S., etc. *Ann. and Mag. Nat. Hist.* (6), vol. xv. pp. 90-101 (January 1895).—These notes are based on Scottish

specimens, and consist of the following :—(1) On the Ova and Larvæ of Gadus virens, L.; (2) On the Ova and Larvæ of the Turbot; (3) On an Egg resembling that of Arnoglossus megastoma, Donov.; (4) On Lumpenus lampetriformis, Walb.; and (5) On Rhombus (Zeugopterus) norvegicus, Günther.

On New and Rare British Spiders found in 1893; with Rectification of Synonyms (Plate). By Rev. O. P. Cambridge, M.A., F.R.S., etc. *Proc. Dorset Nat. Hist. and Antiq. Field Club*, vol. xv. pp. 103-116 (1894).—Deals with 37 species, a number of the records being from Scottish localities, mainly from the Edinburgh district, Aviemore, and Paisley. The following are described and figured, namely :—Drassus mysticus, *sp. n.* (from Paisley); Pedanostethus neglectus, Cambr., female; Tmeticus carpenteri, *sp. n.* (from Pentland Hills); Caledonia evansii, Cambr., female (from Pentland Hills); Cnephalocotes curtus, Sim. (from "Scotland," Aberlady); Savignia frontata, Bl., female (a common Scottish species).—W. E.

Jottings from my Note-book. By David Robertson, F.L.S., F.G.S. *Trans. Nat. Hist. Soc. Glasgow*, vol. iv. (N. S.) part i. (1892-1894), pp. 79-84.—Notes on Scottish specimens of Sacculina carcini, Thompson, Amphithoe podoceroides, Rathke, Podocerus pulchellus, Milne-Edwards, Buccinum undatum, Linn., Anceus maxillaris, Montagu, and Aglaophenia myriophyllum, Linn.

Pholas crispata, Linn., as a Borer. By John Smith. *Trans. Nat. Hist. Soc. Glasgow*, vol. iv. (N. S.), part i. (1892-94), pp. 37-39.—On a small colony discovered a few years ago on the Ayrshire coast.

Retrospect of a Lepidopterist for 1894. By J. W. Tutt. *Ent. Record*, vol. vi. pp. 8-14 (January 1895).—Mention is made of several Scottish records.

Short Notes from the Exchange Baskets. *Ent. Record*, vol. vi. pp. 16-18 (January 1895) and pp. 91-95 (March 1895).—Several Scottish records are given in these notes.

Perthshire Entomology. By T. M. M'Gregor. *Trans. Perthshire Soc. Nat. Sci.*, vol. ii. part i. (1893-94), pp. 29-32.

Notes on the Lepidoptera observed during a short Botanical Tour in West Sutherland, the Orkneys, and Shetlands. By Frederick J. Hanbury, F.L.S., F.E.S. *Ent. Mo. Mag.* (2), vol. vi. pp. 1-12 (January 1895).

Collecting in Argyleshire, from June 10th, 1894. Miss M. L. Cottingham. *Entomologist*, vol. xxviii. pp. 20-21 (January 1895).—A list of 108 species of Lepidoptera taken during the year.

Occurrence of the Clouded-yellow Butterfly (Colias edusa, Fab.) in Ayrshire. By John Smith. *Trans. Nat. Hist. Soc. Glasgow*, vol. iv. (N. S.), part i. (1892-94), pp. 35-36.—A specimen seen on 22nd September 1892 on an old road near Auchenskeith farm-steading, Dalry.

Vanessa urticæ, var. connexa, in Scotland. Robert Adkin. *Entomologist*, vol. xxviii. p. 83 (March 1895).—A specimen of this variety reared in Sutherlandshire in the summer of 1894.

On Zygæna exulans, and var. subochracea, White. By W. H. Tugwell. *Entomologist*, vol. xxviii. pp. 8-11 (January 1895). —This article is devoted to remarks on the status of the variety subochracea of White, from Braemar.

Note on Argyresthia illuminatella. J. W. Tutt. *Ent. Record*, vol. v. p. 34 (February 1895).—This note relates to Scottish specimens.

Late Nest of Wasps. Mackenzie Partington. *The Field*, 8th December 1894, p. 889.—A wasp's nest found at Blairgowrie on 30th November.

An overlooked Record of the Occurrence of Thermobia domestica (furnorum) in Britain. R. M'Lachlan. *Ent. Mo. Mag.* (2), vol. vi. pp. 75-76 (March 1895).—Refers to a record published by James Simpson in the Proceedings of the Royal Physical Society of Edinburgh for 1878. The insect was found in a large baking establishment in Edinburgh.

On an Abnormal Crab (Cancer pagurus). By James R. Tosh, M.A., B.Sc. *Ann. and Mag. Nat. Hist.* (6), vol. xv. pp. 245-247 and fig. (March 1895).—The specimen described was brought to the St. Andrews Marine Laboratory by one of the fishermen in June 1894.

On some New and Rare Crustacea from Scotland. By Thomas Scott, F.L.S. *Ann. and Mag. Nat. Hist.* (6), vol. xv. pp. 50-59, Plates V. and VI. (January 1895).—Five species of Copepoda new to science are described and figured, and one new to Britain.

On some Entomostraca from Castle Milk, near Ruthergen. By Thomas Scott, F.L.S. *Trans. Nat. Hist. Soc. Glasgow*, vol. iv. (N. S.), part i. (1892-94), pp. 69-72.—The material examined contained 18 species representing 15 genera, and comprising 5 species of Ostracoda, 6 of Copepoda, and 7 of Cladocera.

The (eighteenth) Report of Observations of Injurious Insects and Common Farm Pests, for 1894, by Miss E. A. Ormerod, is, like its predecessors, full of information important in the first degree to agriculture, but of interest also to all lovers of natural history. Most of the observations are from localities in England, but the following are from Scotland:—Larvæ of the Antler Moth (*Chareas graminis*), very numerous, and hurtful to hill-pastures in the south of Scotland in June and July; so many of them were infested by parasites that of numbers kept in confinement hardly any survived; Mites (*Tyroglyphus longior*, Gervais) in hay, reported from various localities, sometimes in heaps in late autumn; Currant Clearwing

Moth (*Sesia tipuliformis*, L.), seriously hurtful to black currants in a large garden in the south of Scotland; Diamond-back Moth (*Plutella cruciferarum*, Zeller) in Fifeshire, Aberdeenshire, and Argyleshire; Turnip Mud-beetle (*Helophorus rugosus*, Oliv.), injurious to turnips in Aberdeenshire, the larvæ in the roots and the beetles on the leaves; Springtails (*Smynthurus luteus*, Lubbock, and *S. niger*, Lubbock), gnawing the lower surface of turnip leaves in Aberdeenshire; larvæ of Winter Turnip Gnat and Thaw Gnat (*Trichocera hiemalis*, De Geer, and *T. regelationis*, L.) in roots of turnips, but only when decayed, observed in Aberdeenshire.

## BOTANY.

First Records of British Flowering Plants. Compiled by W. A. Clarke, F.L.S. *Journ. Bot.*, xxxiii., Jan.-Feb. 1895.—Covers from *Epipogum* to *Juncus capitatus*.

Notes on the Plants of Northumberland and Durham, in relation to their extension northwards to Dumfries, Kirkcudbright, and Wigtown. By Arthur Bennett, F.L.S. *Tr. and Pr. D. and G. N. H. and A. Soc.*, No. 10, 1893-94, pp. 132-137.—A valuable and suggestive discussion of the subject, though the irregular arrangement of the plants is a slight obstacle to ready reference.

Botanical Notes for 1893 (from Wigtownshire). By Mr. James M'Andrew. *Tr. and Pr. D. and G. N. H. and A. Soc.*, No. 10, 1893-94, pp. 10-11.—Enumerates flowering plants and mosses from various localities.

A List of Wigtownshire Plants. By Mr. James M'Andrew (*l.c.*, pp. 72-111).—We have already (p. 69) referred to this list.

Botanical Notes for the Moffat District for 1892-93. By Mr. John Thorburn Johnstone. *Tr. and Pr. D. and G. N. H. and A. Soc.*, No. 10, 1893-94, pp. 36-38.—In this paper are recorded several plants new to the district or confirmed; and a list of *Hieracia* is given, prepared from a local collection, named by Revs. E. F. and W. R. Linton.

The Flowering Plants and Fern-Allies of the Cairngorms. By James W. H. Trail, M.D., F.R.S. *Journal of the Cairngorm Club, Aberdeen*, Jan. 1895, pp. 197-212.

Notes on the Lepidoptera observed during a short Botanical Tour in West Sutherland, the Orkneys, and Shetland. By Fred. J. Hanbury, F.L.S., F.E.S. *Entom. M. Mag.*, Jan. 1895, pp. 1-12.—Despite the title of this article and the journal in which it is contained, some botanical notes will be found in it, especially on the *Hieracia* of the counties.

Notes on the Rubi and Salices of Upper Nithsdale. By Mr. James Fingland. *Tr. and Pr. D. and G. N. H. and A. Soc.*, No. 10, 1893-94, pp. 160-162.—Lists of local collections; the *Rubi* determined by Mr. J. G. Baker, and the *Salices* by Rev. E. F. Linton.

On the Rubi List in "London Catalogue," Ed. 9. By Rev. W. Moyle Rogers. *Journ. Bot.*, xxxiii. pp. 45-49, 77-82, Feb.-March.—Gives a valuable summary of the British Rubi, with the distribution (under the numbers employed in "Topog. Botany"), including that in Scotland.

Rubus Rogersii, Linton, in Scotland. By Rev. E. F. Linton. *Journ. Bot., l.c.*, p. 86, March.—Found by Ch. Bailey, in 1884, near Crieff, and by Rev. E. S. Marshall near Bonar Bridge.

Potamogeton Bennettii, Fryer. By Alfred Fryer. *Journ. Bot.*, xxxiii. pp. 1-3, Plate 348, Jan. 1895.—Describes and figures what is probably a hybrid between *P. crispus* and *P. obtusifolius*, found near Grangemouth, in Stirlingshire, by R. Kidston and Col. Stirling.

Juncus tenuis in Great Britain. By Arthur Bennett, F.L.S. *Journ. Bot.*, xxxiii. pp. 39-40, Feb. 1895.—Calls attention to its distribution, its increasing frequency, and the question of its origin in Britain.

Cladium germanicum, Schrad., in Scotland. By Arthur Bennett, F.L.S. (*l.c.*, pp. 25-27, Jan. 1895).—Calls attention to distribution of this plant.

The Ustilagineæ of North Ayrshire. By D. A. Boyd. *Trans. Nat. Hist. Soc. Glasgow.*

The Peronosporeæ of North Ayrshire. By D. A. Boyd (*l.c.*) —These articles contain a number of new county records.

Obituaries of Francis Buchanan White. *Sci. Gos.*, Jan.; *Journ. Bot.*, Feb.

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## REVIEWS.

Allen's Naturalists' Library. Edited by R. Bowdler Sharpe, LL.D., F.L.S., etc. (London: W. H. Allen and Co., Limited, 1894.)

There is now being issued, under the above title, a series of "Handbooks" on a variety of Zoological subjects. The volumes before us treat of "Marsupials and Monotremes," by R. Lydekker, F.R.S.; two on "Monkeys," by Dr. H. O. Forbes; one, of four, on "British Birds," by Dr. Sharpe; and one, of two, on "Butterflies," by Mr. Kirby. A goodly number of volumes are to follow.

The plates, most of which did duty in Jardine's "Naturalists' Library," we are sorry to see resurrected, since they are only to be tolerated at the price. Many of us, perhaps, would prefer the books minus the plates. It must be said, however, that the plates in the monkey volumes are by Mr. Keulemans, and have been specially drawn for the work. Some of the bird plates are by the same well-known artist.

The most important of the volumes, from a British naturalist's point of view, is the one by Dr. Sharpe on "British Birds." In this, as indeed in all the others, the subject matter is most admirably arranged under definite headings, and we can find the precise item of information desired in a moment—a most excellent feature, absent, alas, from too many scientific works. The matter, like the treatment, is in many respects most excellent, but we demur from several of Dr. Sharpe's methods. We do not approve of the changes made in the generic names of many species, believing that in a popular work, as this is sure to be, such departures from accepted names are most undesirable.

Nor do we acquiesce in the promotion to full specific rank of such mere departures from their respective types as *Parus dresseri* and *Anorthura* [*Troglodytes*] *hirtensis*. It is all very well to inveigh against the use of trinomials, and then to bolster up such *species* as these. If trinomials had been used for these birds, at least one advantage would have accrued; namely, we should have fully appreciated their *true value and precise relationships*, *i.e.* as races only of particular species.

As Scottish naturalists, we cannot always agree with Dr. Sharpe's remarks on the status and distribution of several of our species. Thus the Goldfinch is not "an accidental visitor," but a *resident*, and is not uncommon in the S.W. The Marsh Titmouse is resident in Strathspey, and thus breeds much farther north than Stirlingshire. Several records of our very rarest visitors are omitted. Among others, of the Desert Wheatear obtained at Arbroath in 1888; and the Red-breasted Fly-catcher in the Outer Hebrides,—the *only* Scottish record, for the Berwick-on-Tweed specimen was obtained in Northumberland.

Mr. Kirby, in his very acceptable volume on Butterflies, makes special reference to all the British species. The plates are good, and woodcuts excellent.

The above criticism, however, chiefly concerns matters of opinion, and it affords us pleasure to recommend these volumes as excellent books on the subjects upon which they treat. They are well printed and nicely got up, and are marvels of cheapness

A Monograph of the Land and Freshwater Mollusca of the British Isles. By John W. Taylor, F.L.S., with the assistance of W. D. Roebuck, F.L.S., the late Charles Ashford, and other well-known conchologists. (Leeds: Taylor Brothers, 1894.)

Of this work, Part I., which was issued on the 26th October, 1894, and which contains 64 Royal 8vo pages, lies before us. The immediate scope of the present and the three succeeding parts is to present a full and precise general view of the science of conchology as a whole, and the volume which they form will be a necessary preliminary to the full detailed and exhaustive account of the British species which is to follow in the second and succeeding volumes. The part now under review first gives a definition of Conchology, then follows with History, Classification, Nomenclature, and Synonymy; after which, the Shell, its structure, forms, sculpture, measurements, etc., are treated of in every possible way; after which are given weighty observations with reference to species and varieties, with which the part terminates.

It is a pleasure to review a work like this, which evidences on every page, indeed in every line, the wonderful amount of care and attention which Mr. Taylor has devoted to its preparation. Accuracy and precision are throughout conspicuous, and withal the interest of the reader is sustained by the admirable manner in which Mr. Taylor's terse diction conveys a full meaning in comparatively few words. Then again no expense appears to have been spared in the production of the work; for it is most profusely illustrated by blocks inserted in the text, 138 in number. One of these we have the pleasure of reproducing with its full description. This illustration is itself interesting as the first occasion of the attachment of the columella muscle being figured at all. Full credit, as will be seen, is given by Mr. Taylor to his collaborators: a commendable practice which he carries out systematically throughout the book, and which adds most materially to its value. The frontispiece is a coloured plate of excellently executed figures.

FIG. 130.—*Helix pomatia* L., Nieder Kaufungen, near Cassel. Collected by Mr. P. W. Munn.
Showing the character and position of the scar (*s*), indicating the point of attachment of the columella muscle (from a section cut by Mr. F. Rhodes).

In conclusion, we congratulate Mr. Taylor on the production of a work which is well worthy of his reputation, alike as naturalist, author, and artist, and would urge all who are in any way interested in the Mollusca to possess themselves of this work.

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## ORNITHOLOGICAL NOTES MADE IN THE ISLAND OF BUTE IN MIDWINTER.


By William Evans, F.R.S.E.


It is not without considerable hesitation that I venture to give publicity to the following notes on birds observed by me in the island of Bute in the course of a few weeks spent at Rothesay in December and January last (1894-95).

Bute, as everybody knows, is famed for the mildness of its winter climate,[1] and it was mainly this fact that attracted me to its shores. Nothing was further from my thoughts than to write on its ornithology; and my notes were made more from force of habit, and to give a zest to outdoor recreation, than from any other motive. As furnishing an "object" in one's walks I know of nothing superior to this habit; and, as the list of species detected grows from day to day, it is surprising how fascinating the search for some

[1] The ease with which many plants from warmer climates can be grown and kept through the winter in the open air in Bute is well known; and the kangaroos imported some years ago by the Marquess of Bute seem to thrive wonderfully well in their enclosure in the woods at Mount Stuart, where I saw them under rather novel conditions, namely when there was snow on the ground. Incidentally I may mention that the Marquess's Beaver Enclosure is now untenanted, the last of the animals having died, it is supposed, about five years ago.

comparatively common bird—such as the Dipper or the Woodcock for instance—becomes.

Observations made during flying visits to outlying and little frequented localities are always worthy of record; but the case is very different when we are dealing with a place like Bute, perhaps the most accessible and popular island resort on the west coast of Scotland, and therefore, no doubt, well known in its ornithological aspects to many of the naturalists and sportsmen resident in "Clyde"—the faunal area within which the island lies. Nothing in the nature of a list of Bute birds exists, however, so far as I know, if we except that quoted by Gray in his "Birds of Arran," from a manuscript account of the sister island written by J. Blain about the year 1800. This circumstance may perhaps be offered as a partial excuse for the appearance of the present notes in print; but their main justification lies in the fact that they were made in midwinter—the season when, owing to the mildness of its climate, the island may be expected to attract a large contingent of the wild-fowl and other birds wintering on the west coast of Scotland; and when, probably, ornithologists visit it least.

Besides comparative mildness of climate, there are other features about Bute which combine to draw birds to its shores. Roughly speaking, its length in a straight line is about fifteen miles, and its average breadth between three and four. The character of its coast-line—mostly a low, rocky foreshore, with here and there a sandy bay—is, especially along the west side, just such as many species of wild-fowl and shore-birds delight in. The character of the land, also, is sufficiently varied to suit the habits of a large variety of species. North of a line drawn across the island from Kames Bay to Ettrick Bay we meet with little but heather-clad hills and moorlands of considerable elevation (Kames Hill attains a height of 875 feet), the lower slopes of which, including the broken cliffs of the ancient "raised beach," are in many places well clothed with natural birch and oak. In this section, known as North Bute, Grouse and Black Game, with an occasional Kestrel or other hawk, were the characteristic birds at the time of my visit. South of the line mentioned the country, though still moorland in some

of the central parts, becomes decidedly fertile and more lowland in aspect, much of it, especially on the west side, being under cultivation and well farmed, thus supplying the wants of large numbers of rooks, finches, buntings, pigeons, and other gramnivorous birds. Extensive plantations, both young and old, of pines, firs, and other trees, give shelter to the woodland tribes; while the numerous sedge and reed-girt lochs, now full of the Canadian pond-weed (*Anacharis Alsinastrum*), provide a perfect paradise in ordinary seasons for Wigeon and other ducks.

With the exception of those species which are, or are supposed to be, injurious to game, birds seem to suffer little persecution at the hands of the inhabitants. Although I explored practically the whole of the forty or so miles of coast-line, I did not meet a single person carrying a gun. The vigilance of the gamekeepers has, however, reduced the birds of prey to a minimum, and such a thing as a Jay or a Magpie is now never seen.

The winter temperature of Bute is stated to be about 13° warmer than the average for Scotland, and in ordinary seasons its feathered inhabitants have little to fear from frost and snow. During such an exceptionally severe storm, however, as that which prevailed throughout the country during January and February last (up till the closing days of December the winter, it may be noted, had been unusually mild), any difference in the number of degrees of frost registered in favour of the island could practically avail them nothing.[1] With the lochs and marshes covered with thick ice, and the ground rendered hard as iron for many consecutive weeks, their position in this respect could scarcely be better than that of their neighbours; consequently, as I am informed by Mr. Bodin, Port Bannatyne, innumerable "thrushes," blackbirds, snipe, woodcock, herons, waterhens, coots, and even curlews, wigeon, etc., were found dead, or in a dying state, before the storm came to an end. Lapwings, which were in some numbers up to the time I left (middle of January), remained, Mr. Bodin tells me, throughout the

[1] The frost was the keenest experienced in Bute for very many years. Before I left, the thermometer frequently registered 10° of frost, and during February it fell much lower, as many as 18° being registered at Rothesay on the 10th.

winter: it must have been a trying time for them, however, and several are reported to have been found dead.

The number of species identified was ninety-one—a fair indication that the island is a favourite avian winter haunt. A few others—among them the Purple Sandpiper—which I fully expected to have met with probably escaped notice.

Although arranged for convenience of reference in the form of an annotated list of species according to the arrangement and nomenclature of Saunders' "Manual of British Birds," the following notes are nothing more than a record of personal observations: to have attempted anything in the form of a catalogue of even the winter birds of Bute would have been mere presumption on my part.

## Notes under Species.

Turdus viscivorus, *L.*—The Missel Thrush was observed from the first, but only in limited numbers, and the storm which set in during the closing days of December did not produce any perceptible increase.

Turdus musicus, *L.*—During the first ten days of my visit, only five solitary Mavises were seen; after that the daily record was about half a dozen. The storm had either made those already on the island draw more in about the gardens and farm-steadings, or driven over others from adjacent districts; in any case the number wintering even in Bute seems to be comparatively small.

Turdus iliacus, *L.*—Redwings, in parties of from five to thirty, were met with almost daily both before and after the advent of the storm. By the middle of January they were feeling the effects of the frost keenly, and numbers were to be seen searching for food among the seaweed-covered rocks.

Turdus pilaris, *L.*—No Fieldfares were observed till the storm set in, when they made their appearance, at first in small numbers, but soon in considerable flocks, frequenting chiefly the arable lands on the south-west of the island.

Turdus merula, *L.*—Throughout the whole of my visit no bird was more in evidence than the Blackbird, which literally swarmed in the neighbourhood of Rothesay, and, indeed, in most parts of the island. On every bit of pasture some were sure to be visible, and often as many as fifteen to twenty were counted within the four corners of a small field.

Erithacus rubecula (*L.*).—Robins were also abundant, and during the time of the frost they were continually showing themselves on the roadsides, as if begging for crumbs.

Regulus cristatus, (*K. L. K.*).—In the fir plantations Goldcrests were common; but they were not confined to these, a few being observed even beyond Kilmichael (near the north end of the island) in the birch and oak thickets, the only kind of "wood" in that part of Bute.

Accentor modularis (*L.*).—In the Rothesay and Kingarth districts, where there is plenty of shelter in the form of woods and hedges, the Hedge Sparrow was met with abundantly.

Cinclus aquaticus, *Bechst.*—A few Dippers, I was told, frequent several of the streams, but I only succeeded in seeing the bird on two occasions. One was on a stream which flows through Mount Stuart grounds; the other was singing from a block of ice where the Glenmore Burn enters the sea at Ettrick Bay.

Acredula caudata (*L.*).—Parties of Long-tailed Tits were met with on several occasions, chiefly in the woods about Kerrycroy and Mount Stuart and on the west side of Loch Fad.

Parus major, *L.*, P. ater, *L.*, and P. cæruleus, *L.*—The Great Tit, the Coal Tit, and the Blue Tit, were all common and widely distributed. The Coal Tit, which seemed to be the commonest, was observed in company with the other two and Goldcrests even in a birch thicket near the north end of the island, the nearest fir plantation being across the Kyles at Tigh-na-bruich.

Troglodytes parvulus, *K. L. K.*—Wherever we went, be it to the wooded dell or the open heathery hillside, we were sure to meet with the cheery Wren, which evidently finds in Bute a congenial home.

Certhia familiaris, *L.*—The Tree-creeper—never numerous—was about as common as one usually finds it. Around Rothesay and in the Mount Stuart woods nearly every group of Tits was accompanied by a pair.

Motacilla lugubris, *Temm.*, and M. melanope, *Pall.*—From first to last a good many Pied Wagtails were noticed, but they were not plentiful. On the last day of the year a solitary Grey Wagtail—the only one met with in the island—was observed in a ditch by the inland road between Rothesay and Port Bannatyne. At Tigh-na-bruich, on the Argyllshire side of the Kyles, another was noted on 8th January busy searching for insects among the stones on the beach.

Anthus pratensis (*L.*) and A. obscurus (*Lath.*).—A few Meadow Pipits winter in Bute, but the number does not appear to be greater than in many other parts of the South of Scotland. A small party was observed on the moor near Loch Dhu on 30th December, and on 8th January I met with five on the hillside above Kilmichael. Solitary examples were noted on several other occasions, chiefly on the shore, but on 12th January—a bitterly cold day—I

was surprised to see one near the summit of one of the highest hills in the centre of North Bute. The Rock Pipit was common on most parts of the coast.

Passer domesticus (*L.*).—Needless to say, the House Sparrow was abundant, not a habitation, the farthest farm in Glenmore included, being without at least a few. I looked in vain, however, for the Tree Sparrow.

Ligurinus chloris (*L.*) and Fringilla cœlebs, *L.*—The Greenfinch and the Chaffinch were both abundant, large flocks frequenting the stubble-fields and farm-yards. On 6th January a flock of not less than a thousand, fully one-half of which were Greenfinches, was seen feeding on a field close to Rothesay.

Fringilla montifringilla, *L.*—Two or three Bramblings were daily observed feeding along with Chaffinches under a row of beech-trees on the outskirts of Rothesay, and on 9th January several beautiful males were seen, in company with other Finches, Buntings, and Larks, in the farm-yard at Lubas near the south end of the island. No females were noticed.

Acanthis cannabina (*L.*), A. rufescens (*Vieill.*), and A. flavirostris (*L.*).—The Linnet, the Lesser Redpoll, and the Twite were all present, but none of them—unless, perhaps, the Redpoll, which was frequently noticed among the birches—could be reckoned common; indeed, the only Linnets I saw were in the hands of a bird-catcher who had captured them at St. Ninian's Bay; and only once did I meet with a flock of Twites, namely on 30th December on the moor between Barone Hill and Loch Dhu.

Pyrrhula europæa, *Vieill.*—The Bullfinch was decidedly scarce, but a few were heard and seen in the young fir plantations bordering the moor road between Loch Ascog and Kingarth.

Loxia curvirostra, *L.*—I did not myself notice the Crossbill, but several members of my family, who know the bird well, saw one in the pines on the heights behind Craigmore: its call first attracted their attention. In the course of a conversation I had with a gamekeeper in North Bute he informed me he had seen one in the end of November. The species breeds, I believe, in the neighbouring island of Arran, where, in the woods at Brodick Castle, I saw a pair in April of the present year.

Emberiza miliaria, *L.*, E. citrinella, *L.*, and E. schœniclus, *L.*—Flocks of Corn Buntings were observed about several of the stack-yards in the vicinity of St. Ninian's Bay: at one farm—Meikle Kilmory—I counted upwards of fifty. The Yellow Hammer, on the other hand, was generally distributed and decidedly more numerous, though flocking less, than its relative; while the Reed Bunting was represented by merely a solitary example, or at most a pair, here and there.

PLECTROPHENAX NIVALIS (*L.*).—Prior to the frost I saw no Snow Buntings, but early in January they made their appearance, and by the 10th flocks were to be seen about every other farm in the Scalpsie and Stravanan district. The first I observed, however, were at the remote farm of Kilmichael in the north-west corner of the island.

STURNUS VULGARIS, *L.*—Of the many common birds, few were more so than the Starling. Many were daily to be seen about the castle and other parts of Rothesay; others frequented the coasts, where they evidently found a plentiful supply of food among the *rejectamenta* and the seaweed-covered rocks. No bird suffered less, Mr. Bodin tells me, from the severity of the long storm.

CORVUS MONEDULA, *L.*—Jackdaws were also abundant, large numbers consorting nightly with the Rooks at Mount Stuart rookery.

CORVUS CORAX, *L.*—Twice only was the Raven recognised; namely one on the 8th January, crossing from Ardlamont, and two on the 11th, passing over Barone Hill towards Loch Dhu. At the time the two last mentioned made their appearance, I was watching a mole endeavouring to force its way into the frozen ground, and their croaks as they circled close overhead were very significant of their interest in my proceedings.

CORVUS CORONE, *L.*, and C. CORNIX, *L.*—A goodly number of Crows were seen, especially along shore on the west side of the island; and to judge by the number of intermediate plumaged birds, interbreeding must be common. In the course of a walk from Scalpsie Bay to St. Ninian's Bay (a rocky part of the coast), I counted over twenty, some pure but the majority mixed. Of two together at one point, one was a typical Black (Carrion) Crow, the other a typical Grey (Hooded) Crow; while at another point a typical grey-back and one not greyer than a jackdaw were in company. On another occasion (at Lubas Bay), of seven together on the rocks, three were well-marked grey-backs, two were entirely black, and two intermediate.

CORVUS FRUGILEGUS, *L.*—The rookery at Mount Stuart is the winter abode not only of the large number of Rooks which nest there and at Port Bannatyne, but also of many reared on the adjoining mainland of Argyll, and likewise of hundreds of Jackdaws. Towards evening the innumerable flocks which in the daytime were scattered over the island in search of food, assembled among the rocks on the foreshore opposite the rookery prior to settling for the night.

ALAUDA ARVENSIS, *L.*—Skylarks, though frequently observed during the mild weather of December, could scarcely be regarded as abundant till the storm set in, when a very marked increase speedily took place, the flocks betaking themselves for the most part to the farm-lands on the west side of the island.

Alcedo ispida, *L.*—From Mr. Bodin I learn that a Kingfisher was killed at Ardmaleish Point, near Port Bannatyne, in February. The species, it seems, is very seldom seen in any of the islands which make up the county of Bute. Mr. Wilson, the Marquis of Bute's head gamekeeper, tells me he has seen it but very rarely.[1]

Strix flammea, *L.*, Asio otus (*L.*), and Syrnium aluco (*L.*).—These three Owls—the Barn, the Long-eared, and the Tawny—all occur on the island, as I was able to satisfy myself by the examination of recently stuffed specimens,[2] but none of them would seem to be common. The last named is probably only an occasional visitor. I did not myself hear its well-known hoot, and the gamekeepers and others whom I questioned agreed in saying that it was to be heard only at rare intervals. The specimen I saw was shot at a farm near Ettrick Bay in the winter of 1892-93; its hooting drew attention to it and led to its destruction. On two occasions in fir plantations at dusk I was made aware of the presence of an Owl by the clamour of Blackbirds, Chaffinches, and other small birds, but on neither occasion was I able to identify the species, though I have little doubt they were Long-eared, of which a specimen, shot at Ettrick bay in November 1893, was shown to me in Port Bannatyne. A Barn Owl seen in Mr. Bodin's shop had been killed in the immediate neighbourhood of Port Bannatyne shortly before I called.

Accipiter nisus (*L.*).—In spite of persistent persecution, the Sparrow Hawk still manages to maintain a place, albeit in sadly reduced numbers, among the *feræ naturæ* of Bute. Twice only did it come under my observation. Mr. Bodin showed me two recently stuffed specimens, and the gamekeepers at Mount Stuart destroy two or three nests every year.

Falco peregrinus, *Tunst.*—On 3rd January I was delighted to see a pair of Peregrines at Woodend, Loch Fad: the female made a determined stoop at a Jack Snipe I flushed, but failed to secure it. I subsequently saw single birds at Kilmichael, Mount Stuart, and Dunagoil.

Falco æsalon, *Tunst.*—The only Merlins noted were:—a female at Loch Quien on the 5th of January, and a male at Lubas Point on the 9th.

Falco tinnunculus, *L.*—I was glad to see a fair number of Kestrels about, but they might well be more plentiful with substantial advantage to the farmers and without practical injury to the game.

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[1] Mr. Reside, keeper, Brodick Castle, Arran, informs me he saw one there many years ago.

[2] There are also local specimens of these three species in the small museum at Rothesay.

PHALACROCORAX CARBO (*L.*) and P. GRACULUS (*L.*).—All along the coast, more especially on the west side, Cormorants were common, and during the open weather one or two were daily to be seen on the freshwater lochs. The Shag was also indentified on the coast, but seemed to be far from common—only one came into Mr. Bodin's hands for preservation in the course of the winter, while he had several of the larger species sent him.

ARDEA CINEREA, *L.*—The Heron was frequently observed, chiefly on the west coast. There used to be two heronries in high trees at Mount Stuart, but now, as I am informed by the keeper, not more than five or six pairs breed in the policies. In North Bute, however, I understand a goodly number nest in a thicket of quite low trees.

TADORNA CORNUTA (*S. G. Gmel.*).—On three separate occasions —namely at Stravanan Bay on 9th January, at Scalpsie Bay on the 10th, and at St. Ninian's Bay on the 11th—I had excellent views of a pair of Shelducks—which might be the same birds, though I hardly think so.

ANAS BOSCAS, *L.*, and QUERQUEDULA CRECCA (*L.*).—Wild Duck and Teal were fairly numerous on the lochs during the open weather, and after the frost set in they—at any rate the first named—were to be seen in much greater numbers on all suitable parts of the western coast-line. On 5th January a pure white Wild Duck was noticed at Loch Quien.

MARECA PENELOPE (*L.*).—During December and the early part of January the lochs (Fad, Ascog, Greenan, and Quien) were literally alive with Wigeon, whose actions on the water and in the air were a continual source of pleasure to the eye, while the soft whistle of the drakes was not less pleasing to the ear. The Canadian pond-weed (*Anacharis Alsinastrum*) has become very abundant in these lochs, and upon it the Wigeon are supposed to feed. Not being divers, they probably can only obtain the weed for themselves in shallow water; and when this was not convenient I noticed that they attended closely on the Coots and eagerly seized on a portion of what these birds brought to the surface. After the frost had fairly set in they were of course only to be met with on the coast, where large numbers were daily seen among the rocks and stones at low tide, or resting on the water a short distance off shore.

FULIGULA FERINA (*L.*), F. CRISTATA (*Leach*), and F. MARILA (*L.*). —A Pochard or two were observed on Loch Fad, but their chief haunt was the reedy Loch Quien. There too the Tufted Ducks[1] assembled to the number of about forty, till the frost drove them to the sea. Loch Quien is a great haunt of wild-fowl: on 5th January

[1] The "Danes" of Blain's M.S. list were probably Tufted Ducks.

I counted between 500 and 600 ducks on it. The only Scaup Ducks identified (half a dozen) were on the coast, on the north side of Kilchattan Bay, on 4th January.

Clangula glaucion (*L.*) and Harelda glacialis (*L.*).—Solitary immature Golden-Eyes were noticed on Loch Fad and Loch Quien, and groups of ten to fifteen were frequent off all the rocky parts of the west coast, where a few small parties of Long-tailed Ducks were also observed. Among the numerous groups of diving ducks noticed off shore between Kilmichael and Ettrick Bay on 8th January, was one of seven birds which I felt pretty certain were Common Scoters (*Œdemia nigra*), but they were too far off for me to identify them perfectly.

Mergus merganser, *L.*, and M. serrator, *L.*—A pair of Goosanders off shore to the south of St. Ninian's Bay were the only ones detected. Mergansers, on the other hand, were very common all round the island.

Columba palumbus, *L.*, and C. livia, *J. F. Gmel.*—Ring Doves were abundant, large flocks feeding on the turnip-tops during the frost. On the fields between Kingarth and Stravanan Bay I frequently saw small flocks of Rock Doves feeding, and on 9th January I traced about thirty of them to their roosting-places in caves south of Dunagoil Bay.

Tetrao tetrix, *L.*, and Lagopus scoticus (*Lath.*)—In suitable ground in the southern half of the island (the hilly district to the west of Loch Fad, for instance), but more especially on the birch-clad slopes skirting the shores of North Bute, Black Grouse were common; and Red Grouse abounded on all the moors, both south and north.

Phasianus colchicus (*L.*) and Perdix cinerea, *Lath.*—On suitable ground Pheasants and Partridges were both common. Of the two I found the Pheasant much the more numerous and widely distributed, occurring not only in the woods and cultivated lands of central and southern Bute, but also in the outlying and much wilder district at the head of the Kyles.

Rallus aquaticus, *L.*—On 6th January a frozen-out Water Rail was observed in a ditch by the roadside between Barone and Loch Fad, and I saw a stuffed specimen in Mr. Bodin's hands.

Gallinula chloropus (*L.*) and Fulica atra, *L.*—From first to last, a goodly number of Moor-hens were noticed, and on the lochs Coots were common as long as there was open water—on 30th December I counted over a hundred on Loch Fad.

Ægialitis hiaticula (*L.*) and Charadrius pluvialis, *L.*—On the sands and shingles of Kilchattan Bay, St. Ninian's Bay, etc.,

Ringed Plovers, in flocks of half a dozen up to 30 or 40, were frequently observed; and along the whole of the west coast Golden Plover were abundant from the commencement of the storm. The tameness of the latter (I often walked to within 15 to 20 yards of a group before they rose) told how seldom their haunts were disturbed by the shore-shooter.

Vanellus vulgaris, Bechst.—Lapwings in considerable numbers appear to winter in Bute. During all the time I was there they were seen almost daily, and Mr. Bodin tells me some remained throughout the storm. The following jottings from my diary will best give an idea of their numbers:—1st January, 20 on grass-field beside Loch Ascog; 4th January, 30 to 40 in field near Kingarth; 9th January, 70 flying over between Kingarth and Lubas; 10th January, 17, St. Ninian's Bay.

Strepsilas interpres (*L.*) and Hæmatopus ostralegus, *L.*—Although the rocky foreshores of Bute seem so admirably suited to the habits of the Turnstone, I did not find it at all plentiful; small groups (of from 4 to 9) to the north of Kilchattan, between Ardscalpsie and St. Ninian's Bay, and between St. Ninian's and Ettrick Bay, being all that I saw. Oyster-catchers, on the other hand, were abundant.

Scolopax rusticula, *L.*, Gallinago cœlestis (*Frenz.*), and G. gallinula, *L.*—Woodcock were flushed on a good many occasions both inland (in the woods and on the moors) and close to the shore. The Common Snipe abounded in the meadows and marshes around the lochs, as well as in ditches by the fields and roadsides. In walking round Loch Quien I put up between 20 and 30. Solitary examples of the Jack Snipe were several times flushed in boggy spots by Loch Fad and Loch Quien. Mr. Bodin tells me that many Snipe and Woodcock were found dead or in a dying condition during the storm.

Tringa alpina, *L.*, and T. canutus, *L.*—A group of Dunlins (30 to 40) was several times observed in Kilchattan Bay, and on two occasions a flock of about 80 was noticed in St. Ninian's Bay. The only Knots identified were a flock of 20 in Kilchattan Bay on 4th January. The absence of extensive mudflats is sufficient, however, to account for the paucity of *Tringæ* and some other "waders" with similar habits.

Totanus calidris (*L.*).—Redshanks, on the other hand, find just such a coast as suits them well, and consequently they were plentiful on most parts of it.

Numenius arquata (*L.*).—So was the Curlew, of which flocks of over a hundred were several times seen.

Limosa lapponica (*L.*).—I was scarcely prepared, however, to meet with the Bar-tailed Godwit, and was therefore delighted to find a group of eleven in St. Ninian's Bay on 10th January. The tide was ebbing at the time, and the birds were following it and probing the soft sand in characteristic fashion. They were observed in the same spot on a subsequent day, so were probably wintering there.

Larus ridibundus, *L.*—Black-headed Gulls were abundant, especially about Rothesay and Port Bannatyne, where they became objects of much interest during the prolonged severe weather, many coming daily about the houses and poultry-yards to be fed.

Larus canus, *L.*, L. argentatus, *J. F. Gmel.*, and L. marinus, *L.*—Perhaps not less numerous was the Common Gull; and the Herring Gull, especially in the plumage of immaturity, was likewise plentiful. A number of adult Great Black-backed Gulls were also perfectly identified, but I much doubt if I saw a Lesser Black-back, unless perhaps in the immature state.

Uria troile (*L.*), and Alca torda, *L.*—A good many Guillemots were seen as we crossed from Wemyss Bay to Bute, and again between the island and Toward when we left, some of them being quite close to Rothesay. One or two Razorbills were also noted, but no Puffins.

Colymbus glacialis, *L.*, and C. septentrionalis, *L.*—Divers, singly or in pairs, were scattered along the entire western coast-line; but, as many of my readers know, it is not always easy, even with a good glass, to say to which species a Diver at some distance off shore belongs. On several occasions, however, by hiding among the rocks when the birds were on the surface and running forward while they were below, I managed to perfectly identify both the Great Northern and the Red-throated species. The Black-throated was probably also present, but of this I could not be certain.

Podicipes fluviatilis (*Tunst.*), P. auritus (*L.*), and P. cristatus (*L.*).—On Loch Quien I had five Little Grebes in view at one time, but I did not notice this bird on any of the other lochs. A medium-sized Grebe seen diving a short distance from shore near Kilmichael on 8th January was most likely a Sclavonian Grebe; and in February a Great Crested Grebe was killed on the coast, as I am informed by Mr. Bodin, who stuffed it.

# ADDITIONS TO THE AUTHENTICATED COMITAL CENSUS OF THE LAND AND FRESHWATER MOLLUSCA OF SCOTLAND.

Wm. Denison Roebuck, F.L.S.
Late Hon. Secretary and Recorder to the Conchological Society of Great Britain and Ireland.

I have again to bring forward a considerable number of additional and other records, in continuation of my papers in previous numbers of the "Annals of Scottish Natural History," the last instalment of which appeared in the number for July 1894. For the materials from which the notes now brought forward are written I am again indebted to old friends and former contributors in Mr. William Evans, F.R.S.E., to whom I am in particular indebted for the great and abiding interest he takes in these papers of mine, Mr. Andrew M'Clellan of Stirling, Mr. Thomas Scott, F.L.S., of Leith, and Mr. Alex. Shaw of Glasgow; and I have also the pleasure of including material from two new investigators in Mr. G. M'Dougall of Stirling and Mr. G. A. Frank Knight of Glasgow. To all these gentlemen I have to tender my best thanks for their cordial appreciation of the value of the "authentication" principle—an appreciation to which some of my friends, never having heard of the life's work of Mr. Hewett Cottrell Watson in botanical topography, have never been able to attain. The paragraphs are numbered in continuation of my previous papers.

43. Mollusca from South Perth with Clackmannan Vice-County.—We are indebted to Mr. G. M'Dougall of Stirling for a number of shells collected by him in the neighbourhood of Bridge of Allan, Blairlogie, and Abbey Craig, including a few from the Lake of Menteith; all these localities being within vice-county No. 87, which includes South Perthshire, lying south of the watershed line between the basins of the Forth and the Tay, in addition to Clackmannanshire and outlying and detached portions of Stirlingshire. The species sent were as follows, those marked with the asterisk (*) being additions to the authenticated list:—**Succinea elegans* (see also paragraph 44), *Vitrina pellucida*, *Hyalinia cellaria*, *H. alliaria*, *H. nitidula*, *H. pura*, *H. radiatula*, *H. crystallina*, *H.*

*fulva*, *Helix aculeata*, *H. nemoralis* (vars. *olivacea* ooooo and *libellula* 12345), **H. hortensis* (var. *lutea* 1(2345)), *H. arbustorum*, **H. hispida*(=*concinna*) and var. *albocincta*, *H. hispida* var. *hispidosa*, *H. rotundata*, **H. pulchella*, **Vertigo pygmæa*, **V. pusilla*, *V. edentula*, *Clausilia perversa*, *Cochlicopa lubrica*, *Carychium minimum*, **Valvata piscinalis*, *Planorbis albus*, **Pl. parvus*, **Pl. spirorbis*, *Pl. contortus*, **Bullinus hypnorum*, **Physa fontinalis*, *Limnæa peregra* and var. *lacustris*, *L. palustris*, *Ancylus fluviatilis*, **Sphærium corneum*, *Pisidium fontinale*, *P. pusillum*, and **P. milium*(=*roseum*) —37 species in all, of which 13 are new, bringing up the total for the vice-county to 59 authentications.

44. Succinea elegans at Callander.—By the kindness of Mr. William Evans we have been able to see an example of this species, found by him at Callander, South Perthshire, on the 6th of May 1894.

45. Arion subfuscus in Stirlingshire.—In July 1894 Mr. Andrew M'Clellan, to whom I have been much indebted for assistance in these papers, sent me this species, which had not before been authenticated for Stirlingshire. With it he sent examples of *Limax marginatus*(=*arborum*) and var. *nemorosa*, and *L. maximus* and vars. *fasciata* and *obscura*. All were collected within five minutes' walk of the Nursery Gate, Stirling, and near the mill at Cambusbarron; the *A. subfuscus* being plentiful, and the others more rare.

46. Erratum in New Records for Selkirkshire.—Referring to the paragraph, No. 29, on p. 154 of the "Annals" for July 1894, Mrs. Carphin informs me that the specimens of *Hyalinia nitida* submitted and authenticated were all from Faldonside, Roxburghshire, and not, as stated, from both that place and Clovenfords, Selkirkshire. The species, therefore, should be deleted as for Selkirkshire until fresh records are forthcoming.

47. Sphærium corneum in South Aberdeenshire.—Mr. G. A. Frank Knight of Glasgow was good enough to send me a few examples of this species from Loch Skene. Although the shell is a common one, and on record for the locality, these specimens are the first that have been submitted for authentication. Another shell sent from the same vice-county, though not an addition to the census, may be mentioned: three examples of *Helix aspersa*, approaching the form named *undulata*, from Aberdeen, were also sent by Mr. Knight.

48. Succinea elegans and Helix hortensis in North Aberdeenshire.—From Mr. G. A. Frank Knight we have received a few examples of *Succinea elegans* from Collieston, and two of *Helix hortensis* var. *lutea* ooooo from Cruden Bay, both additions to the list for North Aberdeenshire. This is, strange to say, one of

the vice-counties concerning the land and freshwater mollusca of which scarcely anything is known or on record. So far we have only had thirteen authentications, and it is much to be wished that some active conchologist would make it his concern to visit the coast-line and search it well, from Newburgh and the Ythan mouth round to Aberdour, and permit our referees to see the results of his labours.

49. Limnæa peregra an Addition to the Dumbartonshire List.—To Mr. G. A. Frank Knight we are also indebted for several Dumbartonshire shells, one of which—the ubiquitous *Limnæa peregra*—is an addition to the authenticated list. The specimens sent, two in number, were of the var. *ovata*, and were collected at Craigton, Milngavie. Other shells sent from this county were *Helix rufescens* from Bearsden, near Glasgow, *H. rotundata* from the Kilpatrick Hills, *Vitrina pellucida* from Kilpatrick and Bearsden, *Cochlicopa lubrica* from Kilpatrick, *Helix aspersa* from Helensburgh, and the *Succinea* to be mentioned in my next paragraph.

50. Succinea putris, an Addition to the Dumbartonshire and Main Argyleshire Lists.—Mr. G. A. Frank Knight sent us a couple of examples collected in the River Loin near Arrochar. As the river appears to be the dividing line of two counties, it would appear to be unavoidable to add the species to the authentication lists for both areas.

51. Pisidium pusillum an Addition to the Clyde Islands List.—Mr. Knight has favoured us with examples of this bivalve from Iorsa Water, Arran, an addition to the list for the vice-county. From Iorsa Water also were sent very numerous and very small examples of *Limnæa peregra* var. *minor*, and from Machrie Water, Arran, numerous examples of the same species. From the Bull Loch, island of Bute, were sent numerous examples of *L. peregra* var. *ovata*, a small example of the type, and several specimens of *Ancylus fluviatilis*.

52. Pisidium nitidum an Additional Species for Easterness.—From Loch Morlich, which is situate at an elevation of 1046 feet among the Cairngorm Mountains, Inverness-shire, we have received from Mr. Knight a few examples of this bivalve, which is an addition to the vice-comital list for Easterness. Other shells sent from the district include a single valve of *Unio margaritifer* from the river Spey, and numerous examples of *Limnæa peregra* var. *ovata* from Nethy Bridge, Speyside.

53. Ancylus fluviatilis an Addition to the List for Westerness.—Several specimens of the freshwater limpet collected in the Righ Water, Onich, on Loch Linnhe, were sent by Mr. Knight, and add the species to the vice-comital list. Other species sent from Onich include a specimen of *Cochlicopa lubrica*, and numerous very small ones of *Clausilia perversa*.

54. Ayrshire Shells.—Of these we have received numerous examples of *Helix virgata* (mostly of var. *subdeleta*), and numerous specimens of *Helix acuta* (including one of var. *articulata*), all sent by Mr. Knight, and collected on the well-known locality, the ballast-hills at Troon. From Mr. Alexander Shaw we have numerous specimens of *Helix caperata* and *Pupa cylindracea*, and one *Cochlicopa lubrica* from Ayr.

55. Stirlingshire Shells.—From Dongalston Loch, Stirlingshire, Mr. Knight has submitted a couple of examples of *Valvata piscinalis*, a couple of *Planorbis contortus*, and numerous examples of *Pl. albus* and *Helix rotundata* from Baldernock. From Strathblane Mr. Shaw has sent us a few specimens, including *Helix rotundata*, *Hyalinia alliaria*, *Vertigo edentula*, *Pupa cylindracea*, and *Cochlicopa lubrica*.

56. Shells from the Argyleshire Shores of the Kyles of Bute.—Mr. Knight has sent *Helix rotundata*, *Hyalinia cellaria*, and *Pupa cylindracea*, from the Loch Ridden Islands, several *Limnæa peregra* var. *ovata*, and one *Helix aspersa* from Auchenlochan, and several *L. peregra* var. *ovata* from Loch Meldalloch, Tighnabruaich, all of which localities I suppose are on the Argyleshire side of the Kyles.

57. Main Argyleshire Shells.—From Strachur, Loch Fyne, we have received examples of *Helix rotundata* and *Vitrina pellucida*; from the Pass of Brander, Loch Awe, a specimen of *Ancylus fluviatilis* and several of *Limnæa peregra*; from the Loch Awe islands single examples of *Hyalinia alliaria* and *H. nitidula*; and from Arrochar, on Loch Long, an example of *Helix arbustorum* which had been taken at a height of 700 feet up Ben Chrois. All these records we owe to the kindness of Mr. G. A. Frank Knight.

58. West Sutherland and Kirkcudbrightshire Limnæa.—For several *Limnæa peregra* from Lochinver, Sutherland West, and numerous examples of *L. peregra* var. *ovata* and a couple of *L. auricularia* var. *acuta* from the Gatehouse of Fleet, Kirkcudbrightshire, we are likewise indebted to Mr. Knight.

59. Helix aculeata and Carychium minimum added to the Dumbartonshire List.—We are indebted to the public-spirited kindness of Mr. Alexander Shaw of Glasgow for a number of shells collected at Old Kilpatrick in April 1894, which includes two additions to the county list in *Helix aculeata* and *Carychium minimum*, which were accompanied by *Hyalinia cellaria*, *H. nitidula*, *H. crystallina*, and *Ancylus fluviatilis*.

60. Additions to the Mid-Ebudes List.—Mr. Alexander Shaw has done a piece of good work in paying a visit to Salen, on the island of Mull, in July 1894; it having resulted in the acquisition of four

additions to the vice-county of Mid-Ebudes. These are *Hyalinia crystallina*, *H. nitida*, *H. fulva*, and *Carychium minimum*, of each of which one or more examples were found. *Vitrina pellucida*, *Hyalinia alliaria*, *Helix rotundata*, *Pupa cylindracea*, and *Clausilia perversa* also occurred at the same time. The Mid-Ebudes list now amounts to 24 species, so that it is evident that further visits to Mull, Coll, Tiree, Staffa, and Iona ought to result in very considerable augmentation of our list.

61. Shells found at Killin.—Although there are no fresh records for Mid-Perth among them, it may be well to place on record that Mr. Alexander Shaw collected *Hyalinia alliaria*, *H. nitidula*, *H. fulva*, *H. crystallina*, *Helix hispida*, *H. rotundata*, *Pupa cylindracea*, *Clausilia perversa*, *Cochlicopa lubrica*, and *Carychium minimum*, at Killin, at the head of Loch Tay.

62. Additional Records for the Outer Hebrides.—To another old friend and supporter, Mr. Thomas Scott, F.L.S., of Leith, we are indebted for a few shells collected on the islands of Barra and North Uist, in May of last year, 1894. Those from the former island were collected in Sinclair Loch, on the 10th of May 1894; they include a small example of *Limnæa truncatula*, single specimens of *Planorbis nautileus* and of var. *crista*, and of *Pl. parvus*, and a number of *Pisidium pusillum*—all species which have not before been authenticated from the Outer Hebrides, and there were also three examples of *Limnæa peregra* var. *ovata*. The North Uist shells were collected in a stream running out of Loch Fada, on the 24th of May; they include an example or two of *Limnæa peregra* var. *ovata*, as well as a couple of species additional to our records,—*Pisidium pusillum* and *Ancylus fluviatilis*,—of each of which a number of examples were collected. With these additions, the Outer Hebridean list now includes 22 species, a number to which it is devoutly to be wished that further additions may be made, as the result of careful and systematic further research.

63. Additions to the Main Argyleshire List.—It is to the acumen and diligence of our old and faithful friend, Mr. William Evans, F.R.S.E., that we are indebted for a most important consignment of molluscs collected in April 1894 in the neighbourhood of Oban, the 39 species sent by him including no less than 12 additions to the authenticated records for Main Argyleshire, bringing up its total to 49 species. The 12 additions are *Limax marginatus* (= *arborum*), of which several small ones were sent alive, *Helix hortensis* var. *lutea* 12345 (1 adult), *H. pygmæa* (1), *Hyalinia nitida* (several), *H. excavata* (a few), *Vertigo pygmæa* (1), *Succinea putris* (several), *S. elegans* (1), *Limnæa truncatula* (a few), *Planorbis parvus* (several, small), *Pisidium fontinale* (1), and *P. pusillum* (a few). We also received at the same time a few *Arion hortensis*,

many *A. circumscriptus*, a few *A. minimus*, single examples of *Agriolimax agrestis* and *A. lævis*, a juvenile *Helix aspersa*, an immature *H. arbustorum*, several immature *H. rufescens* (from Dunstaffnage Castle), a few *H. granulata* (=*sericea*), one small *H. hispida* var. *hispidosa*, a couple of *H. fusca*, a single example of *H. rotundata*, several adults of *Hyalinia cellaria* and a single var. *albinos*, several adult *H. nitidula*, one example of *H. fulva*, several *H. crystallina*, a single *H. pura*, a few *Vitrina pellucida*, a few *Pupa cylindracea*, also *P. anglica* (=*ringens*), several *Vertigo edentula*, many *Clausilia perversa*, a few *Cochlicopa lubrica* and one var. *lubricoides*, a few *Carychium minimum*, one *Limnæa peregra*, and a few *Ancylus fluviatilis*.

64. Shells from East Lothian.—From Mr. William Evans I received in March last a few species, which he found on 22nd September 1894 in a damp spot on Westbarns Links, Haddingtonshire. There were single examples of *Succinea putris*, *S. elegans*, *Hyalinia radiatula*, *Helix pulchella*, *H. caperata* var. *ornata*, *Pisidium pusillum*, *Limnæa truncatula*, *Carychium minimum*, and *Planorbis spirorbis*. At the same time was sent an example of *Bulimus obscurus*, from Biel, in the same county, collected 24th September 1894. Although, from the county having been so thoroughly examined by Mr. Evans and others in times past, there are no actual additions to the authenticated list, the *Planorbis spirorbis* is worthy of note from its rarity, there being only one previously known locality for it in Haddingtonshire.

65. Limax cinereo-niger, L. marginatus (arborum), and Helix hortensis, added to the Clyde Islands List.—On the 26th April of this year I had the pleasure of receiving from Mr. William Evans a number of slugs and shells, mostly collected at Brodick, in the Isle of Arran. It included a nearly adult example of *Limax cinereo-niger* (from a fir-wood at the entrance to Glen Rosa), and several of *L. marginatus* (=*arborum*), both of which are additional for the Clyde Islands vice-county, as is also *Helix hortensis*, of which there was a specimen from Bennan. There were also *Arion ater*, *A. subfuscus*, *A. hortensis*, *A. circumscriptus*, *A. minimus*, *Agriolimax agrestis*, *A. lævis*, *Succinea putris*, *Vitrina pellucida*, *Hyalinia cellaria*, *H. alliaria*, *H. radiatula*, *H. crystallina*, *H. fulva*, *Helix hispida* (*concinna*), *H. fusca*, *H. rotundata*, *H. pygmæa* (a good many), *Pupa cylindracea*, *Vertigo edentula*, *Clausilia perversa* (numerous), *Cochlicopa lubrica*, *Carychium minimum*, and *Pisidium pusillum*, mostly represented by single examples, or a few of each. The Clyde Islands list now includes 58 authenticated species. Other species were taken, but not sent to me,—such as *Helix aspersa*, *H. nemoralis*, *Hyalinia nitidula*, and *Ancylus fluviatilis*.

# ON THE OCCURRENCE IN ROSS-SHIRE OF *CEPHENOMYIA RUFIBARBIS*, A NEW BRITISH BOT-FLY PARASITIC ON THE RED DEER.

By Percy H. Grimshaw, F.E.S.

Among some Diptera collected by my friend Mr. L. W. Hinxman in Ross-shire in the months of June and July 1894, and kindly handed over to me for my collection, are two specimens of a species of Bot-Fly (*Cephenomyia rufibarbis* (Meigen), which is not only new to Britain, but is of additional interest owing to its being parasitic upon the Red Deer (*Cervus elaphus*, Linn.). The specimens (both females) were captured in Strath Carron, close to the loch of that name, and only a few feet above high-water mark.

As I believe this particular species has never been described in any English work, I have thought it desirable to give a short description of the mature insect, pointing out how it differs from the other members of the family to which it belongs, together with a few words on its life-history, which may be of special interest to sportsmen. Full accounts of the species and its life-history may be found in F. Brauer's papers on the *Œstridæ* in the "Verhandlungen der k. k. zool.-bot. Gesellschaft in Wien," and in the same author's "Monographie der Œstriden." It is from these accounts, and from Schiner's description in the "Fauna Austriaca" that my remarks are chiefly compiled (see Bibliography).

The *Œstridæ*, or Bot-Flies, are now represented in Britain by nine species, belonging to the five genera *Gastrophilus*, *Hypoderma*, *Œstrus*, *Pharyngomyia*, and *Cephenomyia*. The genus *Cephenomyia*, of which the species just discovered is the only British representative, may be roughly characterised as follows—Large, black, hairy flies, partly clothed with hairs of a lighter shade; head as broad as the thorax—antennæ inserted in a cavity in the face, which is *not completely divided by a ridge* as in *Hypoderma*, the ridge being quite rudimentary and only faintly visible on the upper part of the face between the antennæ; lower part of the face quite hollow, with no trace of shield; first and second joints of

antennæ very short, third orbicular with a naked dorsal seta; vertex broad in both sexes, somewhat narrower in the male and gradually widened towards the front; thorax a little broader behind than in front; abdomen broadly oval, almost round, *rounded at the apex in both sexes*, and without projecting ovipositor in the female. Wings with the fourth longitudinal vein bent upwards towards the third at a right angle, forming an apical transverse vein, but not uniting with the third, the straight portion prolonged slightly *beyond* the angle; apical transverse strongly curved inwards towards the base of the wing; discal transverse joining the fourth longitudinal at some distance behind the origin of the apical transverse.

The sexes in this genus are difficult to distinguish, owing to the ovipositor not projecting in the female. Brauer points out, however, that some clue is afforded by the shape of the eyes. Seen from the front, the inner margin of each eye in the female appears distinctly angled, that is to say, it descends vertically about half way and then turns abruptly outwards; in the male the same margin seen from the front is straight and inclined outwards the whole way.

*Cephenomyia* may be readily distinguished from *Gastrophilus* by the inflexion of the fourth longitudinal vein of the wings; from *Hypoderma* by the prolongation of this vein beyond the origin of the apical transverse vein, by the position of the discal transverse vein, which in *Hypoderma* joins the fourth longitudinal immediately at its angle, and especially by the absence of the dividing ridge in the concavity of the face. From *Œstrus* it differs in the apical transverse vein not uniting with the third longitudinal; and from *Pharyngomyia* in the body being more uniformly coloured, never checkered, but densely clothed with hairs.

*Cephenomyia rufibarbis* (Meigen) is a large fly, measuring nearly three-quarters of an inch in length. Head black, clothed behind with tawny hairs and a ring of black hairs behind the eyes; vertex with black hairs and a median line of yellowish-gray hairs; face between the eyes and in the cavity silvery; cheeks with a beautiful bright tawny beard. Antennæ dark reddish brown, with brown seta. Thorax with five not very distinct naked lines, otherwise densely

clothed with hairs, these forming a tawny transverse band before the suture, continuous in colour with the pubescence on the hinder part of the head ; hinder part of thorax clothed with black hairs. Scutellum with tawny hairs. Sides of thorax with light tawny hairs ; beneath the base of the wings a patch of almost white hairs. Abdomen densely clothed with hairs, which on the first two segments are dirty yellow, on the third and fourth black, and from the hind border of the fourth segment to the apex white. Under side of abdomen with long, white, silky hairs ; at the base on each side a patch of white. Wings grayish, the veins blackish brown, sometimes clouded with brown. Alulæ dirty white, edged with brown. Halteres dark brown, with white tips. Legs black, femora with gray and black hairs, tarsi reddish brown with the apices of the joints darker.

The life-history of this fly is quite as interesting as that of its allies. The females are viviparous, and the larvæ are parasitic upon the Red Deer (*Cervus elaphus*, Linn.). From May to July the adult females are to be seen flying slowly and noiselessly in vertical circles round and round the heads of their victims, who become greatly disturbed and begin to snort and kick. Suddenly a fly darts down upon the open nostril of the restless animal, soon flying up again, only to repeat this irritating process several times. The poor victim becomes still more excited, and tries to scratch its nose with its hind feet, or endeavours to rub this organ, which is sometimes already bleeding, upon its fore feet, all the while sneezing violently, and occasionally by this means succeeding in dashing its little enemy down to the ground. In the meantime the fly has succeeded in injecting into the nostril a drop of fluid containing minute, living, and very active maggots. These adhere firmly by means of the hooks with which they are provided, and by constant wriggling work themselves continually onwards until they come to lie at the back of the throat, where they remain until almost ready to enter the pupal stage. They are then forcibly ejected from the throat by the coughing and sneezing of their host. When fully-developed the larvæ measure from twelve to thirteen lines in length. Their colour is dirty yellow, the upper border of the last segment of the body yellowish brown, the end of the

head and the tenth segment marked above with small dark spots. They pupate on the earth in dark places, at the base of walls or under leaves, becoming pupæ from half a day to two days after leaving the throat of the deer. The pupal stage lasts from twenty-one to forty days, in colder weather much longer.

The males of this and allied Bot-Flies seem to be very rare, being generally found near the summits of mountains.

### Synonymy and Bibliography.

Œstrus cervi, *Schrank*, "Fauna Boica," iii. 2290 (1803). Larva only.

Œstrus rufibarbis, *Meigen*, "System. Beschr.," iv. p. 172, No. 7 and taf. 38, fig. 17 (1824).

Œstrus auribarbis, *Meigen*, *t.c.* p. 171, No. 6. Variety.

Cephenemyia auribarbis, *Macquart*, "Hist. Nat. Ins. Dipt.," tom. ii. p. 50 (1835).

Œstrus Trompe, *Ratzeburg*, "Die Forst-Insekten," iii. 10, fig. 13 (1844); *Kellner*, "Ent. Zeit. v. Stettin" (1847 and 1853).

Cephenemyia rufibarbis, *Brauer*, "Verh. der zool.-bot. Gesellsch. Wien," viii. pp. 394, 401, 410, taf. x. figs. 1 and 1*a*, *b*, *c*, *d*, taf. xi. figs. 3 and 3*a*, *b*, *c* (1858).

Cephenomyia rufibarbis, *Schiner*, "Fauna Austriaca," Diptera, I. Theil, p. 394 (1862); *Brauer*, "Monographie der Œstriden," pp. 193-198 and taf. iii. figs. 9 and 9*a*, *b*, *c*, taf. vi. fig. 6, taf. ix. figs. 2, 3 (?), 4, 5, 6 (1863); *Brauer*, "Verh. der zool.-bot. Gesellsch. Wien," xlii. pp. 79-84 (1892). Note on larva.

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## A LIST OF PERTHSHIRE DIPTERA COLLECTED IN 1894.

By Percy H. Grimshaw, F.E.S.

A few months ago Mr. T. M. M'Gregor, of Perth, submitted to me for examination and identification a number of flies collected by him in the county during the spring and summer of 1894. The following list is a partial result of my investigations, and though it contains nothing striking in the way of rarities or novelties, yet, as there does not

appear to be anything known about this portion of the fauna of the county, it may serve as a first contribution on which to base future work. In addition to the species here recorded were several specimens about whose identity I could not be absolutely certain, and as I do not care to commit doubtful records to paper, these must be reserved for further consideration.

## MYCETOPHILIDÆ.

Glaphyroptera fascipennis (*Mg.*). Woody Island (June).

## BIBIONIDÆ.

Scatopse notata (*Linn.*). Almond Valley (April).

Bibio pomonæ (*Fab.*). Methven Moss (August).

Bibio Marci (*Linn.*). Almond Valley (May).

Bibio leucopterus (*Mg.*). Almond Valley (May).

Bibio venosus (*Mg.*). Almond Valley (May).

Bibio nigriventris, *Hal.* Almond Valley (May); Woody Island (May).

Bibio Johannis (*Linn.*). Almond Valley (May).

Bibio laniger, *Mg.* Methven Moss (April); Minkie Moss (April).

## SIMULIDÆ.

Simulium reptans (*Linn.*). Almond Valley (May); Woody Island (May); Dalguise (May).

## CULICIDÆ.

Culex nemorosus, *Mg.* Minkie Moss (April).

## LIMNOBIDÆ.

Amalopis immaculata (*Mg.*) Almond Valley (May).

## TABANIDÆ.

Chrysops relictus, *Mg.*

Leptis scolopacea (*Linn.*). Methven Moss (June); Kinnoull Hill (June).

Leptis tringaria (*Linn.*). Methven Moss (August).

Atherix Ibis (*Fab.*). Woody Island (June).

## BOMBYLIDÆ.

Bombylius canescens, *Mik.* Near Perth (June).

## THEREVIDÆ.

Thereva nobilitata (*Fab.*). Stanley (June).

## EMPIDÆ.

Rhamphomyia sulcata (*Fall.*). Dalguise (May).

Empis tessellata, *Fab.* Almond Valley (May); near Perth (June); Bankfoot (July).

Empis livida, *Linn.* Almond Valley (August).

Empis borealis, *Linn.* Dalguise (May).

Empis chioptera, *Fall.* Almond Valley (May).

Hilara pinetorum, *Zett.* Almond Valley (May); near Perth (June).

Hilara nigrina (*Fall.*). Woody Island (May).

## DOLICHOPODIDÆ.

Porphyrops crassipes, *Mg.* Almond Valley (May).

## LONCHOPTERIDÆ.

Lonchoptera lacustris, *Mg.* Minkie Moss (April).

## PLATYPEZIDÆ.

Opetia nigra, *Mg.* Almond Valley (May).

## SYRPHIDÆ.

Pipizella virens (*Fab.*). Woody Island (June).

Pipiza noctiluca (*Linn.*).

Leucozona lucorum (*Linn.*). Glenfarg (May).

Melanostoma mellinum (*Linn.*). Almond Valley (May); Woody Island (May); Methven Moss (June).

Platychirus manicatus (*Mg.*). Woody Island (May and June); Kinnoull Hill (June); near Perth (June).

Platychirus albimanus (*Fab.*). Almond Valley (April, May, and August); Woody Island (May and June).

Syrphus lasiophthalmus (*Zett.*). Almond Valley (April); Methven Moss (April); Minkie Moss (April); Dalguise (May).

Syrphus corollæ, *Fab.*

Syrphus ribesii (*Linn.*). Kinnoull Hill (June).

Syrphus albostriatus (*Fall.*). Bankfoot (July).

Catabomba pyrastri (*Linn.*). Stanley (August).

Ascia podagrica (*Fab.*).

Rhingia rostrata (*Linn.*). Glenfarg (May).

Volucella bombylans (*Linn.*). Methven Moss (August).

Volucella pellucens (*Linn.*). Bankfoot (July); Almond Valley (August).

Sericomyia lappona (*Linn.*). Glenfarg (May).

Eristalis tenax (*Linn.*). Almond Valley (April, July, and August); Bankfoot (July); Stanley (August).

Eristalis intricarius (*Linn.*). Almond Valley (April); Methven Moss (April).

Eristalis arbustorum (*Linn.*). Almond Valley (April and August; near Perth (June); Stanley (August).

Eristalis rupium, *Fab.* Stanley (August).

Eristalis pertinax (*Scop.*). Minkie Moss (April); Methven Moss (August); Stanley (August).

Eristalis nemorum (*Linn.*). Stanley (August).

Myiatropa florea (*Linn.*). Stanley (August).

Helophilus hybridus, *Lw.* Almond Valley (August).

Helophilus pendulus (*Linn.*). Almond Valley (July).

Helophilus lineatus (*Fab.*). Almond Valley (July and August).

Xylota segnis (*Linn.*). Almond Valley (August).

Syritta pipiens (*Linn.*). Woody Island (June); Stanley (August).

## CONOPIDÆ.

Sicus ferrugineus (*Linn.*). Methven Moss (August).

Myopa fasciata, *Mg.* Stanley (June).

## TACHINIDÆ.

Echinomyia grossa (*Linn.*). Methven Moss (August).

Olivieria lateralis (*Fab.*). Stanley (August).

Nemoræa rudis (*Fall.*). Glenfarg (May). The single specimen representing this species in the collection was submitted to Mr. R. H. Meade of Bradford, who very kindly identified it for me.

## SARCOPHAGIDÆ.

Cynomyia mortuorum (*Linn.*). Methven Moss (April); Glenfarg (May).

## MUSCIDÆ.

Lucilia cornicina (*Fab.*). Methven Moss (April); Almond Valley (August).

Lucilia cæsar (*Linn.*). Methven Moss (June); Woody Island (June).

Calliphora grœnlandica (*Zett.*). Dalguise (May).

Pollenia vespillo (*Fab.*). Dalguise (May).

Pollenia rudis (*Fab.*). Almond Valley (April); Methven Moss (April).

Mesembrina meridiana (*Linn.*). Dalguise (May); Glenfarg (May); Almond Valley (August).

## ANTHOMYIDÆ.

Hyetodesia dispar (*Fall.*). Almond Valley (May).

## CORDYLURIDÆ.

Scatophaga stercoraria (*Linn.*). Almond Valley (April and August); Methven Moss (April); Dalguise (May); Woody Island (June); Kinnoull Hill (June).

## SCIOMYZIDÆ.

Dryomyza flaveola (*Fab.*). Glenfarg (May).

Tetanocera elata (*Fab.*). Kinnoull Hill (June).

Tetanocera punctulata (*Scop.*). Kinnoull Hill (June).

## PSILIDÆ.

Psila fimetaria (*Linn.*).

## TRYPETIDÆ.

Tephritis leontodontis (*Deg.*). Methven Moss (June).

Euaresta conjuncta (*Lw.*). Almond Valley (May); Woody Island (May and June).

## LONCHÆIDÆ.

Palloptera arcuata, *Fall.* Glenfarg (May); Woody Island (May and June).

## SAPROMYZIDÆ.

Sapromyza rorida, *Fall.* Kinnoull Hill (June).

Lauxania ænea, *Fall.* Woody Island (June).

## BORBORIDÆ.

Borborus equinus (*Fall.*).

Borborus geniculatus, *Mcq.*

# NOTES ON FRESHWATER ENTOMOSTRACA, WITH SPECIAL REFERENCE TO LOCH LEVEN.

By Thomas Scott, F.L.S.,
Naturalist to the Fishery Board for Scotland.

Some time ago I had my attention directed to an interesting correspondence of a semi-private nature, relating to the presence of Copepoda in the River Leven—the effluent of Loch Leven, Kinross-shire.

Along the banks of this river there are various public works, such as powerloom factories, paper-mills, etc. At one of these paper-mills, belonging to Mr. Tullis, Auchmuty, minute red spots were observed from time to time in the paper that was being made. It was shortly after the New Year when these spots were first noticed, and they continued to be observed for several weeks. For a time no satisfactory reason could be given for the occurrence of the red spots, but eventually when the strainers were examined numerous little objects that at first were supposed to be fish spawn were found collected upon them. These were afterwards examined under the microscope, and were then seen to be small freshwater crustaceans, chiefly Copepods, that had evidently been carried down from the loch. On this discovery being made, the origin of the red spots was easily explained ; and moreover, when the spots themselves were examined under the microscope, each spot was seen to be a crushed Copepod, the test of the animal being in some instances quite distinct.

When a lot of the little objects from the strainers was transferred to a bottle of water, some of them were still alive and commenced swimming about, but the majority were dead. Globules of oily matter were visible, with the aid of the microscope, inside the bodies of almost all the dead specimens.

When Mr. Tullis perceived, from the large numbers of crustacea on the strainers, that an extensive exodus of these little creatures from Loch Leven was in progress, he wrote to some friends, who like himself are interested in natural

history, and gave them a detailed account of the observations that had been made. I had the privilege of reading Mr. Tullis's narrative, and later on he himself favoured me with some additional notes, and from these I obtained the information embodied in the preceding remarks.

The phenomenon observed by Mr. Tullis and described in the communication to his friends suggests one or two questions relating to the micro-crustacea, that, for several reasons, appear to be of some importance, and which I propose to notice in the remarks which follow.

One of these questions, and perhaps the foremost in importance, is the place that the micro-crustacea—or entomostraca, as they are usually called—hold in the fishes' "bill of fare"; or, in other words, their value as fish-food. That the entomostraca hold an important place in this respect seems to be undoubted; for not only do they occur in vast numbers, but when healthy and vigorous they are rich in a kind of oily matter that is more or less diffused through their tissues, and it is owing to the presence of this oily matter in their bodies, as much as to their numbers, that, as fish-food, they are so nutritious and valuable.

The entomostraca when collected together *en masse* soon die, and the oily matter in their bodies is set free and collects in the form of globules within the carapace, or it escapes and rises to the surface of the water and forms a perceptible scum. When strong and vigorous, this oily matter exudes from their bodies even during life, and hence it is—as sailors know well enough—that during summer, when the sea is teeming with small crustacea and other minute animals, a film of oil may frequently be seen spread over considerable areas of the surface of the water, so that during stormy weather the waves do not rise so high nor break so readily as during the winter months, when minute crustacea and other organisms are usually less abundant and vigorous.

But though the entomostraca are unquestionably of great importance as fish-food, and specimens of various kinds are frequently obtained in the stomachs of fishes, it cannot be gainsaid that, as regards trout and other freshwater species, the larvæ of insects—"freshwater shrimps" (Gammarus),

small shell-fish, and others of the comparatively larger invertebrates—form a considerable portion of the food of most of the more or less full-grown specimens; and I have no doubt, from personal observation and otherwise, that the superiority of the Loch Leven trout is due very much to the abundance of these organisms in the loch, rather than directly to the entomostraca. Wherein then does the importance of the entomostraca appear? In trying to answer this question, it may not be out of place to quote a statement by Professor MacIntosh of St. Andrews, who is perhaps one of the greatest authorities on fish and fisheries in Britain. In a paper on the pelagic fauna of St. Andrews Bay he thus refers to one of the entomostracan groups: "As has been often pointed out, no group is more important than the *Copepoda* in connection with the nourishment of fishes, especially in their post-larval stages: and they are ubiquitous in distribution; their varying sizes, from the minute larval nauplii to the larger adults, such as *Calanus*, as well as their highly nutritious nature, render them perhaps the most valuable fish-food in the ocean" ("Eighth Annual Report of the Fishery Board for Scotland," part iii. p. 271, 1890). Objection may be taken to the above statement because it refers only to the marine crustacea; but though that is so, the general bearing of the statement is equally true of the freshwater *Copepoda*. But further, when we take into account the fact that the *Cladocera*—another important group of the entomostraca, which, as regards variety, and sometimes also as regards numbers, is only sparingly represented among sea organisms—are found in myriads, even frequently out-numbering the *Copepoda*, in most freshwater lochs, and the larval and post-larval stages of which may well rank in importance with those of the *Copepoda* as a suitable food-supply for the young of the different freshwater fishes, we begin to realise somewhat the value of these minute crustaceans.

But the importance of the entomostraca does not end here. While, as has been shown, their value as a direct source of fish-food is great, their importance becomes more apparent when it is remembered that they are also the prey of many of those larger organisms that constitute such a

considerable portion of the food of half-grown and adult trout and other fishes. Many of the insect-larvæ and other of the larger invertebrates feed voraciously on the smaller crustacea, and where these are abundant their devourers are also usually more or less common.

When I examined Loch Leven in June 1890, entomostraca were plentiful all over the loch, and it is only necessary to give the following extract from my Report which details the results of the investigation to show that the larvæ of insects were also at the same time in considerable abundance. In referring to these larvæ, the Report goes on to say: "Some idea may be formed of the myriads of these organisms present in the loch, when it is stated that a conspicuous ridge composed of the cast-off skins of insect-larvæ, which had been washed ashore during the preceding stormy weather, extended along the margin of the loch for a considerable distance" ("Ninth Annual Report of the Fishery Board for Scotland," part iii. p. 273, 1891).

The freshwater entomostraca, and especially the *Cladocera*, include many curious and beautiful forms; and who knows but that the trout may be able in some measure to appreciate the beautiful as well as the useful, and if so they will find in Loch Leven much to please the eye as well as tickle the palate. The following remarks by the Rev. A. M. Norman, bearing, though somewhat indirectly, on this point, may be of interest. Speaking of one of the most beautiful of the freshwater *Cladocera*, and a species by the way which is frequent in Loch Leven, and referring to the liability of even careful observers sometimes to overlook rare things, he says: "Dr. Baird many years ago published a very interesting paper on the food of the Vendace. No author at that time was more competent to undertake the task, and two of the entomostraca in the stomachs were new to science, one of which, *Bosmina coregoni*, has not been met with elsewhere in our Islands than in Lochmaben; yet when I repeated these investigations three years ago I found that while the Vendace fed on those species recorded by Dr. Baird, a large portion, perhaps in bulk the largest portion, of its food was *Leptodora hyalina*—an entomostracan unknown to Dr. Baird, and which for its extraordinary tenuity, delicacy, and transparency, and its

totally different form from that usual among *Cladocera*, was no doubt passed over by my old friend as something he could not make out, though it is much larger than the species he satisfactorily determined. A more dainty dish to set before a fish cannot well be imagined than *Leptodora hyalina*—an animal so transparent that, notwithstanding its size, it can scarcely be detected in a glass of water unless held up against the light" ("Fourth Annual Report of the Fishery Board for Scotland," p. 155, 1886).

Since there can be no doubt, then, that the presence of an abundant entomostracan fauna is an important desideratum in lochs that have become, or that it is desirable should become, good trout lochs, any cause that tends to produce a serious diminution of the numbers of such organisms is worthy of earnest consideration; because if the diminution becomes extensive and prolonged it is almost certain to react prejudicially on the finny inhabitants of the loch where such diminution has occurred. Hence Mr. Tullis in his letter, after referring to the large numbers of entomostraca discovered on the strainers of his mill, goes on to say: "I wonder how this destruction of these 'water-fleas' is to affect the fish in the loch. The cause which has killed them will no doubt kill other insects, and if so the trout will this season not get so much to feed on in the water, and will have to come more to the surface to look for their food, and in this way we may at last see some improvement in the fly-fishing. It will therefore be interesting to watch how this season goes."

I do not know if any examination of the loch has since been made to ascertain whether such a destruction of entomostraca and other invertebrates had taken place as would produce a serious diminution of their numbers; but whether or not such an examination has been made, it is hardly likely that the destruction would be so great as that. Entomostraca exist in myriads in Loch Leven, and they are very prolific; and as the cause, whatever it may have been, that resulted in so many of them being carried down by the river was probably only temporary, the loss of a few millions in this way would make scarcely any appreciable difference in the vast multitudes inhabiting the loch. To show how

prolific some of these creatures are, the following statements are submitted :—A few months ago, when examining some gatherings of freshwater entomostraca, I selected at random ten specimens of *Daphnia pulex* and counted the number of ova and embryos in each : in some of the specimens the ova were in the earlier stages of development, in others the embryos were well formed. The first specimen examined contained 27 ova ; in the second there were 30 ; in the third, 32 ; in the fourth, 20 ; in the fifth, 23 ; in the sixth, 32 ; in the seventh, 18 ; in the eighth, 18 ; in the ninth, 16 ; and in the tenth, 20—in all 236 ova and embryos, or an average of 23.6 for each Daphnia. Many years ago the late Dr. Baird, the eminent English naturalist, made a number of experiments with *Daphnia pulex*, and the following brief statement of some of the results he obtained throws much light on the fecundity of the species.[1] I give the results of the experiments in his own words :—"29th November, I isolated a *D. pulex* with an ephippium ; 30th, ephippium is thrown off ; 4th December, Daphnia has eggs ; 8th, young ones are born ; 9th, the mother, having been removed from the young immediately after their birth, was found to have eggs again ; 16th, young ones born ; 20th, has eggs again ; 24th, young ones born ; 25th, has eggs again ; 6th January, young born—mother has eggs in ovary again ; 14th, young born—mother has eggs again ; 22nd, young born ; 1st February, has eggs again ; 8th, young born.

"On the 8th December, isolated one of the young born from the subject of last series of observations on 30th November. On the 21st December she was found to have eggs ; 28th, young born ; 29th, has eggs again ; 9th January, young born—mother has eggs again ; 24th, young born ; 25th, has eggs again ; 1st February, young born—mother has eggs again ; 9th, young born ; 27th, has eggs again ; 8th March, young born" ("Natural History of the British Entomostraca," p. 80, 1850). Dr. Baird also states that he isolated two specimens born on 18th January, and that both

[1] Although Dr. Baird's experiments are made use of here to prove the fertility of Daphnia, the purpose he had in view was rather to show that though the Daphniæ are not hermaphrodite, as had been supposed, one union with the male "is sufficient not only to fecundate the mother for her life, but all her female descendants for several successive generations."

gave birth to young on 8th February (*op. cit.*, p. 81). Now if in the first series of observations we exclude the ephippial egg thrown off on 30th November, and reckon from 4th December when the normal eggs were first observed, we find that this Daphnia had seven broods of young in 67 days; or, reckoning from 8th December, when the first brood of young ones were born, and not counting that brood, then there were six broods in 62 days, or an average of about 10 days between each brood. It must be remembered also that these experiments were carried on during mid-winter, when the productiveness of the little creatures, even though artificial heat may have been used, would naturally be less than during the genial weather of the summer and autumn months.

If the ten specimens first referred to be now considered, and taking for granted that they would have proved to be as prolific as those described by Dr. Baird, and also allowing on an average twenty young to each brood for each of them, they would in the seven broods have given birth to 1400 young Daphnia; and, moreover, when we take into consideration that the young at certain seasons consist only of females, and that the young females, according to Jurine, begin to produce eggs in about 10 days after birth, and in winter, as Dr. Baird has shown, they produce young in 20 or 21 days after birth, it is not difficult to imagine in how short a time a loch will become replenished with a numerous fauna. As a matter of fact, if the ten specimens already referred to and their offspring were as fertile as the examples cited, and taking for granted that all or most of their young ones were females, which at certain seasons of the year is not unusual among some of the entomostraca, as shown by Dr. Baird, our ten specimens of *Daphnia pulex* would in the course of a little over two months have become the progenitors of several millions of descendants.

The following table shows the actual increase in numbers of Daphnia in 80 days, beginning with the first brood of the 10 Daphniæ referred to, and allowing 20 young ones to each brood, and presuming that these young will themselves reproduce 20 days after birth — all the young being females :—

| No. of days | No. of broods of first 10 specimens. | Young of the | | | | | | | Young of the young of the | | | | | Young of young of young of the | | | Young of young of young of young of |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1st brood. | 2nd brood. | 3rd brood. | 4th brood. | 5th brood. | 6th brood. | 7th brood. | 1st brood. | 2nd brood. | 3rd brood. | 4th brood. | 5th brood. | 1st brood. | 2nd brood. | 3rd brood. | 1st brood. |
| 0 | 1st = $a$ | | | | | | | | | | | | | | | | |
| 10 | 2nd = $b$ | | | | | | | | | | | | | | | | |
| 20 | 3rd = $c$ | 1st $a^1$ | | | | | | | | | | | | | | | |
| 30 | 4th = $d$ | 2nd $a^1$ | 1st $b^1$ | | | | | | | | | | | | | | |
| 40 | 5th = $e$ | 3rd $a^1$ | 2nd $b^1$ | 1st $c^1$ | . | .. | .. | .. | 1st $a^2$ | | | | | | | | |
| 50 | 6th = $f$ | 4th $a^1$ | 3rd $b^1$ | 2nd $c^1$ | 1st $d^1$ | .. | .. | .. | 2nd $a^2$ | 1st $b^2$ | | | | | | | |
| 60 | 7th = $g$ | 5th $a^1$ | 4th $b^1$ | 3rd $c^1$ | 2nd $d^1$ | 1st $e^1$ | .. | .. | 3rd $a^2$ | 2nd $b^2$ | 1st $c^2$ | .. | .. | 1st $a^3$ | | | |
| 70 | 8th = $h$ | 6th $a^1$ | 5th $b^1$ | 4th $c^1$ | 3rd $d^1$ | 2nd $e^1$ | 1st $f^1$ | .. | 4th $a^2$ | 3rd $b^2$ | 2nd $c^2$ | 1st $d^2$ | .. | 2nd $a^3$ | 1st $b^3$ | | |
| 80 | 9th = $i$ | 7th $a^1$ | 6th $b^1$ | 5th $c^1$ | 4th $d^1$ | 3rd $e^1$ | 2nd $f^1$ | 1st $g^1$ | 5th $a^2$ | 4th $b^2$ | 3rd $c^2$ | 2nd $d^2$ | 1st $e^2$ | 3rd $a^3$ | 2nd $b^3$ | 1st $c^3$ | 1st $a^4$ |

| | | | |
|---|---|---|---|
| Number of Daphnia at first | = | 10 | |
| $a$ to $i$ = the young of first 10, or $10 \times 20 \times 9$ | = | 1,800 | |
| And $a^1 = 200 \times 20 \times 7$ . | = | 28,000 | |
| ,, $b^1 = 200 \times 20 \times 6$ . | = | 24,000 | |
| ,, $c^1 = 200 \times 20 \times 5$ . | = | 20,000 | |
| ,, $d^1 = 200 \times 20 \times 4$ . | = | 16,000 | |
| ,, $e^1 = 200 \times 20 \times 3$ . | = | 12,000 | |
| ,, $f^1 = 200 \times 20 \times 2$ . | = | 8,000 | |
| ,, $g^1 = 200 \times 20 \times 1$ . | = | 4,000 | |
| | | 123,810 | |

| | | |
|---|---|---|
| And $a^2 =$ | $4{,}000 \times 20 \times 5 =$ | 400,000 |
| ,, $b^2 =$ | $4{,}000 \times 20 \times 4 =$ | 320,000 |
| ,, $c^2 =$ | $4{,}000 \times 20 \times 3 =$ | 240,000 |
| ,, $d^2 =$ | $4{,}000 \times 20 \times 2 =$ | 160,000 |
| ,, $e^2 =$ | $4{,}000 \times 20 \times 1 =$ | 80,000 |
| ,, $a^3 =$ | $80{,}000 \times 20 \times 3 =$ | 4,800,000 |
| ,, $b^3 =$ | $80{,}000 \times 20 \times 2 =$ | 3,200,000 |
| ,, $c^3 =$ | $80{,}000 \times 20 \times 1 =$ | 1,600,000 |
| ,, $a^4 =$ | $1{,}600{,}000 \times 20 \times 1 =$ | 32,000,000 |
| | | 42,600,000 |
| | | 123,810 |
| Total number of specimens | | 42,723,810 |

The above is a slightly extended and modified copy of a table prepared by my son, Mr. Andrew Scott.

Though in the preceding remarks *Daphnia pulex* only has been considered, there are many others of the entomostraca equally prolific. But though the fecundity of micro-crustacea were considerably less than that shown, it would still be sufficient to fill up in a short time even an extensive blank that some destructive but temporary cause may have produced.

"Full nature swarms with life; one wondrous mass."
COWPER.

The natural habitat of the freshwater entomostraca is the still water of lakes, ponds, ditches, and those parts of streams or rivers where the current is slow and cumbered with water-plants: entomostraca may be found in all such places. Running water is not their natural resort, and when they happen to be in such a situation they are usually there against their will. Nevertheless an exodus of Copepoda such as that observed by Mr. Tullis is not unknown to those who

have made a study of the little creatures. The cause that leads to such an exodus—it can scarcely be called destruction —taking place may not always be obvious, but in the majority of cases it is probably brought about by a sudden change of temperature, when the weather from being mild and warm becomes cold and ungenial, or when there happens to be a prolonged and intense cold such as has been experienced during the past winter. Under such conditions, free-swimming entomostraca—and it is only such that seem to be much affected—appear to become temporarily enfeebled; and those of them which happen to be in the neighbourhood of that part of the loch where the river takes its rise are thus less able to contend against the currents, which gradually increase in force the nearer the overflow or excess of water of the loch approaches the opening of the river, and so, being overpowered, are carried away with the stream. This is the more likely to take place in a loch where the water is comparatively shallow, as it will in that case be more readily influenced by atmospheric changes.

I have records of several instances where entomostraca have been observed in unlooked-for places. At Rothesay, in the spring of 1887, these little "beasts" occurred in considerable numbers in the water supplied to the town for domestic purposes. They were collected by fixing a piece of thick flannel cloth on the water-tap; and after allowing the water to run through the cloth for an hour or two, it was taken off and washed in water in a glass tumbler—myriads of the creatures could then be seen swimming about in the water. In the spring of 1888 a friend sent me a number of entomostraca from Campbelltown that had been collected in the same way. Last year I happened to be at Barra during the month of May, and the weather for part of the time was cold and unpleasant. One day my attention was directed to the presence of numerous "beasts" in the water that was supplied for domestic use from a reservoir behind the village of Castlebay. These "beasts" proved to be *Diaptomus serricornis* and one or two *Cyclops*. "Beasts" that had been obtained in the water supplied to Edinburgh have likewise on one or two occasions been brought to me, and they also turned out to be 'water-fleas,'—*Cyclops viridis*, if I remember right. It

may be of interest to mention that on several occasions I have thoroughly examined the Edinburgh water in the same way as was done at Rothesay in 1887, and have rarely been rewarded with even a single specimen of "beasts" of any kind: the water supplied for domestic purposes to Edinburgh appears to be so carefully and efficiently filtered that organisms of any kind rarely find their way to the water-tap.

The following reference to an example of an opposite kind to those given above may be of interest. In June 1889 an examination was made of Loch Coulter: it is from this loch that the water-supply for the famous Howietoun fish-hatcheries and nurseries is obtained. The weather was mild and warm at the time the loch was examined, and the water was teeming with entomostraca. Being desirous to find out if any of the little creatures were being carried down by the stream which flows out of the loch and supplies the hatcheries and nurseries, a tow-net was fixed in the bed of the stream a short distance up from where the water is led off into the nurseries, and so arranged that most of the water in the stream had to pass through it. The net was placed in position at 7.15 P.M. on the 13th, and removed at 8.15 A.M. next day. Although the water had thus been allowed to flow continuously through the tow-net for thirteen hours, only a few *Cyclops*, *Gammarus*, *Ostracods*, and the larvæ of insects were captured. With the exception of the few *Cyclops*, which were the only organisms that were likely to have been brought down from the loch, all the specimens captured appeared to be stragglers from places in the vicinity of the position where the net had been fixed. (See "Eighth Annual Report of the Fishery Board for Scotland," p. 338, 1890.)

I may mention that Mr. Tullis very kindly sent me two bottles containing water-fleas from the River Leven: one was a sample of those first obtained by him from the strainers in the early part of the year; the other contained several living specimens recently collected. Though the specimens in the first bottle were somewhat decomposed owing to the length of time since they had been gathered, I yet had no difficulty in identifying most of the species. The following are the names of them:—*Diaptomus gracilis*, G. O. Sars, *Cyclops strenuus*, Fischer, *Cyclops vicinis*, Uljanin, and *Cyclops*

*serrulatus*, Fischer ; they are all free-swimming species, which, as I have already pointed out, are more liable to be affected by changes of temperature than those that lodge among the aquatic plants or in the mud at the bottom and sides of the loch.

I may also mention, in concluding these remarks, that a short time ago, when examining a small gathering of entomostraca collected in Loch Leven in June 1890, but somehow overlooked till now, two rare species of *Copepoda* were obtained. One of these, called *Canthocamptus Schmeilii*, and which is frequent in the gathering, was described by Mrazek in 1893, and is new to Britain ; the other is *Canthocamptus minutus*, Claus, and is also an addition to the British fauna. My friend D. J. Scourfield of Leytonstone, Essex, tells me in a letter recently received from him that he obtained *Canthocamptus minutus*, Claus, last year in two different localities, viz. one at Wanstead Park, and another in the Isle of Wight ; and though no record of its occurrence has yet been published, to him belongs the credit of its discovery in the British Islands. The fact of its occurrence in such widely distant localities as Loch Leven and the Isle of Wight is an indication, I think, that its distribution in our islands may be really more general than at present it seems to be. Descriptions and drawings of the two species are being prepared for publication.

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## ADDITIONS TO THE FLORA OF ORKNEY, AS RECORDED IN WATSON'S "TOPOGRAPHICAL BOTANY," 2nd Ed.

By Surgeon-Major H. H. Johnston, D.Sc., F.R.S.E., F.L.S.[1]

Before and since the publication of the second edition of Watson's "Topographical Botany," in 1883, many of the plants named in the following list have been recorded from Orkney by me and others ; but, as the value of botanical records is greatly enhanced by the possession of authentic

[1] Read before the Scottish Natural History Society, on 4th April 1895.

specimens, I have included in this list the names of all specimens in my herbarium, which are either additional to, or confirm doubtful records of, the plants recorded from county No. 111 Orkney, in the second edition of the above mentioned work.

Except where otherwise noted, the specimens have been identified by the late Dr. J. T. I. B. Boswell, author of the third edition of Sowerby's "English Botany."

In the case of those plants which have already been recorded from Orkney, references are given in the following list, under each species and variety, to the books in which the records have been published. These records are principally contained in the Annual Reports of the Botanical Exchange Club of the British Isles; "A New List of the Flowering Plants and Ferns of Orkney," edited by W. A. Irvine Fortescue, and published in the "Scottish Naturalist" for 1882 and 1883; and "Additional Records of Plants from Scotland," by Arthur Bennett, published annually in the "Scottish Naturalist" since 1886 inclusive.

The nomenclature followed is that of the second edition of Watson's "Topographical Botany," except in the case of species and varieties which are not recorded in that work. In the latter case the nomenclature adopted is that of the seventh edition of the "London Catalogue of British Plants."

Non-native plants, which have become naturalised in Orkney, are distinguished by an * prefixed to the names, and the names of casuals and escapes from cultivation are printed in italics.

Of the 55 species and varieties recorded from Orkney in the following list, 46 are native, 3 are naturalised, and 6 are either casuals or escapes from cultivation.

ABBREVIATIONS.

"Bot. Exch. Club Report" = Report of the Botanical Exchange Club of the British Isles.

"Journ. Bot." = Journal of Botany.

"Scot. Nat." = Scottish Naturalist.

"Trans. Bot. Soc. Edin." = Transactions of the Botanical Society of Edinburgh.

Watson, "Top. Bot." = Topographical Botany. Second Edition. By H. C. Watson. 1883.

## Class I.—DICOTYLEDONS.

Ranunculus heterophyllus, *Fries.*—Mud at bottom of stagnant water, Loch of Burness, Westray, 13th July 1883, Henry Halcro Johnston. Native.

Ranunculus diversifolius, *Gilib.*, *var.* radians.—Old quarry at south-west side of the old Deerness Road, near Lynnside, Saint Ola, Mainland, 1874, W. A. Irvine Fortescue; mud at bottom of stagnant water in an old quarry, Balea, near Lynnside, Saint Ola, Mainland, 31st July 1877, H. H. Johnston; and pool, west side of Public Road, Rendall, near the Firth boundary line, 23rd July 1882, W. A. Irvine Fortescue. Native at all these stations. The late Dr. J. T. I. B. Boswell informed me that he regarded *R. diversifolius*, Gilib., var. *radians*, as merely *R. trichophyllus*, Chaix, with floating leaves. See "Scot. Nat.," No. xlvii., July 1882, p. 321.

Ranunculus Baudotii, *Godron.*—Mud at bottom of stagnant water, east end of Loch of Brue, Lady, Sanday, 9th July 1883, H. H. Johnston; and mud at bottom of stagnant water, Loch of Burness, Westray, 13th July 1883, H. H. Johnston. Native at both stations.

Ranunculus bulbosus, *Linn.*—Dry sandy pasture, Linksness, Hoy, 20th June 1883, H. H. Johnston; dry sandy pasture, Links of Boardhouse, Birsay, Mainland, 27th July 1883, H. H. Johnston; dry sandy pasture, Links of Hoxa, South Ronaldshay, 19th September 1883, H. H. Johnston; and dry sandy pasture, Links of Melsetter, Waas, Hoy, 5th June 1884, H. H. Johnston. Native at all these stations, which are all near the seashore. See "Scot. Nat.," No. xlvii., July 1882, p. 321; and "Scot. Nat.," No. xvi., new series, April 1887, p. 57.

*Papaver somniferum*, Linn.—Shingle at seashore, Carrick, Eday, 11th July 1883, H. H. Johnston. Escape from garden.

Cochlearia alpina, *H. C. Wats.*—Pasture, top of Knucher Hill, Westray, 13th July 1883, H. H. Johnston; and pasture at edge of cliffs at the seashore, Ness of Ramnageo, Sandwick, Mainland, 23rd July 1886, H. H. Johnston. Native at both stations. Removes the ? after "111 Orkney?" in Watson, "Top. Bot.," ed. ii., p. 36. See "Scot. Nat.," No. xlvii., July 1882, p. 323; and "Scot. Nat.," No. xiii., new series, July 1886, p. 319.

*Brassica Rapa, *Linn.*, *var.* sylvestris. — Sandy seashore, north-east side of Little Sea, Lady, Sanday, 7th July 1883, H. H. Johnston. Naturalised.

Viola arvensis, *Murr.* — Cornfield, Hurkisgarth, Sandwick, Mainland, 4th August 1886, H. H. Johnston. Native. Large-flowered plants of *V. tricolor*, Linn., were growing in the same cornfield. See "Bot. Exch. Club Report," 1886, p. 145; and "Scot. Nat.," No. xxv., new series, July 1889, p. 112.

*Linum usitatissimum*, Linn.—Rare at a roadside, near Orphir Public School, Orphir, Mainland, 10th September 1885, H. H. Johnston. Casual. See "Scot. Nat.," No. xlvii., July 1882, p. 325.

*Trifolium hybridum*, Linn.—Roadside, Orphir, Mainland, 30th August 1880, H. H. Johnston. Escape from cultivation.

*Lupinus perennis, *Linn.* — Common on a heath, Feavel, Sandwick, Mainland, 4th August 1886, H. H. Johnston. Naturalised and exterminating the native plants. See "Trans. Bot. Soc. Edin.," vol. xvi., part i., p. 166; "Bot. Exch. Club Report," 1886, p. 146; and "Scot. Nat.," No. xvii., new series, July 1887, p. 129.

Rosa canina, *Linn.*, is recorded from Orkney in Watson, "Top. Bot.," ed. ii., p. 152, but the following varieties are not recorded.

*Var.* lutetiana (*fide* J. G. Baker).—Crags at burnsides, Wart Hill, Hoy, 28th August 1883, H. H. Johnston. Native. See "Scot. Nat.," No. xv., new series, April 1887, p. 59.

*Var.* dumalis (*fide* J. G. Baker).—Banks at burnside, Lerquoy Burn, Swanbister, Orphir, Mainland, 15th August 1881, H. H. Johnston; banks at burnside, Hammers, Syradale, Firth, Mainland, 17th August 1883, H. H. Johnston; and banks at burnside, Berriedale, Hoy, 9th August 1886, H. H. Johnston. Native at all these stations. See "Scot. Nat.," No. xlviii., October 1882, p. 363.

*Var.* Reuteri (*fide* J. G. Baker).—Hoy, 1st September 1875, H. H. Johnston; and seashore, Oyce, Firth, Mainland, 21st August 1880, H. H. Johnston. Native at both stations. See "Bot. Exch. Club Report," 1880, p. 31; and "Scot. Nat.," No. xlviii., October 1882, p. 363.

*Var.* subcristata (*fide* J. G. Baker).—Grassy bank at seashore, Oyce, Firth, Mainland, 21st August 1880, H. H. Johnston. Native. See "Bot. Exch. Club Report," 1880, p. 31; and "Scot. Nat.," No. xlviii., October 1882, p. 363.

Alchemilla vulgaris, *Linn.*, *var.* montana.—Hilly pasture and burnside, Midland Hill, Orphir, Mainland, 29th July 1876 and 5th June 1877, H. H. Johnston. Native.

Circæa alpina, *Linn.*—Very rare at a burnside, Naversdale, Orphir, Mainland, 16th July 1877 and 6th August 1878, H. H. Johnston. Native. In Watson, "Top. Bot.," ed. ii., p. 166, the record of this species for "111 Orkney" and 23 other counties is entered as "insufficiently vouched; partly erroneous, although perhaps not wholly so; and some of the counties named are at best uncertain." See "Scot. Nat.," No. xlviii., October 1882, p. 364; and "Scot. Nat.," No. xiii., new series, July 1886, p. 319.

Montia fontana, *Linn.*, *var.* rivularis.—Ditch, Burn of Ore, Waas, Hoy, 3rd June 1884, H. H. Johnston. Native.

*Claytonia perfoliata*, Don.—Gravel walk in garden, Hall of Tankerness, Saint Andrews, Mainland, 21st April 1884, H. H. Johnston. Garden weed.

Saxifraga oppositifolia, *Linn.*—Crags on hillside, Wart Hill, Hoy, 18th August 1881, H. H. Johnston. Native. Removes the ? after "111 Orkney?" in Watson, "Top. Bot.," ed. ii., p. 180. See "Scot. Nat.," No. xlviii., October 1882, p. 365.

Pimpinella Saxifraga, *Linn.*—Pikaquoy, near Kirkwall, Saint Ola, Mainland, 1849, Robert Heddle's Herbarium (in my possession). Native. See "Scot. Nat.," No. xlviii., October 1882, p. 365.

Fœniculum vulgare, *Gaert.*—Grassy banks at the seashore, Carrick, Eday, 11th July 1883, H. H. Johnston. Native.

*Levisticum officinale*, Koch.—Roadside, Swannay, Birsay, Mainland, 27th July 1883, H. H. Johnston. Escape from garden.

Galium palustre, *Linn.*, *var.* Witheringii.—Meadow, Scapa, Saint Ola, Mainland, 25th July 1876, H. H. Johnston. Native.

*Sherardia arvensis*, Linn.—Only one plant in a turnip-field, Swanbister, Orphir, Mainland, 27th August 1880, H. H. Johnston. An introduced weed of cultivation. See "Scot. Nat.," No. xlviii., October 1882, p. 367; and "Scot. Nat.," No. xiii., new series, July 1886, p. 319.

My collection of Orkney Hieracia was examined by Mr. F. J. Hanbury, on 4th December 1894. He has referred the specimens to 12 different species; but, on account of the specimens having been pasted down on the herbarium sheets of paper, and, therefore, not satisfactorily examined, he has only been able to definitely identify 7 of the 12 species. Of these 7 species, 2—*H. Pilosella*, Linn., and *H. iricum*, Fries—are recorded from Orkney in Watson, "Top. Bot.," ed. ii., pp. 229 and 232, and the following 5 are new to the Orkney flora.

Hieracium Schmidtii, *Tausch.*, *var.* crinigerum, *Fries*, "Symb. ad Hist. Hieraciorum," p. 94, 1848 (*fide* F. J. Hanbury).—The same specimen was identified as *H. vulgatum*, Fries, by the late Dr. J. T. I. B. Boswell. Hoy, 4th July 1883, H. H. Johnston. Native. See *H. vulgatum*, Fries, in "Scot. Nat.," No. xlviii., October 1882, p. 370.

Hieracium scoticum, *F. J. Hanbury*, in "Journ. Bot.," vol. xxvi., 1888, p. 106 (*fide* F. J. Hanbury).—The same specimen was identified as *H. gothicum*, Fries, by the late Dr. J. T. I. B. Boswell. Very rare on cliffs at the seashore, Hangaback, Gyre, Orphir, Mainland, 18th August 1885, H. H. Johnston. Native. See *H. gothicum*, Fries, in "Scot. Nat.," No. xlviii., October 1882, p. 370.

Hieracium britannicum, *F. J. Hanbury*, in "Journ. Bot.," vol. xxx., 1892, p. 366 (*fide* F. J. Hanbury).—The same specimen was identified as *H. pallidum*, Fries, by the late Dr. J. T. I. B. Boswell. Crags on hillside, Dwarfie Hammers, Hoy, 28th August 1883, H. H. Johnston. Native. See *H. pallidum*, Fries, in "Scot. Nat.," No. xlviii., October 1882, p. 370.

Hieracium corymbosum, *Fries, var.* salicifolium; "Hierac. Scand. Exsicc.," Fasc. iii., 140, 1878 (*fide* F. J. Hanbury).—The same specimen was identified as *H. strictum*, Fries, by the late Dr. J. T. I. B. Boswell. Cliffs at the seashore, Hobbister, Orphir, Mainland, 11th August 1880, H. H. Johnston. Native. *H. corymbosum*, Fries, is recorded from Orkney in Watson, "Top. Bot.," ed. ii., p. 234, on the authority of the late Dr. J. T. I. B. Boswell; but the specimens collected by Miss I. B. Irvine Fortescue, at Pegal Bay, Waas, Hoy, on 14th August 1880, and sent by Dr. Boswell to the Botanical Exchange Club, labelled "*H. strictum*, Fries? approaching *H. corymbosum*, Fr.," have been named *H. strictum*, Fries, var. *amplidentatum*, n. var., by Mr. F. J. Hanbury, in "Journ. Bot.," vol. xxxii., 1894, p. 232. See "Bot. Exch. Club Report," 1880, p. 33.

Hieracium auratum, *Fries*, "Symb. ad Hist. Hieraciorum," p. 181, 1848 (*fide* F. J. Hanbury). Sandstone cliffs at the seashore, south side of Pegal Bay, Waas, Hoy, 22nd August 1894, H. H. Johnston. Native. Phyllaries blackish-green. Stamens, styles and style-branches yellow.

Taraxacum officinale, *Wigg., var.* udum (*Jord.*).—Grassy banks, Hoy, 9th July 1877, H. H. Johnston; roadside, Gyre, Orphir, Mainland, 11th October 1880, H. H. Johnston; Graveyard, Holm, Mainland, 17th April 1884, H. H. Johnston; and crags on hillside, Green Hill, Rousay, 9th May 1884, H. H. Johnston. Native at all these stations.

Arctium nemorosum, *Lej.* — Sandy banks at the seashore, Linksness, Hoy, 1st September 1875 and 31st August 1883, H. H. Johnston; roadside, near the Black Crag, Stromness, Mainland, 23rd August 1880, H. H. Johnston; and shell-sandy pasture, Skaill, Sandwick, Mainland, 4th August 1886, H. H. Johnston. Native at all these stations. The Hoy specimens were identified by the late Dr. J. T. I. B. Boswell, on the authority of Professor C. C. Babington; the specimens from near the Black Crag were identified by Dr. Boswell; and specimens, sent by me to Professor Babington from Skaill, were identified by him as "probably" belonging to *A. nemorosum*, Lej. Removes the ? after "111 Orkney?" in Watson, "Top. Bot.," ed. ii., p. 240. See "Scot. Nat.," No. xlviii., October 1882, p. 367; and "Bot. Exch. Club Report, 1883, p. 90.

PETASITES VULGARIS, *Desf.*—Pasture, Aikerness, Evie, Mainland, 27th July 1883, H. H. Johnston; and Graveyard, Tankerness, Saint Andrews, Mainland, 15th April 1884, H. H. Johnston. Native at both stations. In Watson, "Top. Bot.," ed. ii., p. 254, Low's record of this species from Orkney is included among the "supposed errors," with the remark, "there are grounds to infer that the Tussilago was mistaken for the Petasites." See "Scot. Nat.," No. xlviii., October 1882, p. 369.

VACCINIUM VITIS-IDÆA, *Linn.*—Heathy banks, Red Glen, Hoy, 14th May 1884, H. H. Johnston; banks, Roonie Gill, Hoy, 14th May 1884, H. H. Johnston; heath, between Berriedale and Valley Burn, Hoy, 15th May 1884, H. H. Johnston; heathy banks, Burn of Ore, Waas, Hoy, 3rd June 1884, H. H. Johnston; and heathy banks, Forse Burn, Waas, Hoy, 6th June 1884, H. H. Johnston. Native at all these stations. See "Scot. Nat.," No. xlviii., October 1882, p. 370; and "Scot. Nat.," No. xii., new series, April 1886, p. 288.

PYROLA ROTUNDIFOLIA, *Linn.*—Rousay, A. R. Duguid; and Rousay, 30th July 1881, James Reid. Native. The specimen collected by Dr. Duguid was given to me by Miss Mary Gold, who received it from Dr. Duguid. See "Scot. Nat.," No. xlviii., October 1882, p. 371; and "Scot. Nat.," No. xiii., new series, July 1886, p. 319.

MELAMPYRUM PRATENSE, *Linn.*, *var.* MONTANUM.—Heath on hillside, Summer Burn, Hoy, 7th July 1877, H. H. Johnston; and heath on hillside, Wart Hill, Orphir, Mainland, 16th July 1877, H. H. Johnston. Native at both stations. See "Scot. Nat.," No. xlviii., October 1882, p. 373.

PRIMULA VERIS, *Linn.*—Cliffs at the seashore, Hellia, Hoy, 5th July 1877 and 20th June 1883, H. H. Johnston; and dry sandy pasture, Links of Aikerness, Evie, Mainland, 27th July 1883, H. H. Johnston. Native at both stations. In Watson, "Top. Bot.," ed. ii., p. 335, *P. veris*, Linn., is "mentioned as an introduced plant in" Orkney; but it is certainly native at both of the above mentioned stations. See "Scot. Nat.," No. xlviii., October 1882, p. 375.

PLANTAGO MARITIMA, *Linn.*, *var.* HIRSUTA.—Edge of cliffs at the seashore, Hellia, Hoy, 20th June 1883 and 9th August 1886, H. H. Johnston; high up on hillside, Wart Hill, Hoy, 10th August 1886, H. H. Johnston; and pasture at edge of cliffs at the seashore, Ness of Ramnageo, Sandwick, Mainland, 23rd July 1886, H. H. Johnston. Native at all these stations. See "Bot. Exch. Club Report," 1886, p. 157; "Trans. Bot. Soc. Edin.," vol. xvii. 1886, p. 134; "Scot. Nat.," No. xvii., new series, July 1887, p. 129; "Scot. Nat.," No. xix., new series, January 1888, p. 214; and "Gardeners' Chronicle," vol. xxvi., new series, 1886, p. 793.

Polygonum amphibium, *Linn.*, *var.* terrestre.—Roadside, Crantit, Saint Ola, Mainland, 25th July 1876, H. H. Johnston; and wet ground, near the east end of the Loch of Brue, Lady, Sanday, 9th July 1883, H. H. Johnston. Native at both stations.

Rumex crispus, *Linn.*, *var.* trigranulatus, *Syme.*—Shingle at the seashore, Hangaback, Gyre, Orphir, Mainland, 11th August 1879, H. H. Johnston. Native.

Salix caprea, *Linn.*—Banks at burnside, Berriedale, Hoy, 15th May 1884, H. H. Johnston; and cliffs at the seashore, Pegal Bay, Waas, Hoy, 16th June 1884, H. H. Johnston. Native at both stations. See "Scot. Nat.," No. i., new series, July 1883, p. 22.

Salix Myrsinites, *Linn.*, *var.* procumbens.—Very rare on crags on hillside, Glen of Gair, Wart Hill, Hoy, 4th July 1883, H. H. Johnston. Native. The cultivated specimens of this variety in the "Set of British Willows," Fasc. i., No. 23, issued by Messrs. E. F. Linton and W. R. Linton, in 1894, were originally gathered at the above mentioned station, by Mr. W. R. Linton, in my company, on 10th August 1886.

## Class II.—MONOCOTYLEDONS.

Orchis mascula, *Linn.*—Cliffs at the seashore, Hellia, Hoy, 20th June 1883, H. H. Johnston. Native. See "Scot. Nat.," No. i., new series, July 1883, p. 25; and "Scot. Nat.," No. xiii., new series, July 1886, p. 312.

Orchis incarnata, *Linn.*—Pasture, Bay of Islands, Loch of Harray, Stenness, Mainland, 26th June 1883, H. H. Johnston. Native.

Listera ovata, *Brown.*—Meadow, near the Established Church Manse, Harray, Mainland, 26th July 1883, H. H. Johnston. Native. See "Scot. Nat.," No. i., new series, July 1883, p. 26; and "Scot. Nat.," No. xiii., new series, July 1886, p. 312.

*Anacharis Alsinastrum, *Bab.*—Stagnant water in an old quarry, near Inganess Cottage, Saint Ola, Mainland, 5th May 1884, H. H. Johnston. Naturalised. Probably accidentally introduced into Orkney by Mr. William Cowan, who informed me that he brought plants of this species, in a tank, to Inganess Cottage, in 1869.

Ruppia spiralis, *Hartm.*—Mud at bottom of brackish water, Bridge of Brogar, Loch of Harray and Loch of Stenness, Mainland, 13th August 1880 and 24th September 1880, H. H. Johnston. Native. Removes the ? after "111 Orkney?" in Watson, "Top. Bot.," ed. ii., p. 423. See "Bot. Exch. Club Report," 1880, p. 41; and "Scot. Nat.," No. i., new series, 1883, p. 25.

RUPPIA ROSTELLATA, *Koch*, *var.* NANA, *Boswell.*—Mud uncovered by the sea at low water, Oyce, Firth, Mainland, 21st August 1880 and 15th September 1880, H. H. Johnston. Native. See "Bot. Exch. Club Reports," 1880, p. 36; and 1886, p. 160; and "Scot. Nat.," No. i., new series, July 1883, p. 25.

ZANNICHELLIA POLYCARPA, *Nolte*, *var.* TENUISSIMA, *Fries.*—Mud at bottom of water, Loch of Kirbister, Orphir, Mainland, 9th August 1878 and 30th August 1880, H. H. Johnston; and mill dam, Gyre, Orphir, Mainland, 15th July 1886, H. H. Johnston, and 6th August 1886, William R. Linton. Native at both stations. See "Bot. Exch. Club Reports," 1872-74, p. 40; 1875, pp. 27 and 28; 1876, p. 35; and 1880, p. 36; and "Scot. Nat.," No. i., new series, July 1883, p. 25.

SCIRPUS PAUCIFLORUS, *Lightf.*—Marsh, Hoy, 20th August 1885, H. H. Johnston. Native. Removes the ? after "111 Orkney?" in Watson, "Top. Bot," ed. ii., p. 445. See "Guide to the Orkney Islands," by the Rev. Charles Clouston, 1862, p. 52; "Scot. Nat.," No. ii., new series, October 1883. p. 72; and "Scot, Nat.," No. xiii., new series, July 1886, p. 314.

CAREX INCURVA, *Lightf.*—Links at the seashore, Cata Sand, Lady, Sanday, 9th July 1883, H. H. Johnston, and links near the sea, Links of Boardhouse, Birsay, Mainland, 27th July 1883, H. H. Johnston. Native at both stations. See "Scot. Nat.," No. ii., new series, October 1883, p. 73; and "Scot. Nat.," No. xiii., new series, July 1886, p. 315.

CAREX FLAVA, *Linn.*, *var.* MINOR, *Townsend* (*fide* F. Townsend). —Marsh, near North Dam, Hoy, 9th August 1886, H. H. Johnston. Native.

CAREX FULVA, *Good.*, *var.* STERILIS.—Marsh, Piggar, Swanbister, Orphir, Mainland, 1st September 1883, W. A. Irvine Fortescue, and 5th August 1885, H. H. Johnston; marsh, near South Dam, Hoy, 20th August 1885, H. H. Johnston; and marsh, near North Dam, Hoy, 9th August 1886, H. H. Johnston. Native at all these stations. See "Bot. Exch. Club Reports," 1876, p. 37; and 1885, p. 139; "Journ. Bot.," 1876, p. 371; "Scot. Nat.," No. ii., new series, October 1883, p. 73; "Trans. Bot. Soc. Edin.," vol. xvii., 1886, p. 134; and "Gardeners' Chronicle," vol. xxvi., new series, 1886, p. 793.

PHLEUM PRATENSE, *Linn.*—Edge of cornfield, Bu, Hoy, 5th July 1877, H. H. Johnston. Native. Removes "111 Orkney" from the "supposed errors" in Watson, "Top. Bot.," ed. ii., p. 473. See "Scot. Nat.," No. ii., new series, October 1883, p. 74.

# THE GENUS *RUBUS* IN THE SUPPLEMENT TO THE THIRD EDITION OF "ENGLISH BOTANY."

By Edward F. Linton, M.A.

Having been interested in Mr. G. C. Druce's articles in the "Annals" on the three published parts of the Supplement to "English Botany," and learning from him that he did not propose to continue through the genus *Rubus*, I offer some observations on this portion of the work.

The acknowledged difficulty of the genus, the mass of accumulated and often contradictory determinations in its more recent study, and the many confusions and alterations of nomenclature that have occurred, called for a botanist to undertake the task who was somewhat familiar with the transitional period, and fairly acquainted with the genus in the herbarium, if not in the field. Mr. N. E. Brown, unfortunately, has none of these qualifications. He begins by saying, "Concerning the members of this very difficult genus, I express no opinion, as I have never made any attempt whatever to study them. I have therefore merely collected together the recorded notes concerning all names that are not given in volume iii. of this work, and adopted Professor Babington's and Mr. Baker's views as to the position of the various forms enumerated," etc. After this, it is not surprising to find that existing confusions are rather augmented than cleared up. The work is weighted with the quotation of numerous notes which are of no permanent value; transient opinions of critics are accepted as if they were final; and a great deal of very useful synonymy on which great care has been bestowed is in consequence in danger of depreciation.

*R. idæus*, L. var., *inermis*, Pryor.—Of this Mr. Brown says there is no description. It was scarcely worth mentioning under these circumstances.

*R. Leesii*, Bab.—If this were a species, it should be named *R. obtusifolius*, Willd. (1811), the oldest name, on Mr. Brown's own showing; but if it be a variety, and it has no

sort of claim to specific rank, then *R. idæus*, L., var. *anomalus*, Arrh., is the right designation.

*R. nessensis*, Hall.—This name is resuscitated to replace *R. suberectus*, Anders., in spite of what Professor Babington wrote ("Brit. Rubi," p. 51). Hall's description is there quoted to show its inadequacy; in the absence of specimens to illustrate it one cannot be sure whether *R. suberectus* or *R. fissus* was intended; and consequently this is by no means a case for dropping a generally accepted name in favour of a supposed prior one.

*R. ammobius*, Focke?—It is a pity that half a page should have been wasted over a species which has no claim even yet to be considered British. Professor Babington's hesitating remarks should have shown how very uncertain the identification was. The description quoted might have been of some value if it were a translation of Dr. Focke's. We are not told whether it is so; but it seems to be a description of the plant of the island in the River Tay, near Perth, which was thought to be *ammobius*, and which Mr. Rogers now tells me is *R. Rogersii*, Linton.

*R. affinis*, W. and N.—No mention is made, as might have been expected, of the general mistake in the past as to the identity of this bramble. Up to the year 1886, if not later, the plant most commonly issued as *R. affinis* was the plant now recognised as *R. villicaulis*, Koehl., var. *Selmeri* (Lindeb.), which after that date was sometimes spoken of as "our North Country *affinis*." All previous records of *R. affinis* need to be verified.

"*R. Bakeri*, Lees."—If this prove to be a species, it should stand "*R. Bakeri*, F. A. Lees," its author not being the same as the author of *R. longithyrsiger*. But it is desirable that further material should be gathered for study. Accompanying the only authentic sheets I have seen of "*R. Bakeri*" were some notes from which it appeared that Professor Babington had suspected a mixture of specimens. The same idea occurred to me independently, from an examination of the specimens. A Barnes Common plant is referred to as probably identical with the Yorks plant; but this suggestion is founded only on Professor Babington's surmise that it was

"probably *hamulosus*"; and Mr. N. E. Brown makes "*R. Bakeri*, Lees," synonymous with *R. nitidus*, var. *hamulosus*, Bab.

*R. Maassii*, Focke.—It is a pity that this name and *R. Muenteri*, Marss., which follows next, should have received any further circulation by the "E. B." Supplement. These two names represent slightly differing forms of the bramble which has been most familiar to us under the name of *R. umbrosus;* and that again is scarcely separable by any constant characters from *R. pulcherrimus*, Neum. (= *R. polyanthemus*, Lindeb.).

*R. amphichloros*, P. J. Mueller, was a name given by Dr. Focke to a Derbyshire form, and soon withdrawn by him.

*R. ramosus*, Bloxam.—The Devon plant was described by Briggs, not Bloxam, and is *R. ramosus*, Briggs. The Warwick plant, which was confused with it by Rev. A. Bloxam, has more recently been described as a species by Mr. J. E. Bagnall under the name *R. mercicus* ("Journ. Bot.," 1892, p. 372).

*R. ulmifolius*, Schott.—Dr. Focke does not appear to retain this name ("Journ. Bot.," 1890, pp. 129, 130), acknowledging that it may have been used in a more aggregate sense. *R. fruticosus*, L., might be taken as the oldest aggregate name, but for sake of precision *R. rusticanus*, Merc., will no doubt continue to be preferred.

*R. leucostachys*, Schleicher, var. *macrothyrsus*, N. E. Brown.—We have issued this Carnarvonshire plant in our set of British Rubi under this name, as a very glandular form of the *R. leucostachys* aggregate. If it is, as the Rev. W. M. Rogers thinks, an extreme form of *R. macrothyrsos*, Lange, it will be known by the older name *R. gymnostachys*, Genev., which Mr. Rogers places as a var. under *R. leucostachys*.

*R. leucostachys*, var. *Borœanus*, N. E. Brown.—Comprehensive an aggregate as *R. leucostachys*, Schleich., may be, it is stretching a point to place *R. Borœanus*, Genev., under it as a variety. Mr. Rogers has well remarked of it, "When dry, looking a good deal like *R. leucostachys*, though differing

from it considerably in the nearly unarmed panicle with few suberect lower branches, as well as in the armature and clothing of the stem" ("Journ. Bot.," 1892). No one seeing the plant growing, especially as the season advances, would connect it so closely with *leucostachys*.

The "species" mentioned next in the Supplement, as *R. Grabowskii*, Bab., not of Weihe, drops out of the list, until the plant or plants which have been so referred can be studied afresh.

*R. septorum*, P. J. Müller, which follows next, was the name given provisionally to a Derbyshire plant which, being shade-grown, proved rather puzzling. This, when *R. durescens*, W. R. Linton, had been described, I referred to that species and my naming was accepted by the Rev. W. R. Linton.

*R. Salteri*, Bab., and var. *calvatus* (Lees).—The notes on these illustrate the impossibility of any one who has not made a careful study of the brambles succeeding in solving their perplexities. There is no doubt confusion among the specimens that have been distributed, as Mr. N. E. Brown remarks. The naming of specimens sent in to a club is often revised afterwards, either by the same or another critic. With regard to *calvatus*, some confusion was initiated by Bloxam himself, the reputed describer of it, through his accepting what we now know as *R. Selmeri*, Lindeb., from the South of England as his *calvatus*. *R. gratus*, Focke, has also been referred to *calvatus*, before it was recognised as a British species; but both these differ considerably in the fresh state from the Midland plant to which the name *calvatus* belongs by right. *R. Salteri*, Bab., will be found far removed from all these in the new "London Catalogue" list, falling into a different group.

*R. podophyllus*, P. J. Müll.—The range of this plant is now extended to nine vice-counties, and being a North Midland rather than a Southern form, it should be looked for in the South of Scotland.

*R. villicaulis*, Koehler, var. *adscitus*, Bab.—*R. adscitus*, Genev., was so placed at a time when *R. villicaulis*, Koehl., was generally misunderstood in this country. It is now moved some way down the list, and regains an independent

position, and the older name, *R. micans*, Gren. and Godr., is adopted for it.

*R. villicaulis* itself proves to be very rare with us, if, indeed, we have the type (see "Journ. Bot.," 1895, p. 49), being only recorded for three vice-counties, East Ross and West Sutherland in Scotland, and S. Devon in England. The most widely distributed form of the aggregate species is *R. Selmeri*, Lindeb., which is recorded for 46 vice-counties.

*R. gratus*, Focke, placed by Professor Babington under *R. villicaulis*, and so quoted in the Supplement, is believed by Dr. Focke to be one of the original species in the genus, on account of its perfect pollen-grains, an exceptional character among the Rubi. It has recently been recorded for the Hebrides, the only vice-county north of the border.

*R. pyramidalis*, Kalt.—A much commoner plant than the localities given in the Supplement would suggest. It was, previously to the year 1886, constantly sent out and recorded as *R. villicaulis*, Koehl., an error which necessitated a fresh working-out of the distribution. It is now recorded for thirty-four vice-counties, Inverness (East and West) and West Ross being the only three at present in Scotland.

"Var. *Drejeri*, Bab."—The plant here intended was referred to *R. Drejeri*, Jensen, in error, and has recently been named *R. Leyanus* by the Rev. W. M. Rogers. The name *R. Purchasii*, Bloxam, given as a synomyn by Mr. N. E. Brown, cannot be adopted, since *R. Purchasii* proves to be a Midland form of *R. mucronatus*, Blox.

*R. rubicolor*, Blox.—There is some doubt what this plant is. It disappears from the list for the present. Mr. N. E. Brown gives two localities: Mancetter, Warwickshire; and Howle Hill, near Ross, Herefordshire. As an illustration of the difficulty of clearing up an obscure bramble by book-work without specimens, or even *with* specimens and without adequate acquaintance with them, I may mention that of my four sheets of the Howle Hill gatherings of this plant, one is *R. plicatus*, W. and N.! A second was considered by Dr. Focke to be a shade form of *R. gratus*, Focke. The other two sheets appear to be the same as the last, and, if so, throw much doubt on Dr. Focke's conjecture.

*R. thyrsiflorus*, W. and N.—Though stated by Mr. N. E. Brown to be recorded from half a dozen localities, this is not yet known to be a British bramble. Mr. Moyle Rogers tells me that his Moreton Hampstead (Devon) plant, which is one of the localities quoted, is *R. pallidus*, W. and N.; and also that in the Genevier Herbarium at Cambridge the Ingleby (Yorks) plant and the Rumple (Devon) plant, both of them stations that Mr. Brown, following Professor Babington, relies on for *thyrsiflorus*, are certainly different both from the Moreton Hampstead plant and from one another. This testimony quite upsets the evidence adduced. The Suffolk variety, named *philyrophyllus* by Professor Babington, is apparently a *dumetorum* form!

*R. chlorothyrsos*, Focke.—There is no ground for supposing that we have this in Britain.

*R. echinatus*, Lindl.—Mr. N. E. Brown gives *R. Questierii*, Lefv. and Muell., as a synonym with a ?, on Professor Babington's authority, and then expresses a doubt whether *R. echinatus* is the true *R. Questierii*, Lefv. and Muell. For this doubt there is much ground. *R. Questierii*, Lefv. and Muell., has been recently identified for us by Dr. Focke with a bramble which is much more likely to be mistaken for *R. erythrinus*, Genev., being but slightly more glandular than that eglandular species.

*R. rudis*, W. and N.—By some mishap Mousehold Heath, Norwich, has been given as a locality, "*teste* Focke." Professor Babington saw the Norwich bramble again and again, and did name it *R. rudis*, W. and N.; but Dr. Focke named it *R. radula*, and *R. radula*, var.; and the plant in question is *R. radula*, W. and N., var. *echinatoides*, Rogers.

*R. Loehri*, Wirtg.—Dr. Focke has withdrawn from the position that our Herefordshire and Gloucester plant is *R. Loehri*. We are calling the plant *R. sertiflorus*, P. J. Muell., for the present, placing it under *R. radula;* though there is still some uncertainty both as to its place and name.

*R. radula*, Weihe.—The Rev. W. M. Rogers considers var. *Leightonii*, Lees, "hardly separable, even as a var.," from *R. radula;* and transfers var. *Bloxamianus*, Colem., to *R.*

*oigoclados*, Muell. and Lefv. (as a variety). *R. Newbouldii*, Bab., is also reduced to a var. under *R. oigoclados*, and is recorded for one Scottish county (Fife, with Kinross) besides six English, and County Dublin.

*R. Koehleri*, W. and N., var. *egregius*, Bab., and var. *Schlickumi*, Bab.—The comments on these two varieties are foggy in the extreme. *R. egregius*, Focke, and *R. Schlickumi*, Wirtg., belong to the *Egregii*. They are, in the Supplement, reduced to vars. of *R. Kochleri !* but as neither of them is yet known for Britain, it is needless to waste further words on their treatment there.

*R. Koehleri*, W. and N., var. *pallidus*, Bab.—This is now recognised as a distinct variety, and is not a shade-grown state of the type. *R. cavatifolius*, P. J. Mueller, which was reduced to a variety of *R. Koehleri* by Professor Babington, is now reinstated as a species, and placed among the *Radulæ*.

*R. melanodermis*, Focke.—This marked species, discovered in Dorset by the Rev. W. M. Rogers, was identified by Professor Babington with *R. melanoxylon*, Muell. and Wirtg. ("Journ. Bot.," 1887, p. 21). Mr. N. E. Brown rightly rejects this identification, but quotes as a description of *R. melanodermis* that given by Professor Babington, which is apparently a description of *R. melanoxylon !* The Derbyshire plant referred to is of course quite different from *R. melanodermis*, and has since been identified (by the Rev. W. H. Purchas) as a setose form of *R. calvatus*, Blox.

*R. fusco-ater*, W. and N.?—As a matter of fact, we had no claim to this species as British when the Supplement was published. It has since been found in Surrey and Derbyshire, and named by Dr. Focke.

*R. Briggsii*, Blox.—This and *R. Bagnalli*, Blox., were placed by the Rev. W. M. Rogers as separable varieties under *R. oigoclados*, Muell. and Lefv., in 1893, but withdrawn altogether a year later as being probably extinct, each of them in its one county, and appearing to be "only anomalous forms." The reference to a Norfolk plant of mine (as "*emersistylus*" = *Briggsii*) is an error.

*R. mutabilis*, Genev.—A description by Professor Babington is given, but without date or reference; the date would be important, as the Professor's views underwent considerable change (see *e.g.* "Journ. Bot.," 1886, p. 232). Four localities are given by Mr. Brown from four different counties. The "Cleves, Yorks," plant was named by Genevier himself; the Plymouth plant was also named by Genevier, but as var. *nemorosus*. The other two have no standing (Hants, Staffs). It is enough to turn to Mr. Brown's first reference to the "Botanical Exchange Club Report" (1883, p. 87) to see that, in the case of the Ham Moor, Staffordshire, plant, the evidence was *nil!* the specimens poor, and the opinions expressed conflicting; whilst the Ramsey (Hants) plant was named *R. mutabilis* with confidence by Professor Babington, *before* he had rectified his idea of Genevier's plant. When fresh material was sent to the Botanical Exchange Club (see Report, 1887, p. 175), Mr. Archer Briggs, who knew the Devon form well, declined to name it *mutabilis*.

*R. Lejeunii*, W. and N., var. *festivus*, Bab.—For this German bramble Dr. Focke may be considered a safer guide than Genevier's Herbarium, on which Professor Babington (as quoted by Mr. Brown) relied. Dr. Focke holds that *R. Lejeunii*, W. and N., and *R. cricetorum*, Lefvr., are closely allied forms, and that we have the latter form, but no precise *R. Lejeunii*. It must, however, be borne in mind that the confusing paragraph in the Supplement has nothing to do with *R. Lejeunii*, W. and N., but with a form or forms which had been mistaken for *R. Lejeunii*. The *R. Fuckelii*, Wirtg., referred to is regarded by Dr. Focke as a form nearly allied to *R. obscurus*. *R. foliosus* and *R. adornatus* will be commented on in the notes following.

*R. flexuosus*, Muell. and Lefv.—Dr. Focke has convinced us that *R. flexuosus*, Muell. and Lefv. (*R. saltuum*, Focke), is a synonym of *R. foliosus*, W. and N., the older name.

*R. tereticaulis*, P. J. Mueller.—Mr. Moyle Rogers' notes ("Journ. Bot.," 1893, p. 7) will have sufficiently shown the distinctness of this species from *R. flexuosus*, of which Mr. Brown surmises it may be "merely a slight form."

*R. saxicolus*, P. J. Mueller (*R. humifusus*, Bab.).—This has been confused in the past with both *R. pallidus*, Bab., and *R. pallidus*, W. and N.; and we are not certain to this day that the form which remained as a residuary legatee of the name is rightly identified with Mueller's plant.

*R. foliosus*, W. and N., var. *adornatus*, Bab.—This is the plant which Professor Babington is quoted (under *R. Lejeunii*) by Mr. Brown as uniting with *his R. Lejeunii* and *festivus* and with *R. Fuckelii*, Wirtg. (p. 112). As in the case of *R. Lejeunii*, so here, it must be borne in mind that the name *R. foliosus*, W. and N., has for some decades been misapplied. *R. foliosus*, W. and N., is what we have known as *R. flexuosus*, Muell. and Lefv.; and *R. Guentheri*, Bab., *R. foliosus*, Blox., Bab., etc., is *R. adornatus*, P. J. Muell., and *R. atrorubens*, Wirtg., var. *aculeatissimus;* also *R. exsecatus*, Mueller and Wirtg. Our British form is more strongly armed than type *adornatus*, but otherwise there is little difference; and therefore it stands in our list under this name.

*R. pendulinus*, P. J. Mueller.—Mr. Rogers tells me that this rested for Britain on three gatherings which are represented in the Cambridge Herbarium, viz.: from near Haslemere, Surrey; Mousehold Heath, Norwich; and Polstead, Suffolk. The Suffolk plant seemed to Mr. Rogers different from the other two, and more like a form of *R. foliosus;* the Mousehold Heath plant can be no other than one that I regard as the open heath form of *R. tereticaulis*, P. J. Muell., an opinion to which Mr. Rogers has assented. Under these circumstances *R. pendulinus* drops out of the list till further evidence can be found of its occurrence in Britain.

*R. Reuteri*, Merc.—The plant referred to under this name was "*R. Reuteri*, Merc.," *fide* Professor Babington ("Bot. Exch. Club Rept., 1882-87, *passim*); *R. rubicundus*, Wirtg. (ditto. 1888-89); *R. obscurus*, Kalt. (ditto. 1889? 1890)—both Professor Babington and Dr. Focke at that date giving this name to it. In 1894 Dr. Focke saw the plant growing, and revoked his former naming; and this year it reappears ("Journ. Bot.," 1895, p. 102) as *R. rosaceus*, W. and N., nov. var. *Purchasianus*, Rogers. It is given by Mr. Rogers (*l.c.*) for Kincardine and South Aberdeen, and six English vice-counties.

*R. corylifolius*, Sm., var. *conjugens* (*sic*), Bab.—I do not know why Mr. Brown repeatedly gives this spelling of the varietal name, unless there is some fascinating printer's error in the original description. I have not access to the third edition of Babington's Manual, but in the eighth edition, and in "British Rubi," the author spells the word in the usual way. A year or more ago Mr. O. Gelert identified specimens I sent him of var. *conjungens*, Bab., as *R. cyclophyllus*, Lindeb., an older name: an identification foreseen as probable by Professor Babington ("Journ. Bot.," 1895, p. 105). Known for seven Scottish vice-counties, viz. 74, 76, 86, 89, 91, 92, 100.

*R. deltoideus*, P. J. Mueller.—Dr. Focke regards this name as belonging to "a hybrid, *R. cæsius* × *tomentosus*, which we cannot expect to find in Britain, where *R. tomentosus* is unknown" (W. M. Rogers in "Journ. Bot.," 1893, p. 42). Certainly some of the miscellaneous British plants which have been placed here look like Corylifolian hybrids; and, on this ground, the name disappears from the list in the "London Catalogue," ed. 9.

*R. scabrosus*, P. J. Muell.—Hybridity is rampant in this group. Mr. Rogers has restored the name *R. tuberculatus*, Bab., in place of *R. scabrosus*, which Dr. Focke thinks is probably *R. cæsius* × *radula*, and which is therefore omitted from the revised British list.

*R. cæsius*, Linn., var. *pseudo-idæus*, Weihe.—The observation on this plant is limited to three lines only beyond the references, but contains the following curiously inapt quotation of a remark by Professor Babington: "Also a very doubtful plant. Ours cannot be a hybrid, as we have not both the supposed parents." After much pondering, I can see no solution to this enigma, unless the quotation has got misplaced. The plant as I have found it is perfectly barren, and combines the characters of *R. idæus* and *R. cæsius* admirably. As an obvious hybrid between these two parents, Mr. Rogers has omitted it, with the rest of the *Rubus* hybrids, from the "London Catalogue" list.

Following still the order in the Supplement to "English Botany," I take the following from the "Doubtful Species," as they come, at the close of the genus:—

*R. fuscus*, W. and N.—A widely spread bramble, from Yorks and Derbyshire southward, showing great variation in Herefordshire and Monmouth; also in Ireland. For description, see "Journ. Bot.," 1892, p. 303.

*R. Lecoqui*, Genev., and *R. muricatus*, Boul. et Gil., are not known for Britain.

*R. opacus*, Focke.—Dr. Focke originally considered *R. opacus* a hybrid between *R. affinis* and *R. plicatus*, but I believe now recognises it as a distinct species which the supposed hybrid much resembles. We do not regard British *R. opacus* as a hybrid, and it has all along been named or accepted by Dr. Focke as his species.

*R. oreogeton*, Focke, was a name suggested tentatively for the Derbyshire plant which has recently been described as *R. dumetorum*, W. and N., var. *rubriflorus*, Purchas.

*R. virescens*, G. Braun, var. *glandulosa*.—There are two forms on Beacon Hill, Monmouth, which Dr. Focke first named "*R. Myricæ*, Focke, var. *glanduligera*," and "*R. Myricæ*, var. *virescens*, Braun, *glanduligera*"; the two are nearly allied, but not identical. In the summer of 1894 Dr. Focke saw the plants growing, and withdrew his previous determination. This name consequently disappears.

*R. viridis*, Kalt., is a recognised British plant, with a distribution through eleven English vice-counties, from Leicester and Radnor southwards; also in Ireland.

The production of this paper has been withheld for some time because many questions of interest have been receiving a solution, through the labours of the Rev. W. Moyle Rogers and others, during the past eighteen months. In its preparation I have gained much from discussion with Mr. Rogers, who has also made some useful suggestions in reading through the MS. It is perhaps needless to say that what I have written should be read with Mr. N. E. Brown's Supplement to "E. B.," part ii., at hand; without which precaution many of my remarks may seem incoherent, if not unintelligible.

# ZOOLOGICAL NOTES.

**Prices paid for "Vermin" in Mull in 1825.**—The following list of prices paid for "Vermin" on the estates of Torosay and Lochbuie, in the Island of Mull, in the year 1825, taken from documents in my possession, may be of interest to the readers of the "Annals":—An Eagle, 10s. 6d.; Corbey or Glade, 1s. 6d.; Hawk, 6d.; Hooded Crow and Owl, 3d.; Magpie and Jay, 2d.; Kingfisher [Dipper?], 3d.; Fox, Marten Cat, and Wild Cat, 5s.; Badger, 2s. 6d.; Polecat, 1s. 6d.; House Cat (at large), Stoat, and Weasel, 6d.; Hedgehog, 3d.; a Crow's Nest with the birds (not less than three), 6d.—Maclaine of Lochbuie, Lochbuie, Mull.

**The White Wagtail and Yellow Wagtail in the Clyde Area.**—On the 14th of April of this year, on the Clyde at Farme, a few miles east of Glasgow, I saw several White Wagtails (*Motacilla alba*, Linn.). On the 18th I again saw several birds, and on the 20th, accompanied by Mr. John Robertson, Thornliebank, I saw between Eastfield and Dalbeth on the Clyde, a distance of less than a mile, a dozen kinds of this species. For two miles above Dalbeth no more were seen, but the Pied Wagtail was not infrequent. Mr. Robertson went over the ground on the 30th April and saw four White Wagtails. Since that date I have been on this part of the Clyde several times but have seen nothing of this species. Attention being directed to this matter, we found solitary examples of the White Wagtail at Roseneath, Dumbartonshire, and at Balgray Dam and Hangingshaw, in East Renfrewshire, during April.

The entire absence of any mention of the Yellow Wagtail (*Motacilla raii* (Bonaparte) in the reports on the movement and occurrence of birds in Scotland published in the "Annals" in recent years, together with the remark in a footnote on p. 67 of Mr. Harvie-Brown's "Vertebrate Fauna of Argyll" that "it is certainly a scarce species even where most abundant in Scotland," calls for some notice as to the status of the Yellow Wagtail in the Glasgow district. Credence will no doubt be readily given to anything that Mr. Harvie-Brown says regarding the distribution of birds in Scotland, but the assertion above quoted is totally inaccurate for the ten mile radius around Glasgow. Gray may have understated the case for the Yellow Wagtail in his "Birds of the West of Scotland," but in the Notes on the Fauna and Flora of the same district (Blackie and Son, Glasgow, 1876) he states, p. xi.: "Ray's Wagtail is abundant on the banks of the Clyde on its arrival, and a pair may be seen nesting in almost every park enclosure, even if surrounded by houses or streets." I have observed the colony on the banks of the Clyde on its arrival for many years past. But many remain there during summer. This year on the 14th April they began to put in an appearance.

On the 20th I counted ten, on the 7th May fifteen, on the 22nd eleven. Within the limits named it invariably finds a place in the lists of birds noted in our excursions, but beyond these limits I have almost entirely failed to find it. In my lists of birds seen in the Upper Ward of Lanarkshire, in Ayrshire, Wigtownshire, Kircudbrightshire, Bute, and Arran, it meantime finds no place. Much more extensive experience has no doubt led Mr. Harvie-Brown to the opinion he expresses, but a little acquaintance with the surroundings of Glasgow would make him modify his views. The Yellow Wagtail is well known even within the city boundary, and never fails to turn up in the third week in April about our disused clay workings, where it remains during summer.—JOHN PATERSON, Glasgow.

**The Garden Warbler in the Clyde Area.**—Attention has been called through the press in Glasgow to the occurrence of quite a number of pairs of the Garden Warbler (*Sylvia hortensis*) in a wood near Hamilton. As there is room for additional information regarding the distribution of this species in Scotland, the following may not be without interest. In Gray's "Birds of the West of Scotland" there is only one locality specified where it had been observed, and as there is nothing unusual in the circumstance of its occurrence at Inverkip to justify the special notice, it leaves the reader in doubt as to the value to attach to the general statement in the preceding paragraph regarding its occurrence "in the sheltered and wooded districts of the southern and midland counties." At Inverkip (West Renfrewshire) it was observed by Gray's friend Mr. William Sinclair. Proceeding up the river from this point, I have been informed by Mr. Morris Young of its occurrence as a familiar breeding species around Paisley (particularly observed in recent years). In East Renfrewshire it has been observed this spring in Cathcart and Mearns parishes. Twenty years since it was recorded as breeding in the Botanic Gardens, Glasgow. Then I have the information communicated by Mr. James S. Dixon, Fairleigh, Bothwell, to the "Glasgow Herald," under date 29th May 1895, that in many years' experience he has seldom seen or heard it in the neighbourhood, whereas "at present at least half a dozen pairs are nesting in a wood formerly much frequented by the chiff-chaff and wood-wren, this season, till now, conspicuous by their absence." Through Mr. Dixon's courtesy, I have had an opportunity of visiting the wood to which he refers, and I can confirm his observation as to their frequency there. Following up this matter, I went on the 8th of June with Mr. John Robertson, Thornliebank, to Cleghorn Woods and Cartland Crags, on the Mouse Water, near Lanark, where we found half a dozen Garden Warblers in song, and on crossing the bridge below Telford's we heard another in an orchard. On the afternoon of the same day, between the loop at the Falls and Corra Linn, we heard three others. In Cleghorn Woods and at the Falls

the birds chiefly frequented the neighbourhood of dense thickets of blackthorn. On the 15th of June we visited the Fiddler Burn, like the Mouse a tributary of the Clyde on its right bank, three miles below Lanark. We searched the precipitous and thickly clad sides of the gill of the Fiddler Burn without result, but on the haugh land between the end of the gill and the Clyde it occurred twice. It is apparently fairly distributed in suitable localities along the line of the river at least.—JOHN PATERSON, Glasgow.

**The Chiff-chaff in Arran.**—On the 22nd of April last I heard a Chiff-chaff (*Phylloscopus rufus*) calling in the woods close to Brodick Castle, Arran; and on the following day two others were detected to the west of the keeper's house. During the next ten days their notes were frequently heard, and the birds themselves occasionally seen, in each of the three localities, so that several pairs, it would appear, come annually to nest in the Castle grounds. When Mr. R. Gray drew up his "Catalogue of the Birds of Arran" in 1872, he was unable to include the Chiff-chaff, although he had no doubt it was to be found in the island.—WILLIAM EVANS, Edinburgh.

**Nesting of the Great Spotted Woodpecker in Berwickshire.**—Readers of the "Annals" may remember that in the number for July 1894 Dr. Stuart of Chirnside recorded the nesting of the Great Spotted Woodpecker (*Dendrocopus major*) in Duns Castle woods, Berwickshire, last year; and they will, I am sure, be pleased to know that the birds have again reared a brood in the same spot. During the spring of the present year Mr. J. Ferguson, Duns, factor on the estate, observed that a fresh hole had been made in the old ash containing last year's nest, but two or three feet lower down, and he rightly conjectured that the birds were in occupation. On the 29th May, on Mr. Ferguson's invitation and under his kindly guidance, I had the pleasure of seeing the birds carrying food to their young, whose chirps we could distinctly hear. In view of the interest which both the proprietor and his factor take in the birds, and the measures they have adopted to prevent them being disturbed, we may assume that Duns Castle woods are likely to be a haunt of these Woodpeckers for many years to come, and a centre for the re-establishment of the species not only in Berwickshire but in other parts of Scotland as well; and it is to be hoped that other proprietors in whose woods they may appear will also take steps to secure their protection. This note ought to have been furnished by Mr. Ferguson, but he has been particularly busy of late, and has asked me to send it.—WILLIAM EVANS, Edinburgh.

**Snowy Owl in Shetland.**—On the 17th of May last a large Snowy Owl (*Surnia nyctea*) settled in a field at Dunrossness, and was soon the centre of attraction for a flock of Gulls, which seemed determined to make the stranger "move on." It was shortly after-

wards shot, and proved to be an adult bird, very white, with a few small dark markings on the wings and head. The date we believe to be late for a visit of this fine bird.—R. and T. Henderson, Dunrossness. [A Snowy Owl visited the island of Rousay, Orkney, on the 10th of April last.—Eds.]

**The Bean and Pink-footed Geese as Scottish Birds.**—We observe with surprise and regret that in the new fourth edition of Morris' "British Game Birds and Wild Fowl," which has been "entirely revised and brought up to date" by Mr. W. B. Tegetmeier, F.Z.S., the old statements are reproduced regarding the breeding of both the Bean and Pink-Footed Geese (*Anser segetum* and *brachyrhynchus*) in Scotland. In the present advanced state of our knowledge of the British avifauna, the repetition of such entirely erroneous and misleading statements is greatly to be deplored. It is quite needless to state that neither species has ever been detected breeding within the British area.

**The Stock Dove nesting in Peeblesshire.**—The fact may be worth recording that we have now the Stock Dove (*Columba œnas*) as a breeding species in the north-west of this county. On the 6th of May last I had the pleasure of examining two nests in the policies of Lamancha House. The first nest seen was in a spruce about eight feet from the ground, and contained two eggs much incubated. It was close to the trunk of the tree, but was otherwise quite open, and seemed to be merely an old flattened nest of the blackbird, which did not appear to have been added to in any way by the new occupant. The other nest was a normal one in the hollow of an old stump, and in it were two half-grown young birds. The gamekeeper and gardener at Lamancha state that the birds were first heard at that place about two years ago.—T. G. Laidlaw, Edinburgh.

**Remains of the Great Auk in the Edinburgh Museum.**—The recent acquisition of a stuffed specimen of the Great Auk by the Natural History Department of the Edinburgh Museum of Science and Art seems to afford a fitting opportunity for laying an enumeration of the series of relics of this extinct bird now in the Museum before the readers of the "Annals of Scottish Natural History."

Eggs.—Two exceedingly fine examples noticed by Feilden in the "Ibis" for 1869, p. 358, and figured by Symington Grieve in his work "The Great Auk" (London, 1885). These eggs were contained in the "Dufresne" collection of natural history specimens purchased by the University in 1819. When the University Natural History Museum was transferred to the Government in 1855, the Great Auk eggs became national property along with the rest of the collections.

Detached Bones.—A cranium, a sternum, several vertebræ and ribs, also several limb bones. These bones are from the collection made by Professor Milne in 1874 at Funk Island, and were purchased in 1876 from Mr. Edward Gerrard for £1 : 5s.

Detached Bones (Scottish).—One entire humerus with fragments of three others, one entire coracoid and a fragment of another, a portion of a tibia, and one vertebra, discovered in a shell mound or "kitchen midden" in the Island of Oronsay by Mr. Symington Grieve in 1881, and figured by him in the "Journ. Linn. Soc. Zoology," vol. xvi. pl. 9. These specimens, presented to the Museum by Mr. Grieve, are exhibited in the British Collection.

Skeleton.—An entire skeleton formed of bones brought by Mr. Lucas from Funk Island, and purchased in 1888 from Mr. E. Gerrard for £150.

Skin.—A very fine stuffed specimen in full summer plumage, purchased from Sir F. Milner in April 1895 for £350. This specimen, in excellent condition and beautifully mounted, having been recently re-stuffed by Cullingford of Durham, was purchased by the late Sir W. Milner from a bird-stuffer in York of the name of Graham, by whom its locality was given as Orkney; it is, however, generally believed to have come from Eldey, Iceland. For some years it was exhibited on loan in the Leeds Museum.

Mr. Tegetmeier, in the "Field" for 27th April, recalls the fact that in 1870 a skin was offered to the Edinburgh Museum for £100, but declined. This occurred several years before I came to the Museum, but on looking into the matter I find that the feet of this specimen were wanting, a circumstance which no doubt accounts for its rejection.

The specimen which has just been purchased is the only example of the Great Auk in Scotland which is exhibited to the general public; for the only other specimens in the country, two in number, are both in private collections. One of them, the property of the Duke of Roxburghe, is at Floors Castle; the other, belonging to Colonel Malcolm, is at Poltalloch in Argyleshire. A report having appeared in "Science Gossip" that Colonel Malcolm had sold his specimen, I have the authority of a correspondent of that gentleman for saying that such is not the case, and that bird and egg "are still safe at Poltalloch."—R. H. Traquair.

**Phycis blennoides in the Orcadian Seas.**—According to the "Northern News" of the 23rd of April last three specimens of the Blennoid Fork-beard were captured on the 18th of that month off the west coast of Orkney, the largest of which measured 17 inches in length.

**Sand Smelt or Atherine in Scottish Waters: A Correction.**—An error has crept into the note on the Atherine. It ought to read: "A full-grown Smelt is also larger than the Atherine, and a more delicately constructed fish; besides, *the Atherine* lacks the peculiar cucumber smell. While most common in the English Channel, the little Atherine cannot be considered a rare Scottish fish." The Atherines sent to Edinburgh were, it seems, from Oban

Bay. They were seen off the pier, and the railway manager stirred up the zeal of the fishermen to capture them. Although the true Smelt is said to have been captured in the vicinity, there is no fishery, nor are we satisfied that those seen are other than the Hebridal or Atherine. We should be glad of fuller information as to this.—W. Anderson Smith, Ledaig.

**Electric Ray on the East Coast of Scotland.**—In referring to a specimen of *Torpedo nobiliana* caught sixteen miles off Wick on the 27th December of last year ("Annals," 1895, p. 127) as the first undoubted specimen for our East Coast so far as he could ascertain, Mr. Sim seems to have overlooked the fact that an example of this species is recorded by Prof. Cossar Ewart in the report of the Scottish Fishery Board for 1883, p. 79, as having been caught in January of that year in the same neighbourhood (Lybster). This specimen was presented by the Fishery Board to the Museum of Science and Art in Edinburgh, and has been ever since exhibited in the British Collection there.—R. H. Traquair.

**Geotrupes typhœus, L., in Arran.**—This fine beetle does not find a place in Dr. Sharp's "Coleoptera of Scotland" ("Scot. Nat.," 1872, *et seq.*), and Canon Fowler in his "Coleoptera of the British Islands (vol. iv., 1889, p. 42) says, "Not recorded from the extreme northern counties of England, or from Scotland." It had, however, as pointed out by Messrs. Lennon and Douglas when recording in the "Annals" for April 1892 the capture of a male near Orchardton, Kirkcudbrightshire, been put on the Scottish list many years ago. They refer us to "Murray's Catalogue," but the original record appears to be contained in the "Addenda," at page 339 of Wilson and Duncan's "Entomologia Edinensis" (1834), where the species is stated to have been taken in Forfarshire by the Misses Lyall. I have now the satisfaction of recording its occurrence in the island of Arran, at the mouth of the Clyde, where I obtained three—two males and a female—on the 24th April last (1895). The exact locality in which they were found is the heathery moor on the left-hand side of the main road going from Brodick to Lamlash.—William Evans, Edinburgh.

**Additions to a List of the Macro-Lepidoptera of Ardclach, Nairnshire.**—The following notes are supplementary to my list of the Macro-Lepidoptera found in the parish of Ardclach and published in the "Annals of Scottish Natural History" for January 1894:—*Argynnis Selene*—Not so abundant as its sister Euphrosyne, whose flight is about over before Selene makes its appearance, but the butterflies are so much alike that the entomologist alone is able to detect the difference. *Macroglossa bombyliformis*—Caught one specimen in fine condition on the 25th May 1895 at Ferness on the Findhorn. Being a northern insect, and as the food-plant (Scabiosa) is plentiful in the district, it might be expected to occur

more commonly in Nairnshire. Should this be so, its presence is amply protected from sight by extraordinary powers of movement, combined with such a striking resemblance to the Humble Bees (Bombus fragrans and muscorum) that even to the practised eye there is often some difficulty in distinguishing the individual species when on the wing. There is only one capture recorded in the late Rev. Dr. Gordon's list of Lepidoptera as having occurred within the Province of Moray up to the year 1861. *Venilia maculata*—Almost abundant this year in Ferness woods and along the river side among trees. *Carsia imbutata*—Took half a dozen specimens in September 1894. This is a very local insect. It occurs among the heather near the Loch of Belevat. As its reputed food-plant Cranberry (Vaccinium oxycoccos) does not grow in Ardclach, or even in Nairnshire, the caterpillar must thrive on some other local wilding. *Apamea oculea*—Occasional in this district. *Plusia pulchrina*—One specimen last year: rare.—R. Thomson, Ferness.

**Nisoniades tages in Moray.**—On 22nd May last I found this butterfly, the Dingy Skipper, which is here local and rare, flying over heather on a hill in Dallas parish at an altitude of 600 feet above sea-level. The butterflies were in the company of *Fidonia piniaria* and *atomaria*. I was struck with the resemblance between *tages* and *piniaria* when on the wing. Colour, design, and mode of flight were so similar that I several times mistook the moth for the butterfly. Is this a case of protective mimicry, or is it the result of adaptation to environment in both instances? As *tages* is so rare here, I cannot obtain sufficient data, but it would be interesting to ascertain whether *tages* and *piniaria* are generally found in company. —Henry H. Brown, Elgin.

**The Cinnabar Moth in Perthshire.**—A fine male of the Cinnabar Moth (*Euchelia jacobææ*) was captured by me at the Woody Island, near Perth, on the evening of 31st May. Whether or not this is a *bona fide* occurrence, or whether the insect has been introduced by a local collector, can only be surmised. Certain it is that the insect was caught on the wing on the date mentioned; and I am not aware that it has ever previously occurred in this district. —T. M. M'Gregor, Perth.

**Boreus hiemalis, L., in the Edinburgh District.**—Among some spiders collected by my friend Mr. W. Evans by the roadside south of Mortonhall in November and December last, I was pleased to find a female of this rare and local neuropterous insect. Mr. J. J. F. X. King, whom I have consulted as to previous Scottish records, kindly informs me that he has taken the insect at Killin, Perthshire, and that Professor Trail has captured it near Aberdeen. In England it appears to be more often taken in the north than in the south, though it has been found near London.—Geo. H. Carpenter, Science and Art Museum, Dublin.

# BOTANICAL NOTES AND NEWS.

**Variation in Plants.**—In the hope of enlisting the aid of Scottish botanists in a line of investigation that has proved of much interest to myself, and that can be successfully pursued during a vacation in the country, I venture to suggest the systematic study of variation. We have very few published records in this field on even the commonest species of weeds, and there is apt to be an impression (for it deserves no stronger name) that there is nothing to be learned that would repay the trouble of examining hundreds or even thousands of examples, which, it is assumed, would closely resemble one another. I confess that till I began the study of variation about three years since I assumed this constancy of structure to be general; but, so far from that being the case, I find variability in some plants to a great degree, not only in form and colour, but also in structure, in the flowers as well as in the vegetative organs. This is especially true of inconspicuous flowers, though by no means confined to them. In certain species of *Polygonum* (*e.g. aviculare*) these floral variations amount to hundreds. This year I have examined many heads of *Equisetum*, and find variations common in them also. The importance of reliable information as to the extent and nature of variation in wild plants in its bearing on the problems of evolution is evident; and a wide field is still open for workers who are willing to devote careful and patient study to the investigation of almost any plant, however common a weed it may be.—James W. H. Trail.

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# CURRENT LITERATURE.

**The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—April-June 1895.**

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

## ZOOLOGY.

Pine Marten in Banffshire. J. K. F. *The Field*, 27th April 1895, p. 595; 25th May 1895, p. 750.—A fine male measuring 31¼ ins. and weighing 4½ lb. Locality not mentioned. [First recorded as a Polecat.]

Roedeer in the South of Scotland. D. A. M. *The Field*, 11th May 1895, p. 671.—Absent from Berwickshire and Roxburghshire. Appeared in Selkirkshire eight years ago, but are now believed

to have been destroyed. Plentiful in Peeblesshire, Dumfriesshire, Kircudbrightshire, and Wigtownshire. Has increased with the spread of plantations during the last fifty years.

Great Snipe in Orkney. James Sinclair. *The Field*, 16th March 1895, p. 356.—In February last. Locality not mentioned.

Common and Lesser Terns in the Outer Hebrides. John H. Teesdale. *Zoologist* (3), vol. xix. p. 235-236 (June 1895).—Common Terns near Stornoway and at Barra in August 1894. A Lesser Tern in Broad Bay, Stornoway, on 3rd August 1894.

The Little Auk on the East and West Coasts of Scotland. *Zoologist* (3), vol. xix. p. 151.—A short abstract of papers on the subject by Messrs. W. Eagle Clarke and John Paterson.

The Little Auk in Scotland. John Paterson. *Zoologist* (3), vol. xix. p. 188 (May 1895).—This note discusses the origin of the occurrence of this bird in the Clyde faunal area during the late visitation.

On some new and rare Crustacea from Scotland. By Thomas Scott, F.L.S., and Andrew Scott. *Ann. and Mag. Nat. Hist.* (6), vol. xv. pp. 457-464, and Plates XVI. and XVII. (June 1895).—In this paper three new species and one new variety are described, and a note is given on the identity of the genera Pseudothalestris, Brady, and Pseudowestwoodia, Scott.

Nyssia lapponaria in Scotland. Richard South. *Entomologist*, vol. xxviii. p. 163 (May 1895). Some specimens bred by Mr. W. M. Christy from larvæ taken in Scotland last year. The locality is not stated.

Ceropacha flavicornis near Edinburgh. Wm. Evans. *Ent. Mo. Mag.* (2), vol. vi. p. 120 (May 1895).—Fourteen specimens taken in the county of Edinburgh on the 6th of April, and one at Wemyss, Fifeshire, on the 8th. Larvæ taken in former years in both localities.

Notes from the Exchange Baskets. *Ent. Record*, vol. vi. pp. 234-236 (15th June 1895).—Includes a note on Scoparia ambigualis in the north of Scotland, by Mr. Arthur Horne, Aberdeen.

Early Perlidæ. Kenneth J. Morton. *Ent. Mo. Mag.* (2), vol. vi. p. 121 (May 1895).—Capnia nigra, Tæniopteryx trifasciata, T. nebulosa, and Nemoura præcox, taken on 16th March about the banks of the river Clyde.

Andrena albicans, Kirb., and Nomada bifida, Thoms. Edward Saunders. *Ent. Mo. Mag.* (2), vol. vi. p. 98 (April 1895).—Examples of both species taken in the Isle of Arran by Mr. K. J. Morton, who considers that they were associated.

Addition of two species of Hydroptilidæ to the British List. By J. J. F. X. King, F.E.S. *Ent. Mo. Mag.* (2), vol. vi. p. 112 (May 1895).—One of these is Oxyethira Frici, Klap., of which one specimen was taken in the Rothiemurchus district a few years ago.

## BOTANY.

Notes on Summer Excursions (of the Perthshire Society of Natural Science) in 1893, by F. Buchanan White, M.D. (*Proc. Perthshire Soc. Nat. Sci.*, vol. ii. part i. pp. v.-xv.), and the Summer Excursions of 1894, by Mr. Barclay (*l.c.* pp. xxx.-xxviii.), sum up the results, botanical and otherwise, of a number of excursions of the Society and of individual members to localities in or near Perthshire.

November Gale at Rock Hall Gardens, Northumberland, 1893. By R. Cleugh. *Hist. Berw. Nat. Club*, 1892-93, pp. 399-400.—Notes several species injured.

List of some rarer Berwickshire Plants. By William Shaw. *Hist. Berw. Nat. Club*, *l.c.* pp. 401-402.—Notes localities of a good many species.

Plants of Newton Don, selected from the List of Mr. William Wood. *Hist. Berw. Nat. Club*, *l.c.* pp. 403-404.—In three lists—rarer, introduced, and generally diffused species.

Mosses of Newton Don. By Rev. George Gunn, M.A. *Hist. Berw. Nat. Club*, *l.c.* p. 405.—Enumerates 39 species, mostly common.

List of some of the Rarer Plants found chiefly in Berwickshire. By Adam Anderson. *Hist. Berw. Nat. Club*, *l.c.* pp. 405-408.—Enumerates, with localities, a good many scarce species.

Cochlearia micacea, Marshall, in Shetland. By Rev. E. S. Marshall. *Journ. Bot.*, April, p. 152.—From Balta Sound, Unst.

Pyrus latifolia, Syme, in E. Ross. By Rev. E. S. Marshall. *Journ. Bot.*, April, p. 153.—One tree beside the Conan River, a doubtful native.

Alchemilla vulgaris and its Segregates. By Edward F. Linton, M.A. *Journ. Bot.*, April, pp. 110-112.—Enumerates, as determined by M. Buser, three forms, viz. *vulgaris* (in Watson's provinces, in Scotland—72, 73, 83, 88, 89, 92, 99, 111); *alpestris*, Schmidt (72, 74, 77, 86, 88, 92, 96, 97, 99, 103); *filicaulis*, Buser (72, 80, 88, 89).

On the Rubi List in "London Catalogue," Ed. 9—*concluded*. By Rev. W. Moyle Rogers, F.L.S. *Journ. Bot.*, April, pp.

100-106.—Discusses the forms from *R. rudis* to end of genus, with a list of Watsonian counties and vice-counties in which each is found.

Two Hybrid Epilobia new to Britain. By Rev. E. S. Marshall, M.A., F.L.S. *Journ. Bot.*, April, pp. 106-108.—*E. alsinefolium* × *obscurum*, sent from Clackmannanshire and from Stirlingshire by Mr. R. Kidston.

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## REVIEWS.

The Cambridge Natural History. Edited by S. F. Harmer, M.A., and A. E. Shipley, M.A. Vol. III.—Molluscs. By the Rev. A. H. Cooke, M.A. Brachiopods (Recent). By A. E. Shipley. Brachiopods (Fossil). By F. R. C. Reed, M.A. (London: Macmillan & Co., 1895.) 8vo, cloth, pp. xiv + 536. 4 Maps and 334 Woodcuts.

"The Cambridge Natural History" differs from all others in the important feature that it is the production of, and emanates from, a band of specialists whose *Alma Mater* occupies the premier position in the world of Natural Science. As the result, we find, perhaps for the first time in the history of such works published in this country, that the great subject is to be treated in accordance with its merits, and thus six out of the ten volumes forming the complete set are very properly to be devoted to a great sub-kingdom of the Invertebrata. The fact that the numerous illustrations are practically all new and original is another most welcome and commendable feature of the publication.

The volume before us, though it forms the third of the set, is the first issued. It is a portly book, and in it we have a well-written and most comprehensive account of the great classes Mollusca and Brachiopoda, which will for a long time serve as a readily accessible repertory of reference for students and teachers of Biology. Necessarily a compiled work, the task of compilation has been carefully and accurately performed. The lion's share of the work falls to the Mollusca; the Brachiopods, both recent and fossil, being somewhat summarily dismissed in fifty pages. Mr. Cooke enters into his subject most thoroughly and systematically, and there is scarcely an aspect of it that does not receive its share of attention. The account of geographical distribution is perhaps the fullest and best part. The chapters on classification adopted follow those on distribution, and in them we have the characteristics given of all the families. The earlier chapters of the book are full of interest, dealing as they do with the living animal, its habits, life-history,

and economic applications. We are pleased to see the precision displayed in the references to figures and in citation of authorities. The illustrations are numerous, and consist of well-executed wood engravings.

Mr. Cooke gives a clear and intelligible account of the association of a dextral shell with a sinistral animal (p. 249), which would have been still more intelligible had he not reversed the line of figures (Fig. 157) which illustrates his remarks. The book is in all respects an excellent one, evidencing a wide and extensive range of reading on the part of the author, and in its neat and handsome get-up worthy of the publishing house from which it emanates.

A Catalogue of the Birds of Prey (*Accipitres and Striges*), with the Number of Specimens in the Norwich Museum. By J. H. Gurney, F.Z.S. (London: R. H. Porter, 1894.) 8vo, cloth, pp. 56. Portrait, Woodcut, and 2 Maps.

Ornithologists will note with extreme pleasure that Mr. Gurney has taken up the study of the two orders of birds with which the name of his father will be for all time associated. The Catalogue under consideration furnishes us with systematically arranged lists of all the known Birds of Prey, with an indication of their climatic races, or sub-species, and distribution, and also with critical notes on some of the rare and more interesting species, which are of great value. We have personally found this well-arranged work a most useful book of reference. It is nicely got up, and contains an excellent portrait of the late Mr. Gurney, and an enumeration, with references, of his numerous and valuable published writings on the Accipitres and Striges.

Forest Birds, their Haunts and Habits: Short Studies from Nature. By Harry F. Witherby. (London: Kegan Paul, Trench, Trubner, & Co., Limited, 1894.)

In this little book Mr. Witherby records, very pleasantly, his own experience of eight species of birds—The Green Woodpecker, Tree Creeper, Nut-hatch, Wood-pigeon, Sparrow-hawk, Tawny Owl, and, oddly, as it seems to us, the Water-hen. The series of articles are the result "of many hours of patient watching and waiting on the part of the writer," and as such have a value and interest of their own. The book is illustrated by eight plates and a number of woodcuts.

A Monograph of the Mycetozoa, being a descriptive Catalogue of the species in the Herbarium of the British Museum. By Arthur Lister, F.L.S. (Printed by order of the Trustees of the British Museum, 1894.)

The strange organisms, forming a connecting link between plants and animals, and classed now in the one kingdom, now in

the other, under the names of *Myxogastres*, *Myxomycetes*, and *Mycetozoa*, have naturally been the object of much interest and study, and have been treated of in several monographs, such as the important *Monograph of the Myxogastres*, by Mr. G. Massee, issued in 1892. But, despite the excellent work that had already been done in this group, Mr. Lister's monograph will be recognised as a most valuable aid towards a clear knowledge of a difficult group of organisms. That it is the work of an adept is evident on every page; and the text is supplemented by fifty-one woodcuts (eight illustrative of the structure, and forty-three of the genera), and seventy-eight plates, on each of which the characters of at least two species are very clearly shown in collotype reproductions of admirable water-colour drawings by the author, and by his daughter, Miss G. Lister.

The subsidiary title does not indicate the full scope of the book, since (though arising from a critical examination of rich materials in the British Museum) it embodies the result of years of study by the author, and is a complete monograph of the whole group. It will be found indispensable to students of this group. The work is honourable alike to the author and to the enlightened procedure of the Trustees of the British Museum in furthering the provision of standard scientific hand-books for the public benefit.

The London Catalogue of British Plants, Part I., containing the British Phænogamia, Filices, Equisetaceæ, Lycopodiaceæ, Selaginellaceæ, Marsileaceæ, and Characeæ.

The *ninth* edition of this well-known Catalogue has very recently been issued by Mr. F. J. Hanbury. That this is much more than a mere list of names, even with the addition of a summary of the number of Watsonian counties and vice-counties tenanted by each species, is too well known to all interested in British Botany to require any advocacy of its value. The new edition is of peculiar importance, inasmuch as it embodies the results of nine years of active labour in the critical study of British plants, alike in the field and compared with those of other lands. Field work has led to the discovery during those years of several species not previously known to exist in the wild state in our islands, and also to the recognition of not a few more or less well-marked varieties, some of which had been previously known from foreign countries, while others have not yet been found out of Britain. There may, in certain genera where the species appear to be in an almost plastic state, be some risk that the ordinary botanist will despair of attaining any satisfactory knowledge of their species or forms, and will leave them to specialists. But it is well, from every point of view, that we should have the means of knowing clearly the conclusions arrived at by recognised authorities in the more perplexing groups; and this we have now given to us.

Nomenclature has given rise to many keenly debated questions of late years; indeed, it has roused the *odium scientificum* at times to an unwonted pitch. But out of the evil has arisen good; and the inquiries into nomenclature have led to more accuracy in a good many cases, even although the result has been at times to show that some well-known name must give place to a prior claimant resuscitated from a long repose. The pages of the Catalogue show many cases of this nature (*e.g. Nuphar* becomes *Nymphæa*, while the former *Nymphæa* becomes *Castalia; Corydalis* becomes *Neckeria; Capsella* becomes *Bursa; Lepigonum* becomes *Buda*, etc.), and the changes in generic names necessarily involve others in the names of species. Those familiar with the "Student's Flora" or Babington's "Manual," but who have not paid much heed to botanical journals, will feel rather at a loss to recognise old and well-known friends in the Catalogue under their new names; but it is well to face the fact that most of these names have returned to stay in our lists, and it is well to accustom oneself to their use, however unwelcome they may seem at present.

The Catalogue further sweeps together the topographical results of many new county records published during the nine years in journals and transactions of local societies. A comparison of the number of districts (Watsonian) recorded for each species in the eighth and ninth editions will show how great is the advance in this field.

To Mr. F. J. Hanbury, and to those gentlemen that have aided him with their wealth of study and observation, we owe a debt of gratitude for their labours.

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We have received from Mr. David Douglas an English and revised edition of Herr Gätke's book "Heligoland: an Ornithological Observatory," a work which naturalists have long looked forward to. We hope to give a notice of this handsome volume in our October number.

Since our notice of The Book of Antelopes in the "Annals" (1894, p. 263), Mr. R. H. Porter has issued parts II. and III. of this fine work, containing beautiful plates of the Korrigum, the Bontebok, the Blessbok, the Sassaby, the Brindled Gnu, the White-tailed Gnu, the Yellow-backed Duiker, Jentink's Duiker, the Natal Duiker, Harvey's Duiker, the Black-fronted Duiker, the Bay Duiker, Ogilby's Duiker, and the Red-flanked Duiker, by Messrs. Joseph Wolf and J. Smit.

# The Annals
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# Scottish Natural History

No. 16] 1895 [October


## REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1894.


By Lionel W. Hinxman, B.A.
Member of the British Ornithologists' Union.


Schedules were sent, as usual, by Messrs. Harvie-Brown and Eagle Clarke to the Light Stations on the Scottish coasts, and of these seven only have been returned. Reports have also been received from twenty-nine other observers in different parts of the country, making a total of thirty-six schedules examined, a slight falling off from the number sent in last year.

The great decrease in the number of returns sent in from lighthouses is, however, much to be deplored, for it is only when more or less complete *data* from coast-stations are available that any correct idea of the bird-movements during the year can be obtained. The dates of arrival and departure of the various species are, however, of value, as these have not hitherto been ascertained for Scotland to the same extent as for England.

To all those who have so kindly aided us in these inquiries, and to Mr. T. G. Laidlaw for assistance in the

despatch and collection of schedules, our hearty thanks are due.

The following list gives the names of observers from whom reports have been received. The localities are arranged under the different faunal areas, proceeding from north to south along the east and west coasts.

### Northern Isles.

#### Shetland

| *Locality.* | *Name of Observer.* |
|---|---|
| North Unst L.H. | James Ferrier, Lightkeeper. |
| Scousbrough, Dunrossness | Thomas Henderson, jun. |

#### Orkney.

| | |
|---|---|
| Hoy Sound, High Light | Thomas Hughson, Lightkeeper. |
| Pentland Skerries L.H. | Malcolm M'Dougall, Lightkeeper. |

#### Sutherland.

| | |
|---|---|
| Thurso | Lewis Dunbar. |

#### Moray.

| | |
|---|---|
| Golspie and Rogart | Hugh Miller. |
| Strathspey | Lionel W. Hinxman. |
| Forres | James Brown. |

#### Dee.

| | |
|---|---|
| Peterhead | Rev. William Serle. |
| Gourdas, Fyvie | George Sim. |
| Aberdeen district | Angus Fraser. |
| Cults | James Stott. |
| Girdleness L.H. | John Gilmour, Lightkeeper. |

#### Tay.

| | |
|---|---|
| Bell Rock L.H. | John R. Laurence, Lightkeeper. |
| Arbroath district | T. F. Dewar, M.D.; W. J. Dewar, M.B. |
| St. Andrews | Allan Briggs. |
| Tayfield, Newport | William Berry. |
| Stravithie | William Berwick. |
| Carse of Gowrie | Charles Heron Watson. |
| Stanley | Thomas Marshall. |

FORTH.

| *Locality.* | *Name of Observer.* |
|---|---|
| Doune, Perthshire | Lt.-Col. W. H. M. Duthie. |
| Callander and the Lothians | William Evans. |
| Dalmeny Park | Charles Campbell. |
| Mid and West Lothian | Bruce Campbell. |
| Edinburgh district | T. G. Laidlaw. |

TWEED.

| | |
|---|---|
| Hallmyre, Peebles | David Laidlaw. |
| Chirnside and Eastern Borders | Charles Stuart, M.D. |

OUTER HEBRIDES.

| | |
|---|---|
| North Bay, Barra | John MacRury, M.B. |

WEST ROSS.

| | |
|---|---|
| Shieldaig | Donald Matheson. |

ARGYLL AND INNER HEBRIDES.

| | |
|---|---|
| Skerryvore L.H. | John Nicol, Lightkeeper. |
| Tiree | Peter Anderson. |
| Oban district | William Evans. |
| Ben Nevis | The Observatory Staff. |

CLYDE.

| | |
|---|---|
| Ailsa Craig L.H. | William Tulloch, Lightkeeper. |
| Various localities—Glasgow district | J. Paterson; J. Robertson; H. B. Watt. |

## GENERAL REMARKS.

The weather during the spring of 1894 was more varied in character than in that of the previous year, the warm genial days of April being followed in May by northerly winds bringing frost and snow-showers. The average dates of arrival of the summer visitants are much the same, however, as in 1893; a few exceptionally early dates being recorded for the Swallow (April 4), Swift (April 26), and Cuckoo (April 4-7).

There is little to notice with regard to the spring migration, and birds are reported as scarce both on the East and West

Coasts. At Tiree, Whimbrel were seen passing north in unusual numbers during the first week of May, and the northern migration of the White Wagtail (*M. alba*) was again observed. The principal movements during the autumn are recorded for the first and last weeks in October, On the East Coast, rushes, observed at Pentland Skerries. Peterhead, and Girdleness, took place on October 7 and 8, during a northerly gale, comprising Song and Missel Thrushes, Blackbirds, Redwings, and Chaffinches. A second rush of *Turdidæ* was noted at Girdleness on October 30 and 31, with heavy gales from the south ; and during the last few days of December there was a general movement of Thrushes southwards along the Aberdeenshire coast, accompanied by snow and gales from N.E.

The principal rush observed on the West Coast took place between October 4 and October 7, with light south-easterly breezes and haze, and included Song and Missel Thrushes, Blackbirds, Fieldfares, Redwings, Wheatears, some Willow Wrens, and a few other birds. Other rushes, chiefly of Song Thrushes and Blackbirds, occurred on October 13, October 28, and November 25. These movements are only recorded from Skerryvore, but the extreme paucity of reports from West Coast light-stations renders this negative evidence of little value.

The closing days of the year, following the northerly gale of December 22, witnessed the beginning of the great irruption of Little Auks (*Mergulus alle*) which characterised the past winter, and has been fully treated of by Mr. W. Eagle Clarke in the April number of the "Annals."

Finally may be mentioned the interesting occurrence of the Sub-Alpine Warbler (*Sylvia subalpina*) in the Outer Hebrides ; a specimen of this bird killed on the island of St. Kilda on June 13 by Mr. J. S. Elliott being the first record of this southern species for Britain.

### Turdus musicus (Song Thrush).

*Shetland*—Flocking and moving S., Dunrossness, Oct. 1. *Dee*—Peterhead, Oct. 7, rush with other *Turdidæ* and Finches, N. gale ; Oct. 20, with Blackbirds ; Dec. 24, 25, in numbers passing south,

strong gale from N.W.; Dec. 31, very numerous along coast, heavy snow from N.E.; Cults, Dec. 12, in numbers; Girdleness L.H., Oct. 30, 31, in rush with Fieldfares and Blackbirds, strong S.-S.E. gale; Dec. 27, with Blackbirds. *Argyll and Isles*—Tiree, left Mar. 30; in flocks, Oct. 21; Skerryvore, April 4, 29; Oct. 4-7, in rushes with other birds, S.E., hazy; Oct. 13, rush, W., fog; Oct. 16-31; Nov. 3; Nov. 25-27, in rush with Blackbirds, mostly ♂, S.E.; Dec. 4. *Clyde*—Great decrease after Nov. 9, Camphill.

Principal movements, Oct. 4-7, 30-31, Nov. 25-27, Dec. 24-31.

### Turdus viscivorus (Missel Thrush).

*Dee*—Peterhead, Oct. 7, plentiful in rush with other birds; Oct. 22, very numerous, with a few Fieldfares; Nov. 8, with Blackbirds. *Argyll and Isles*—Tiree, Oct. 30; Skerryvore, Oct. 6, 7, in rush with other birds.

Principal movements, Oct. 6, 7.

### Turdus iliacus (Redwing).

*Shetland*—Scousbrough, Nov. 1, in flocks with other Thrushes, strong gale. *Orkney*—Pentland Skerries, Sept. 30, one; Oct. 8, with Chaffinches. *Moray*—Aviemore, Oct. 16. *Dee*—Peterhead, Oct. 7. *Forth*—Biel, Oct. 8. *Tweed*—Chirnside, Oct. 24. *Outer Hebrides*—Barra, Oct. 8. *Argyll*—Tiree, Oct. 31, last seen Mar. 30; Skerryvore, Oct. 6, 7, in rush with other birds. *Clyde*—Cambuslang, Oct. 21.

Earliest observed, Pentland Skerries, Sept. 30. Principal movements, Oct. 6-8.

### Turdus pilaris (Fieldfare).

*Shetland*—Dunrossness, last seen April 10; Oct. 25, in flocks; Nov. 1, in hundreds with Redwings and Blackbirds, strong gale; Nov. 19, in rush. *Orkney*—Pentland Skerries, Nov. 4, with Redwings, S.E. strong. *Moray*—Aviemore, April 17, Oct. 17. *Dee*—Peterhead, Oct. 22, Nov. 15, scarce on migration; Girdleness L.H., Oct. 31, in rush with Thrushes and Blackbirds, S. strong; Nov. 28, in flocks with Greenfinches, W.; Fyvie, April 11, Oct. 18. *Tay*—Bell Rock L.H., Oct. 11, 28, with Starlings, E.; Stravithie, April 20, Oct. 14; St. Andrews, April 20. *Forth*—Dalmeny, Oct. 20. *Tweed*—Chirnside, April 28, Oct. 24. *Outer Hebrides*—Barra, Oct. 21. *Argyll and Isles*—Oct. 15, Oct. 23, large flocks; Skerryvore, Oct. 21, 28. *Clyde*—Hawkhead, April 26; Ailsa Craig, Oct. 28.

Earliest, Bell Rock, Oct. 11; latest, Chirnside, April 28. Principal movements, Oct. 21-31, Nov. 1.

### Turdus merula (Blackbird).

*Shetland*—N. Unst, Nov. 2; Dec. 6, at Light; Scousbrough, Oct. 11; Nov. 1, in unusual numbers, strong gale. *Dee*—Peterhead, Oct. 7, in rush with other Thrushes; Oct. 20, with Thrush; Nov. 8, in numbers with Missel Thrush; Girdleness L.H., Oct. 30, 31, in rush, strong S.-S.E. gale; Cults, Nov. 24, in great numbers. *Outer Hebrides*—Barra, Oct. 26. *Argyll and Isles*—Tiree, left by March 30; Skerryvore, Oct. 4, 5, in rushes with other birds, S.E.; Oct. 28, in rush, S.E.; Nov. 24, 26, in rush with Thrush; Dec. 2, 4, March 31.

Principal movements, Oct. 4-7, Nov. 1, 24-26.

### Turdus torquatus (Ring Ouzel).

*Orkney*—Pentland Skerries, Aug. 24. *Forth*—Loganlee, April 2. *Clyde*—Upper Pollok, April 7.

### Saxicola œnanthe (Wheatear).

*Shetland*—Dunrossness, April 9-Oct. 16; N. Unst, May 11. *Orkney*—Pentland Skerries, April 7. *Moray*—Kincardine, Strathspey, April 4; Golspie, April 8. *Dee*—Peterhead, March 24-Sept. 30; Girdleness, March 28; Cults, Oct. 17. *Tay*—St. Andrews, April 6. *Forth*—Moorfoots, March 13; Dalmeny, March 28. *Tweed*—Hallmyre, March 23; Chirnside, March 28-Sept. 4. *Outer Hebrides*—Barra, March 24. *Argyll and Isles*—Tiree, March 20-Oct. 16; Skerryvore, April 9-11, May 8-15; Aug, 11, 23, 24, in flocks; Aug. 28, 29, Sept. 17-22, Oct. 3-5, in rush with other birds, S.E., haze. *Clyde*—Mearns Moor, March 25; Blacklaw, Ayrshire, March 26; Gleniffer, Dec. 15, one.

Earliest, Moorfoots, March 13; latest, Gleniffer, Dec. 15. Principal movements, Aug. 23, 24, Oct. 3-5.

### Pratincola rubetra (Whinchat).

*Moray*—Rogart, April 21. *Forth*—Moorfoots, April 6. *Tweed*—Hallmyre, April 8. *Outer Hebrides*—Barra, May 28-Aug. 21. *Clyde*—Giffnock, April 28; Langside, Sept. 6.

Earliest, April 6, Moorfoots; latest, Sept. 6, Langside.

### Ruticilla phœnicurus (Redstart).

*Shetland*—Dunrossness, Nov. 25. *Moray*—Kincardine, Strathspey, April 16. *Forth*—Dalmeny, April 12; Doune, April 16; Hermitage, April 15. *Argyll and Isles*—Oban, April 21; Skerryvore, Sept. 6. *Clyde*—Camphill, Sept. 19.

Earliest, April 12, Dalmeny; latest, Nov. 25, Dunrossness.

ERITHACUS RUBECULA (Redbreast).

*Shetland*—N. Unst, Dec. 6, at Light; Dunrossness, Nov. 21. *Dee*—Peterhead, Oct. 7, a few in rush with other birds; Oct. 11, numerous.

SYLVIA CINEREA (Whitethroats).

*Shetland*—Mid Yell, June 13. *Orkney*—Pentland Skerries, Aug. 19. *Moray*—Rothiemurchus, May 17. *Dee*—Peterhead, May 12-Sept. 22. *Tay*—St. Andrews, May 9-Sept. 2. *Forth*—Callander, May 5. *Tweed*—Hallmyre, May 3. *Outer Hebrides*—Barra, May 28-Sept. 18. *Clyde*—Kirkintilloch, May 12; Langside, Sept. 5.

Earliest, Hallmyre, May 3; latest, Peterhead, Sept. 22.

SYLVIA ATRICAPILLA (Blackcap).

*Tweed*—Chirnside, May 18.

SYLVIA HORTENSIS (Garden Warbler).

*Tay*—Stanley, May 12.

PHYLLOSCOPUS COLLYBITA (Chiff-chaff).

*Moray*—Alvie, Strathspey, Sept. 18. *Tweed*—Chirnside district, March 30-Oct. 20. *Clyde*—Doon, March 26; Castle Semple, March 31.

PHYLLOSCOPUS SIBILATRIX (Wood Wren).

*Moray*—Craigellachie, May 8. *Tweed*—Hawick, April 16; *Forth*—Dalmeny, April 20. *Clyde*—Millport, Cumbrae, Aug. 19.

PHYLLOSCOPUS TROCHILUS (Willow Wren).

*Moray*—Rogart, April 20; Rothiemurchus, April 24. *Dee*—Fyvie, April 11; Cults, April 29. *Tay*—Arbroath, April 22. *Forth*—Dalmeny and Hermitage, April 15; Doune, April 16; Dunbar, Sept. 6. *Tweed*—Hallmyre, April 24; Chirnside, Sept. 10. *Outer Hebrides*—Barra, April 15, one; April 26, many. *Argyll and Isles*—Oban, April 17; Skerryvore, Oct. 4, 5, in rush with other birds, S.E. *Clyde*—Thornliebank, April 8; Camphill, Sept. 22.

Earliest, April 8, Thornliebank; latest, Oct. 5, Skerryvore.

ACROCEPHALUS SCHŒNOBÆNUS (Sedge Warbler).

*Moray*—Aviemore, May 16. *Dee*—Fyvie, May 8. *Tay*—Arbroath, May 13. *Tweed*—Sprouston, April 19. *Clyde*—Mearns and Giffnock, April 29.

Earliest, April 19, Sprouston.

Lanius excubitor (Great Gray Shrike).

*Solway*—One killed at Terregles, Feb. 15.

Muscicapa grisola (Spotted Flycatcher).

*Shetland*—N. Unst, May 11. *Forth*—Craigmillar, May 5; Tynefield, Sept. 9. *Tweed*—Chirnside, Sept. 15. *Argyll and Isles*—Skerryvore, April 29; May 2, four at Light. *Clyde*—Camphill, Sept. 21.

Earliest, April 29, Skerryvore; latest, Sept. 21, Camphill.

Hirundo rustica (Swallow).

*Shetland*—Dunrossness, June 3, a pair. *Dee*—Peterhead, April 21-Oct. 23; Fyvie, April 20-Oct. 17. *Tay*—Stravithie, April 4; Tayfield, April 15-Sept. 29; St. Andrews, April 20. *Forth*—Braid Hills, April 14; Aberlady, Nov. 6. *Tweed*—Sprouston, April 19; Chirnside, Oct. 4. *Outer Hebrides*—Barra, May 12. *Argyll and Isles*—Oban, April 27; Skerryvore, April 27-Oct. 4. *Clyde*—Uddingston, April 21.

Earliest, April 4, Stravithie; latest, Nov. 6, Aberlady.

Chelidon urbica (House Martin).

*Dee*—Peterhead, April 21. *Tay*—Stanley, Nov. 25. *Forth*—Duddingston, April 19. *Tweed*—Chirnside, May 6-Oct. 5. *Clyde*—Ardgowan, April 21.

Earliest, April 19, Duddingston; latest, Nov. 25, Stanley.

Cotile riparia (Sand Martin).

*Moray*—Aviemore, April 27. *Tay*—St. Andrews, April 27. *Forth*—Duddingston, April 19. *Tweed*—Sprouston, April 19; Chirnside, April 22-Sept. 17. *Argyll and Isles*—Oban, April 27; Skerryvore, Oct. 10. *Clyde*—Dalbeth, April 15.

Earliest, April 15, Dalbeth; latest, Oct. 10, Skerryvore.

Loxia curvirostra (Common Crossbill).

*Shetland*—N. Unst, June 28, one; Foula, Aug. 16, one, Sept. 3, five. *Orkney*—Pentland Skerries, Aug. 19; N. Ronaldshay, June 13, White-winged Crossbill (*L. bifasciata*) ♂ killed. *Sutherland*—Skurrery, June 30, ♂ killed. *Outer Hebrides*—Barra, June 30, flock of nine, remaining a week, "first time observed here"; Monach L.H., July 7, ♂. *Argyll and Isles*—Skerryvore, July 2, in flock, S.E.

### Fringillinæ (Finches).

*Shetland*—Scousbrough, Oct. 11, Chaffinches. *Orkney*—Pentland Skerries, Oct. 8, Chaffinches, in rush with Redwings. *Dee*—Peterhead, Oct. 7, Greenfinches and Chaffinches, gale; Oct. 20, 28, Chaffinches in small flocks; Nov. 8, Greenfinches and Linnets in numbers. Girdleness, Nov. 28, Greenfinches in flock with Fieldfares. Fyvie, Nov. 2, Tree Sparrow (*P. montanus*). *Outer Hebrides*—Barra, May 14, Linnets, "first time observed here." *Argyll and Isles*—Ben Nevis Observatory, "Redpoll," Sept. 15. Skerryvore, Oct. 4, 5, Chaffinches, in rush with other birds, S.E.; Jan. 9, April 17, Linnets. *Clyde*—Ailsa Craig, Nov. 1, Siskins; Nov. 21, Chaffinches.

Principal movements, Oct. 4-7.

### Plectrophanes nivalis (Snow Bunting).

*Shetland*—N. Unst, April 6; Oct. 1, in flocks, S.W. Dunrossness, March 16, in flocks, N.; Sept. 22, Oct. 26, Nov. 19, in rush. *Orkney*—Pentland Skerries, Sept. 19, S.E.; Dec. 20, "a great rush." *Forth*—Edinburgh, Oct. 30. *Outer Hebrides*—Barra, Oct. 16.

First seen, Sept. 19, Pentland Skerries; last seen, April 6, N. Unst.

### Motacillinæ (Wagtails).

*Shetland*—Scousbrough, Sept. 22, *M. melanope*. *Orkney*—Pentland Skerries, Aug. 24, *M. melanope*. *Outer Hebrides*—Barra, *M. alba*, Aug. 15; *M. melanope*, Jan. 14. *Argyll and Isles*—Tiree, *M. alba*, April 7, 12, 30, in small flocks passing N. *Clyde*—*M. raii*, Kenmuir, April 21; Cathcart, Oct. 21; Ailsa Craig, *M. lugubris*, Nov. 11.

### Anthus pratensis (Meadow Pipit).

*Argyll and Isles*—Skerryvore, March 19; April 4, a rush; April 8, 11, 17; Aug. 31, numbers at Light, S.W.; Sept. 12, 16, in numbers at Light, W.

### Anthus trivialis (Tree Pipit).

*Tay*—Stanley, April 29. *Tweed*—Hallmyre, April 29. *Argyll and Isles*—Oban, April 26. *Clyde*—Giffnock, April 28.

Earliest, April 26, Oban.

### Alauda arvensis (Skylark).

*Argyll and Isles*—Skerryvore, Feb. 11, April 5, 17, Oct. 17, 27, Dec. 6, 24. *Clyde*—Ailsa Craig, Dec. 29.

### Cypselus apus (Common Swift).

*Shetland*—N. Unst, May 31; Nov. 10, one "Swift." *Moray*—Forres, May 9. *Dee*—Cults, May 10; Peterhead, May 13-Aug. 19. *Tay*—Arbroath, May 5-Aug. 22. *Forth*—Craigmillar, May 5. *Tweed*—Chirnside, May 9. *Argyll and Isles*—Skerryvore, June 30, Oct. 13. *Clyde*—Crookston Castle, Renfrew, April 26; Rosshall, Sept. 1.

Earliest, April 26, Crookston Castle; latest, Nov. 10 (!), N. Unst.

### Caprimulgus europæus (Nightjar).

*Dee*—Fyvie, May 1.

### Dendrocopus major (Great Spotted Woodpecker).

*Tweed*—Nesting at Duns Castle; seen Longformacus, Berwickshire.

### Cuculus canorus (Cuckoo).

*Moray*—Rogart, April 29. *Dee*—Fyvie, April 29. *Tay*—Stravithie, April 4; caught at Anstruther, Oct. 8. *Forth*—Dalmeny, April 15; Leadburn, Aug. 25. *Tweed*—Hallmyre, April 24. *Outer Hebrides*—Barra, April 28. *Argyll and Isles*—Oban, April 20. *Clyde*—Mearns, April 15.

Earliest, April 4, Stravithie; latest, Oct. 8, Anstruther.

### Strigidæ (Owls).

*Shetland*—Dunrossness, June 28, two Short-eared Owls (*Asio accipitrinus*); Snowy Owl (*Nyctea scandiaca*) shot, Balta Sound, Jan. 26. *Sutherland*—*A. accipitrinus*, Thurso, Feb. 26; Georgemas, Jan. 15; Snowy Owl (*Nyctea scandiaca*), young ♂, Armadale, April 7. *Moray*—Short-eared Owl (*A. accipitrinus*), Dufftown, Aug. 14. *Forth*—Short-eared Owl (*A. accipitrinus*), Pentlands, Sept. 23. *Argyll and Isles*—Short-eared Owl (*A. accipitrinus*), Skerryvore, Oct. 4, 8.

### Anserinæ (Geese).

*Shetland*—Dunrossness, Oct. 27, Gray Geese passing E. *Tay*—Pink-footed Geese (*A. brachyrhynchus*), Tentsmuir, Sept. 25. *West Ross*—Shieldaig, Sept. 24, 34 "Geese" passing S.E. *Outer Hebrides*—Barra, Oct. 17, Brent Geese (*Bernicla brenta*) and Bernacle Geese (*B. leucopsis*), "less plentiful than usual." *Argyll and Isles*—Tiree, Brent Geese (*B. brenta*), April 13; Bernacle Geese (*B. leucopsis*), April 14, Oct. 25; White-fronted Geese (*A. albifrons*) arrived Oct. 19, left May 8; "Geese" passing E., Oct. 15, 17. *Solway*—One Pink-footed Goose (*A. brachyrhynchus*) shot near Annan, March.

Principal movements, Oct. 12-19.

CYGNINÆ (Swans).

*Shetland*—Dunrossness, March 18, 25, April 3, small flocks ("Swans") passing N.; Oct. 3, Nov. 12, Dec. 10, passing S.; one Whooper (*C. musicus*) shot. *West Ross*—Shieldaig, "Swans" arrived for winter, Nov. 14. *Argyll and Isles*—Tiree, Oct. 20, 22, "Swans" passing S.; Oct. 21, 11 Whoopers (*C. musicus*) on Loch; Nov. 11, 50 Whoopers (*C. musicus*) and a few Bewick's Swans (*C. bewicki*) on Loch; Swans left by March 11.

Principal movements, Oct. 20-22, Nov. 11-14.

ANATINÆ (Ducks).

*Shetland*—Dunrossness, Widgeon (*Mareca penelope*), July 27, twelve; Sept. 18, large flock; Tufted Duck (*Fuligula cristata*), Oct. 12, Oct. 15 in large flocks with Golden Eye (*Clangula glaucion*); Long-tailed Duck (*Harelda glacialis*), first seen Nov. 2. *Sutherland*—Long-tailed Duck (*H. glacialis*), Thurso, April 24; Common Scoter (*Œdemia nigra*), Dorrery, Aug. 2. *Moray*—Long-tailed Duck (*H. glacialis*), Dunrobin, March 5. *Dee*—Smew (*Mergus albellus*) killed on R. Don, Fintray, Jan. 16. *Tay*—Ruddy Sheldrake (*Tadorna casarca*), one ♂ and two ♀ killed on Tay below Perth, Sept. 26. *Forth*—Tufted Duck (*F. cristata*), Firth of Forth, Sept. 13; Long-tailed Duck (*H. glacialis*), Oct. 20; Pochard (*F. ferina*), R. Carron, Jan. 7. *Outer Hebrides*—Barra, Widgeon (*M. penelope*) in flocks, Sept. 26; Gadwall (*A. strepera*), Sept. 28; Long-tailed Duck (*H. glacialis*), Oct. 10. *Argyll and Isles*—Tiree, Widgeon (*M. penelope*) and Gadwall (*A. strepera*) left by May 4; Shoveller (*Spatula clypeata*), ♂ on loch May 4. *Clyde*—Tufted Duck (*F. cristata*) nesting at Mearns and Eaglesham, Renfrew. *Solway*—nesting in Wigtownshire.

COLUMBA ŒNAS (Stock Dove).

*Shetland*—Dunrossness, March 27, one. *Tay*—Arbroath, pair killed April 28; Stanley, May 15. *Forth*—Dalmeny, Feb. 17.

TURTUR COMMUNIS (Turtle Dove).

*Shetland*—Dunrossness, one shot Oct. 6, "second only seen here."

CREX PRATENSIS (Land Rail).

*Moray*—Forres, Sept. 14. *Dee*—Cults, April 29. *Tay*—Arbroath, May 11, one killed Nov. 15; Bell Rock L.H., July 4. *Forth*—Mortonhall, April 26. *Tweed*—Hallmyre, April 28. *Outer Hebrides*—Barra, April 30. *Argyll and Isles*—Tiree, May 17. *Clyde*—Thornliebank, April 26.

Earliest, April 26, Mortonhall.

Rallus aquaticus (Water Rail).

*Argyll and Isles*—Tiree, Oct. 13. *Clyde*—Ailsa Craig, Nov. 22, S.W. gale.

Charadrius pluvialis (Golden Plover).

*Shetland*—Dunrossness, Oct. 12, Nov. 7, in large flocks, "unusually abundant." *Dee*—Peterhead, Oct. 28, Nov. 1, 24, in large flocks. *Argyll and Isles*—Tiree, April 16; very large flocks passing N.; Oct. 20. *Clyde*—Thornliebank, Aug. 22, in flocks.

Squatarola helvetica (Gray Plover).

*Orkney*—Westray, Sept. 27. *Tay*—Tayport, Sept. 25. *Forth*—Dunbar, Aug. 22.

Eudromias morinellus (Dotterel).

*Dee*—Fyvie, May 22. *Forth*—Dirleton, E. Lothian, flock of eight, May 22.

Vanellus vulgaris (Lapwing).

*Shetland*—Dunrossness, Oct. 30, flock passing S.W. *Orkney*—Hoy Head L.H., March 24. *Dee*—Cults, first seen Feb. 4; general movements S., Oct. 7, 17. *Argyll and Isles*—Skerryvore, April 5.

Strepsilas interpres (Turnstone).

*Shetland*—Dunrossness, Nov. 24. *Orkney*—Westray, Sept. 13. *Argyll and Isles*—Skerryvore, at Light, Nov. 27.

Phalaropus (Phalarope).

*Shetland*—Red-necked Phalarope (*P. hyperboreus*), breeding, Dunrossness, left by Aug. 12. *Argyll and Isles*—Skerryvore, Oct. 9, two Gray Phalaropes (*P. fulicarius*).

Scolopax rusticula (Woodcock).

*Shetland*—N. Unst, Nov. 22, W.-S.W. gale; Dunrossness, Oct. 25, Nov. 1, N.E. gales. *Moray*—Strathspey, in numbers on migration, Oct. 1-8. *Argyll and Isles*—Skerryvore, Oct. 21.

Gallinago gallinula (Jack Snipe).

*Shetland*—Dunrossness, Oct. 13, "in unusual numbers, with Common Snipe." *Moray*—Kincardine, Strathspey, Oct. 20. *Dee*—Fyvie, Oct. 20. *Tay*—Tayfield, Oct. 8.

CALIDRIS ARENARIA (Sanderling).

*Sutherland*—Melvich, Aug. 27, one ♀ killed. *Argyll and Isles*—Tiree, April 6, flock of over 100.

TRINGA CANUTUS (Knot).

*Argyll and Isles*—Tiree, Jan. 17, April 6, 15.

MACHETES PUGNAX (Ruff).

*Tay*—Tentsmuir, Aug. 27.

TOTANUS OCHROPUS (Green Sandpiper).

*Argyll and Isles*—Ardnamurchan, Aug. 8. *Clyde*—Douglaston, Dec. 8.

TOTANUS HYPOLEUCUS (Common Sandpiper).

*Moray*—Aviemore, April 14. *Forth*—Loganlee, April 15. *Tweed*—Sprouston, April 19. *Outer Hebrides*—Barra, May 7. *Argyll and Isles*—Connel Ferry, April 30; Tiree, May 9. *Clyde*—Dalbeth, April 11; Cumbrae, Aug. 25.

Earliest, April 11, Dalbeth.

LIMOSA (Godwit).

*Orkney*—Westray, Sept. 21, Black-tailed Godwit (*L. belgica*). *Sutherland*—Bighouse, Sept. 21 [? Bar-tailed Godwit (*L. lapponica*)]. *Forth*—Firth of Forth, Bar-tailed Godwit (*L. lapponica*), Oct. 13. *Argyll and Isles*—Tiree, Aug. 27, small flock of Bar-tailed Godwit (*L. lapponica*), left April 16.

NUMENIUS PHÆOPUS (Whimbrel).

*Orkney*—Westray, Sept. 13. *Tay*—St. Andrews, July 16. *Forth*—North Berwick, Aug. 2; Tynefield, Aug. 16. *Outer Hebrides*—Barra, April 28, returning S. July 25. *Argyll and Isles*—Oban, April 30; Tiree, in very large flocks, May 3, 7, 11; Aug. 16, plentiful; "extraordinarily numerous on spring migration."

STERNINÆ (Terns).

*Orkney*—Pentland Skerries, Common Tern (*S. fluviatilis*), May 13-Aug. 14. *Moray*—Common Tern (*S. fluviatilis*), Invergordon, April 28. *Dee*—Peterhead, last seen Sept. 22. *Outer Hebrides*—Arctic Terns (*S. macrura*), Barra, May 14. *Argyll and Isles*—Tiree, Arctic Tern (*S. macrura*), May 8; Little Tern (*S. minuta*), May 15; Terns all left by Sept. 15. *Solway*—Whiskered Tern (*Hydrochelidon hybrida*), one ♂ killed on Carse Loch, Nithsdale, May 30.

LARINÆ (Gulls).

*Shetland*—Dunrossness, Glaucous Gull (*L. glaucus*), Oct. 29, Nov. 7, 24; Black-headed Gulls (*L. ridibundus*) arrive to breed March 27, greatly increasing. *Sutherland*—Glaucous Gull (*L. glaucus*), Dalrawillan, March 8. *Moray*—Little Gull (*L. minutus*), Loch Ness, Jan. 8. *Solway*—Little Gull (*L. minutus*), Solway Firth, Jan.

STERCORARIUS CREPIDATUS (Richardson's Skua).

*Shetland*—N. Unst, March 29, April 13. *Argyll and Isles*—Tiree, May 20, several.

MERGULUS ALLE (Little Auk).

*Shetland*—Dunrossness, Dec. 31. *Orkney*—Hoy, Dec. 23, 24, many. *Tay*—St. Andrews, Jan. 10; Crail, Dec. 29; Elie, Dec. 31. *Forth*—Collessie, Feb.; E. Linton, Dec. 22; North Berwick, Dec. 26. *Outer Hebrides*—Barra, March 7.

PODICIPEDIDÆ (Grebes).

*Shetland*—Dunrossness, Oct. 20, two Little Grebes (*P. fluviatilis*). *Argyll and Isles*—Tiree, Nov. 10, several Sclavonian Grebes (*P. auritus*). *Solway*—Great Crested Grebe (*P. cristatus*), Myreton Loch, Wigtown, June (also nesting in Fifeshire).

FULMARUS GLACIALIS (Fulmar Petrel).

*Sutherland*—Sandside, Sept. 27. *Moray*—Nairn, Sept. 8. *Forth*—Dunbar, Sept. 23.

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## LIST OF THE BIRDS OF EAST RENFREWSHIRE.[1]

By JOHN PATERSON and JOHN ROBERTSON.

THE area to which the following notes relate is the present political division of East Renfrewshire, which embraces the whole of the parishes of Eaglesham, Mearns, and Eastwood, the Renfrewshire part of the Renfrewshire parish of Cathcart, and the Renfrewshire portion of the Lanarkshire parish of Govan. The extent of the district is not great, being roughly twelve miles north and south, and seven at the broadest part, although the average breadth is much less. There are no striking physical features throughout the area,

[1] Read before the Andersonian Naturalists' Society, 4th September 1895.

but it is sufficiently varied in aspect to be quite free from monotony. The greatest elevation is attained in the south-east corner of Eaglesham (1230 feet). The slope of the district is to the north. There are in the upland parishes of Eaglesham and Mearns extensive moorlands; but while the moors in the former are of the heathery type, Mearns Moor is formed principally of grass lands. Lochs and reservoirs abound in this upland tract. Cathcart and Eastwood parishes, with little elevation, are largely cultivated, with a fair share of woodlands. The White Cart and its tributary the Earn are the principal streams. The presence of maritime or estuarine conditions in this country always greatly augment a local list of birds. This advantage our district does not possess. Still birds are abundant, although the list of species, even for an inland district, may not be a remarkable one. Of 130 species recorded, 73 are believed to have nested.

To Mr. A. Gilmour, Yr. of Eaglesham, Mr. W. Cox, who has been for a long period head gamekeeper to Sir John Stirling Maxwell, Bart., M.P., and Mr. Taylor, the keeper at Pollok Castle, we are much indebted for information regarding the birds of the district.

Missel Thrush, *Turdus viscivorus*, L.—Fairly common, but in the present year (1895), presumably from the unusual severity of the weather of the months of January and February, scarcer than in former years.

Song Thrush, *Turdus musicus*, L.—Common. Usually after severe winters, and notably so this year, a decrease in numbers is observed. But in the hardest winter an occasional bird may still be seen.

Redwing, *Turdus iliacus*, L.—A few are seen annually, usually appearing in the last days of October. They are seen not infrequently in Queen's Park within the Glasgow boundaries.

Fieldfare, *Turdus pilaris*, L.—A regular and abundant winter visitor. In 1894 very generally observed in the district in the first ten days of November. The fly line of this species, as of the Lark, when seen in companies on arrival, is in a direction from N.E. to S.W., and they have been observed in spring flying in a N.E. direction. Remaining, according to the New Statistical Account of Mearns, till the end of April, a solitary bird has been seen as late as the 11th of May.

Blackbird, *Turdus merula*, L.—Common at all seasons.

Ring Ouzel, *Turdus torquatus*, L.—The only occurrences known to us relate to single birds at the spring and autumn migrations, as we are informed by Messrs. H. B. Watt and A. Gilmour, Yr., respectively.

Wheatear, *Saxicola œnanthe* (L.)—Generally distributed in spring and autumn. Nesting in the upland portions of the district, a pair occasionally chooses a site at a lower elevation, as in the rubble heaps at the Giffnock sandstone quarries. Appearing in the end of March, young birds are seen in the end of July on the return passage, and Wheatears may be seen irregularly till November.

Whinchat, *Pratincola rubetra* (L.)—Common. Appears usually in the last ten days of April.

Stonechat, *Pratincola rubicola* (L.)—Mentioned in the "Notes on the Fauna and Flora of the West of Scotland" (1876) as having bred at Pollokshields. We have never seen it in the district.

Redstart, *Ruticilla phœnicurus* (L.)—Appears regularly in spring from the 9th April (♀), and again on the return passage it has been seen in consecutive years in Camphill from the end of July till the first days of September. Common enough in parts of Lanarkshire and in Dumbartonshire, we only know it in this district as a bird of passage. While this is being written a nest has reached us, taken in the Abbey parish of Renfrewshire, bordering our district.

Redbreast, *Erithacus rubecula* (L.)—Common.

Whitethroat, *Sylvia cinerea* (Bechst.)—A common species in summer. Has been noted on the 23rd and 28th April on arrival; but in 1894, though diligently sought for by a number of observers, it did not appear in our district till 12th May, when it suddenly became common.

Lesser Whitethroat, *Sylvia curruca* (L.)—Reported in a letter to the "Glasgow Herald" as occurring near Pollokshaws. Our attempts to trace it through the gentleman who mentioned it, Mr. Andrew Scobie, Hurlford, have ended unsatisfactorily.

Blackcap, *Sylvia atricapilla* (L.)—Mentioned in the same letter as the last species, but our inquiries have resulted similarly.

Garden Warbler, *Sylvia hortensis* (Bechst.)—Has nested at Upper Pollok, and has been noted at Aikenhead, on the confines of our district, by Mr. Dale, a good observer.

Golden-crested Wren, *Regulus cristatus*, Koch.—Very common in winter in plantations and in hedgerows; a few pairs remaining during the nesting season.

Chiff-Chaff, *Phylloscopus rufus* (Bechst.)—We have never met with this local bird in the district, but Mr. Dale has heard it at Aikenhead.

Willow Wren, *Phylloscopus trochilus* (L.)—This is the most common warbler in the district in summer, appearing about the second week in April.

Wood Wren, *Phylloscopus sibilatrix* (Bechst.)—We have failed to find this bird in the nesting season, but it appears regularly on Camphill in Queen's Park in the end of July and in August in some numbers.

Sedge Warbler, *Acrocephalus phragmitis* (Bechst.)—Common, arriving towards the end of April. A writer in "Science Gossip," August 1895, has drawn attention to the nest of this species being at times suspended in reeds, although this habit is asserted to distinguish the Reed Warbler from the Sedge bird. We can quite confirm, from our experience in Renfrewshire, that the Sedge bird's nest is sometimes interwoven with and suspended by the stout grasses of the hedgerow—in one instance at Loch Libo clearly suspended in a clump of *Phragmitis communis*, and in another among plants of *Epilobium angustifolium*.

Grasshopper Warbler, *Locustella nævia* (Bodd.)—Appeared in the present year in the district at Giffnock on the 1st of May, as we are informed by Mr. Robert Wilson. It was heard on the 7th, 8th, and 9th May by Mr. Robertson, who had favourable opportunities at Thornliebank and Giffnock of seeing its behaviour while reeling. On the 23rd June it was again heard in a plantation at Nether Pollok, where we suppose it breeds.

Hedge Sparrow, *Accentor modularis* (L.)—Common.

Dipper, *Cinclus aquaticus* (Bechst.)—Very common on the streams of this district, singing its simple song even in the hardest weather, although Mr. Seebohm seems to indicate that it is only tempted to sing when mild weather sets in.

British Long-tailed Titmouse, *Acredula rosea* (Blythe).—Occasionally seen in small parties, but only in winter.

Great Titmouse, *Parus major*, L.—Common.

British Coal Titmouse, *Parus britannicus*, S. and D.—Chiefly known as a winter visitor, often in considerable flocks, in the company of Goldcrests, Tree-Creepers, and Blue Titmouses.

Blue Titmouse, *Parus cæruleus*, L.—Common at all seasons.

Wren, *Troglodytes parvulus*, Koch.—Common.

Tree-Creeper, *Certhia familiaris*, L.—Most numerous in winter, a dozen birds sometimes occurring together. A few remain to breed.

Pied Wagtail, *Motacilla lugubris*, Temm. — Common at all seasons.

White Wagtail, *Motacilla alba*, L.—First observed at Balgray and Hangingshaw in the spring of this year. It has probably been overlooked at the time of the spring passage in former years.

Grey Wagtail, *Motacilla melanope*, Pallas.—Chiefly known as a winter bird.

Yellow Wagtail, *Motacilla raii* (Bp.)—A common nesting species, indeed much the commonest Wagtail in summer in this district.

Tree Pipit, *Anthus trivialis* (L.)—Common. Appearing from the 21st of April onwards.

Meadow Pipit, *Anthus pratensis* (L.)—The most common small bird on the moors in summer, here as elsewhere the Cuckoo's dupe. In winter in a day's walking on the uplands you may fail to find it. In the present year its return to its breeding haunts in numbers was noticed on the 31st of March.

Spotted Flycatcher, *Muscicapa grisola*, L.—Fairly distributed. It appears in considerable numbers in the end of July and August in Camphill.

Swallow, *Hirundo rustica*, L.—Common. The most curious circumstance in the economy of this species which has come under our observation is its nesting in the tunnels in the sandstone quarries at Giffnock and Williamwood, referred to in the "Annals," 1895, p. 54. Since that notice the birds have reappeared in their former haunts, where a bird has been seen on the nest. The tunnels present the appearance of great natural caves, and the nests are sometimes placed over the flooded workings, and are quite inaccessible. The 12th of April is the earliest date we know of its arrival here.

House Martin, *Chelidon urbica* (L.)—Locally common.

Sand Martin, *Cotile riparia* (L.)—Common in suitable localities.

Greenfinch, *Ligurinus chloris* (L.)—Common.

Goldfinch, *Carduelis elegans*, Steph.—Appears pretty regularly in winter on waste ground about Hangingshaw. It has been reported to us to have nested in two instances in recent years in Cathcart and Eastwood parishes respectively.

Siskin, *Chrysomitris spinus* (L.)—This species has not come under our observation in the district, but Mr. Cox informs us that a nest and young were taken in the North Wood at Nether Pollok a few years since by an under keeper named Spalding. We have also been informed of this bird having been taken at Giffnock by bird-catchers.

House Sparrow, *Passer domesticus* (L.)—Common.

Chaffinch, *Fringilla cœlebs*, L.—Common.

Brambling, *Fringilla montifringilla*, L.—One was seen at Cathcart on the 3rd of February 1895. Six days later one was shot at Burnside Farm, Clarkston.

Linnet, *Linota cannabina* (L.)—This species occurs regularly in autumn in small numbers on waste ground at Hangingshaw. Small flocks are sometimes seen in winter. We do not know of its breeding in the district.

Lesser Redpole, *Linota rufescens* (Vieill).—Occurs irregularly in small flocks in winter in the Giffnock district, where a few pairs have bred in recent years.

Twite, *Linota flavirostris* (L.)—Well known in the uplands in considerable flocks in winter. Breeding, as we are informed, on the Ayrshire moors, just south of Mearns parish, it may also do so in parts of Eaglesham.

Bullfinch, *Pyrrhula europæa*, Vieill.—Comparatively rare in the district, chiefly appearing in midwinter. A pair came under our notice at Patterton Quarry on 8th April 1894, and we believe it has nested in this locality.

Corn Bunting, *Emberiza miliaria*, L.—This is a rare species in our district, one only having come under observation at Clincart Farm, within the Glasgow boundaries.

Yellow Bunting, *Emberiza citrinella*, L.—Common.

Reed Bunting, *Emberiza schœniclus*, L.—A well-known bird in the district. We have seen the nest in a thorn hedge on the moor at Giffnock, about four feet from the ground, an unusual height for this species to build at.

Snow Bunting, *Plectrophenax nivalis* (L.)—An uncertain winter visitor, sometimes occurring in flocks and sometimes singly.

Starling, *Sturnus vulgaris*, L.—Common.

Jay, *Garrulus glandarius* (L.)—We are only able to record the occurrence of two stray examples. One was caught at Nether Pollok about twenty years ago, in a trap set for a prowling domestic cat. Mr. Gilmour informs us of another shot twenty-five years ago in the Stonebyres Wood on his property.

Magpie, *Pica rustica* (Scop.)—Fortunately this handsome bird is not yet uncommon in the district, nesting here and there. The largest number we have seen together, was a party of eleven, early in the present year, at Thornliebank ; but eighteen and nineteen have been seen together by others in recent years.

Jackdaw, *Corvus monedula*, L.—Common, but greatly out-numbered by the Rook.

Raven, *Corvus corax*, L.—Mr. Gilmour informs us he has in his possession one shot in the Stonebyres Wood about fifty years ago.

Carrion Crow, *Corvus corone*, L.—Mr. Gilmour has one which was shot on 26th October 1892. This is a decidedly rare bird in our district, keepers declaring they have never known a place where it was so scarce.

Hooded Crow, *Corvus cornix*, L.—This species is better known than the last ; but, though sometimes trapped, it is an unfamiliar bird.

Rook, *Corvus frugilegus*, L. — Abundant. There are many rookeries in the district, though none of great size. The apparently recently acquired egging propensity of the Rook has brought it under the ban of the game preserver. The loss of eggs on one estate in our area is estimated at 6000 per annum in recent years. Thirty years ago the Rook caused no anxiety in this connexion.

Skylark, *Alauda arvensis*, L.—Common, particularly in the uplands and in winter, sometimes occurring in enormous numbers when snow is on the ground.

Swift, *Cypselus apus* (L.)—Fairly common, arriving in the last days of April or first two or three days of May.

Nightjar, *Caprimulgus europæus*, L.—Has been mentioned by Gray as occurring in Queen's Park, and has been heard at Nether Pollok, but we know of no instance of its occurrence for the past twenty years.

Kingfisher, *Alcedo ispida*, L.—Not unfamiliar on our streams, also on the reservoirs in the uplands. A few pairs breed.

Cuckoo, *Cuculus canorus*, L.—Common, arriving from the middle of April. Twice in the same season within a few days, and at localities about fifty yards apart, the egg of the Cuckoo has been found in the Sedge Warbler's nest.

Barn Owl, *Strix flammea*, L.—Formerly bred, as Mr. Cox informs us, at the railway bridge over the Cart at Pollokshaws. We suppose it to have nested at Darnley, where it has been seen in the breeding season. It is a species little known nowadays.

Long-eared Owl, *Asio otus* (L.)—Comparatively common, and the best-known Owl in the district. Five eggs partially incubated were found on 26th March 1887. A small plantation suffices for this bird's requirements.

Short-eared Owl, *Asio accipitrinus* (Pallas).—Well known in autumn to sportsmen on our moors.

Tawny Owl, *Syrnium aluco* (L.)—Resident, and breeds, but much less numerous than *A. otus*.

Snowy Owl, *Nyctea scandiaca* (L.)—One was obtained at Pollokshields (Gray, "Birds of the West of Scotland," p. 63).

Hen Harrier, *Circus cyaneus* (L.)—Mentioned in the New Statistical Account of Eaglesham.

Sparrow Hawk, *Accipiter nisus* (L.)—Not common, but breeds. Mr. Cox tell us, that in the thirty years he has been at Nether Pollok he knows no difference in the numbers of this species and the Kestrel.

Peregrine Falcon, *Falco peregrinus*, Tunstall.—The writer of the New Statistical Account of Eaglesham says he has handled examples of this and the following species shot on Mearns Moor.

Hobby, *Falco subbuteo*, L.—See previous species.

Merlin, *Falco æsalon*, Tunstall.—Has been shot in Mearns, and may nest on the heathery moors in Eaglesham.

Kestrel, *Falco tinnunculus*, L.—Most numerous in winter.

Cormorant, *Phalacrocorax carbo* (L.)—Mr. Gilmour gives us the following interesting note referring to the 22nd December 1894:—"During the height of the big gale my boys and I watched a Cormorant fighting to make headway against the wind for some time, high up in the air, but it was eventually beaten, and blown away south-eastwards.

Shag, *Phalacrocorax graculus* (L.)—Mr. Morris Young informs us of the occurrence of this species at Glanderston Dam.

Gannet, *Sula bassana* (L.)—A party of six was observed passing over Thornliebank on 29th June in 1892.

Common Heron, *Ardea cinerea*, L.—Although we do not know of the Heron breeding in this district, it is a common bird on the numerous lochs in Mearns and Eaglesham. Two seasons in August parties of thirteen and fourteen respectively have come under our notice at the Glen reservoir.

Barnacle Goose, *Bernicla leucopsis* (Bechst.)—Mr. Gilmour informs us that on 5th October 1882 he saw twenty-five Barnacle Geese alighting at Binend Loch. Some shot at that time are in his possession. Again, on 8th October 1887 he saw a flock of thirty heading south-east.

*Cygnus.*—Swans have been seen and shot in the district, but we have no information to enable us to state specifically what they were.

Common Shelduck, *Tadorna cornuta* (Gm.)—This species has been once shot at Nether Pollok, and Mr. Gilmour tells us of a flock of ten which he saw at Eaglesham.

Mallard or Wild Duck, *Anas boscas*, L.—Occurs in large flocks in winter. Only a few remain to breed. One spot in Mearns has been occupied for nesting for the past twelve years.

Shoveller, *Spatula clypeata* (L.)—One has been shot at Nether Pollok. A pair, ♂ and ♀, were observed on 23rd April 1895, on the Little Loch, in passage.

Pintail, *Dafila acuta* (L.)—Very rare, but has been shot on Balgray Dam (22nd December 1894, the day of the great storm), one on the pond in the North Wood at Nether Pollok, and one on the Cart during the winter of 1894-95.

Teal, *Querquedula crecca* (L.)—A well-known winter visitor, and an occasional breeder in the district.

Wigeon, *Mareca penelope* (L.)—Common in winter on the lochs of the uplands. A drake was observed at the Little Loch as late as the 9th of June this year.

Pochard, *Fuligula ferina* (L.)—Occurs in large flocks in winter.

Tufted Duck, *Fuligula cristata* (L.)—So far as we can learn, it is during the past decade that this duck began breeding in the district, and in the period indicated it has entirely eclipsed the Mallard and Teal in its numbers as a breeding species. A dozen nests were known to us last year. This year (1895) they have been very much scarcer, perhaps attributable to the unusual drought of spring and the phenomenal lowness of the lochs resulting therefrom.

Golden-Eye, *Clangula glaucion* (L.)—A common winter visitor, remaining till May.

Goosander, *Mergus merganser*, L.—Frequent in winter.

Red-breasted Merganser, *Mergus serrator*, L.—This species has been reported to us as a winter visitor, but we have not observed it.

Ring Dove or Wood Pigeon, *Columba palumbus*, L.—Abundant. A clutch of eggs has been found in the district on 9th April, and a nest in the first week in October with young birds not nearly feathered.

Stock Dove, *Columba œnas*, L.—Towards the end of a hard spell, about twenty years since, Mr. Cox trapped a number of small doves, no doubt referable to this species.

Black Grouse, *Tetrao tetrix*, L.—A breeding species in Mearns and Eaglesham. About a hundred cocks have been shot on one estate in a season.

Red Grouse, *Lagopus scoticus* (Lath.)—Common in suitable localities in Eaglesham and Mearns.

Pheasant, *Phasianus colchicus*, L.—Common.

Partridge, *Perdix cinerea*, Lath.—Common in the lowlands, and a few in the uplands.

Quail, *Coturnix communis*, Bonnat.—This species has occurred in a solitary instance at Nether Pollok.

Corncrake, *Crex pratensis*, Bechst.—Common, arriving regularly in the last week of April.

Water-Rail, *Rallus aquaticus*, L.—Occurs occasionally throughout the district, but it is not known to breed.

Moor-hen, *Gallinula chloropus* (L.)—Common.

Common Coot, *Fulica atra*, L.—Common. Has become much scarcer at Balgray on account of the removal of suitable cover.

Ringed Plover, *Ægialitis hiaticula* (L.)—Mentioned by Gray as occurring in Eaglesham, where Mr. Gilmour tells us he has seen numbers in spring. This species has only come under our notice in the present autumn and in Mearns.

Golden Plover, *Charadrius pluvialis*, L.—Very common in cultivated ground in autumn and winter. Not very numerous as a nesting species. Eggs are not infrequently found in the second week in April (and these sometimes partially incubated). This is earlier than it is usually stated to nest in this country.

Lapwing, *Vanellus vulgaris*, Bechst.—Common. In winter flocks of thousands are not infrequently seen.

Oyster-Catcher, *Hæmatopus ostralegus*, L.—This species was heard passing near Pollokshaws on 29th July 1894.

Woodcock, *Scolopax rusticula*, L.—Not numerous in winter. Not known to breed.

Common Snipe, *Gallinago cœlestis* (Frenzel).—Common.

Jack Snipe, *Gallinago gallinula* (L.)—Always a few in winter.

Dunlin, *Tringa alpina*, L.—The commonest nesting wader in suitable localities in Mearns and Eaglesham, the Lapwing alone excepted. The second week in May is the usual time to find fresh eggs, although broken eggs have been found in a nest on 30th April in our district.

Ruff, *Machetes pugnax* (L.)—Mr. Gilmour informs us that a Reeve was shot on his property out of a flock of Golden Plovers.

Common Sandpiper, *Totanus hypoleucos* (L.)—Common. Appears earlier in the Glasgow district than it is generally supposed to arrive in this country. Thus last year (1894) several were seen at Dalbeth on 11th April ; this year (1895) as early as the 5th, and again in numbers on the 10th. No doubt some of these birds were in passage, but that the birds which nest here arrive early is borne out by the following :—6th May 1893, Loch Cochno, Kilpatrick Hills, nest with three eggs ; 11th May 1895, nest with two eggs at Ryat, in Mearns, and on same date, at Fyn Loch (over 1000 feet elevation), in the Kilpatrick Hills, nest with two eggs. The earliest occurrence of this species that Mr. Macpherson mentions in his "Fauna of Lakeland" is a single bird on 11th April, and the earliest nest one with a clutch of eggs on 10th May. Professor Newton, "Dictionary of Birds," part iii., 1894, says this species usually arrives in May.

Redshank, *Totanus calidris* (L.)—Common.

Green Sandpiper, *Totanus ochropus* (L.)—One shot on the Cart, 10th November 1868, and another seen in its company, have been recorded by Gray ("Birds of the West of Scotland," p. 293).

Greenshank, *Totanus canescens* (Gm.)—Gray has mentioned the occurrence of this species at Mearns, and has expressed the possibility of its nesting on the moor there. This has not been confirmed, although the bird has been seen by Mr. Morris Young, and Mr. Gilmour shot one on the 4th of August last year (1894).

Common Curlew, *Numenius arquata* (L.)—Common.

Tern, *Sterna* ——?—Terns have been shot on Balgray, but we have no information as to the species.

Black-headed Gull, *Larus ridibundus*, L.—At Harelaw, on the borders of our district, the great colony of Black-headed Gulls described by Gray ("Birds of the West of Scotland," p. 476) still maintains its position. A few have bred at Binend Loch, and about ten years ago many bred on an island in the Brother Loch, but owing to disturbance they have not succeeded in establishing a colony there.

Common Gull, *Larus canus*, L.—Once observed in the Recreation Ground, Queen's Park, in winter.

Herring Gull, *Larus argentatus*, Gm.—So far as we know, it is only in recent winters that this species has become a common visitor to fields in this district in mid-winter, sometimes to the number of several hundreds of birds together.

Lesser Black-backed Gull, *Larus fuscus*, L.—Not infrequently seen in summer on the lochs and moors. Scarcer in winter.

Kittiwake Gull, *Rissa tridactyla* (L.)—One was found dead at the Brother Loch, 11th November 1894.

Little Auk, *Mergulus alle* (L.)—One was captured at Balgray Dam on 31st January 1895 during the irruption of this species.

Puffin, *Fratercula arctica* (L.)—Two have occurred in recent years —one at Darnley, and the other near Mearns Castle.

Red-throated Diver, *Colymbus septentrionalis*, L.—Mr. Creber, of the Waterworks, Darnley, has one which was shot on the Glen Dam about four years ago.

Great Crested Grebe, *Podicipes cristatus* (L.)—This handsome bird has bred in this district in recent years; and though it has been much persecuted it still reappears in its breeding haunts, where we have observed it in the present year (1895).

Red-necked Grebe, *Podicipes griseigena* (Bodd.) and Sclavonian Grebe, *Podicipes auritus* (L.)—Probably the above are what were intended by the writer of the New Statistical Account of Eaglesham for *Podicipes ruficollis* and the Eared Grebe.

Little Grebe, *Podicipes fluviatilis* (Tunstall).—Common.

Fork-tailed Petrel, *Cymochorea leucorrhoa* (Vieill).—One was found dead near Mearns on the day of the Tay Bridge storm in December 1879. This bird is in the possession of Mr. Daniel Waterhouse, Newton Mearns.

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## WIGEON (*MARECA PENELOPE*) BREEDING IN SELKIRKSHIRE.

By Peter Adair.

With reference to Mr. Wm. Evans's note ("Annals," 1893, p. 115), I have much pleasure in reporting this bird as an undoubted breeding species in the small lochs which he visited in June 1889.

In connection with the point, it may not be out of place to state the result of my observations during an annual angling visit to one of the lochs for a period of some fifteen years. A day yearly has been devoted to the loch referred to, generally in the middle of June or a week later. Here this bird was not observed by me till June of 1884 or 1885;

but I have since seen it yearly on that loch. Not more than one to three birds were seen in any one day, except on the occasion after mentioned. Sometimes the birds were on the loch on our arrival in the morning. On other occasions they came on during the day, singly as a rule, and almost always ducks. Scarcely a drake was to be seen at that time of the year. But on 6th May 1889 (in which year the loch was visited twice) four drakes and three ducks rose from the loch on our arrival early in the day, and flew off in an easterly direction. A couple of ducks returned in the afternoon, but remained only a few minutes. On 16th June 1893 ducklings were observed by me among the reeds at the south side of the loch, at a point which was inaccessible, so that the fact could not be verified by a capture. These were the first ducklings seen by me. The duck on that occasion displayed remarkable solicitude for her young, repeatedly flying within thirty yards of where I stood.

On the occasion of our visit to Ettrick in the end of the third week of last June, our angling party had the pleasure of the company of Mr. W. Eagle Clarke; and it was arranged to devote a day to a search for the nest or the young. The search party, which consisted of Mr. Eagle Clarke, Mr. Alexander Sturrock, and Mr. A. M. Milroy, all of Edinburgh, and myself, visited four small but singularly sequestered lochs in addition to the loch above referred to. From the first of the four a couple of Mallard drakes were flushed, but no Wigeon. The second held a Wigeon drake and three ducks, one of which, from her actions, had young. On the third loch and its outlet we found three Wigeon ducks, each with a brood. We had an excellent opportunity of observing the first brood, three in number, from a distance of some ten yards, as they swam through some long grass at the edge of the loch. During our inspection one of the young birds was, I regret to say, taken by what I assume, from the commotion in the water, to have been a large pike, with which fish the loch abounds. The remaining two broods were in the stream which forms the outlet of the loch. From one of these broods a couple of birds were secured. We were unable to ascertain the number of birds in these broods, as the young at once con-

cealed themselves under the banks, and we did not desire to disturb them after identification was complete. On the fourth loch visited we saw a brood of six young Wigeon and several old birds, in addition to other wild-fowl. All the young Wigeon seen appeared to be of the same age, which we estimated at ten days. A conspicuous and unvarying feature in the ducks with broods was an extreme solicitude for their young. They kept flying round our party, often within easy gunshot, uttering their peculiar croak, so long as we intruders remained in the neighbourhood of their progeny. Following Mr. Evans's example, of which I approve, I do not think it judicious to be more specific as to locality.

I believe that this is the first occasion on which the breeding of the Wigeon, in a wild state, has been reported, with proofs, south of the Forth.

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## NOTES ON SOME RARE FRESHWATER AND MARINE COPEPODA FROM SCOTLAND.

By Thomas Scott, F.L.S.,
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and Andrew Scott,
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### Plate IV.

One of the Authors of the following Notes, in a paper recently published in the "Annals of Scottish Natural History," refers very briefly to the recent discovery of two freshwater Copepods in Loch Leven, Kinross-shire, that have not previously been recorded as members of the British fauna. Though both species have been described in continental works, we do not know of any description of them in English, and have therefore prepared, and now submit, the following descriptions, with illustrative drawings, based upon specimens obtained in Loch Leven. We also take this opportunity to record some observations on the habits

of two marine Copepods that have been added to the British fauna within the last year or two.

We first describe the species from Loch Leven.

CANTHOCAMPTUS SCHMEILII, *Mrazek*, Plate IV. Figs. 1-13.

1893. *Canthocamptus schmeilii*, Mrazek, "Beitrag zur Kenntniss der Harpacticidenfauna des Süsswassers" ("Zoologische Jahrbücher," Siebenter Band), p. 116, Taf. VII. Figs. 107-117.

DESCRIPTION.—*Female.*—Length .8 mm. ($\frac{1}{31}$ of an inch). The cephalothoracic segments serrated on the posterior margins both dorsally and laterally; the abdominal segments with the posterior edges serrated only on the dorsal aspect, while laterally they are fringed with setæ; the whole integument of the thorax and abdomen covered with minute hairs. The antennules (anterior antennæ) somewhat shorter than the first cephalothoracic segment, and eight-jointed: the fifth and seventh joints are shorter than any of the others, the seventh only about half the length of the end joint. The proportional lengths of all the joints are shown by the annexed formula:—

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Proportional lengths of the Joints | 13 | 13 | 14 | 12 | 8 | 11 | 6 | 12 |
| Number of the Joints | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8. |

The secondary branches of the antennæ (posterior antennæ) are two-jointed: the first joint bears one seta, but the end joint is furnished with two terminal setæ—one slender, and one stout and spiniform (Fig. 4). The mandible-palp consists of a single very small joint and bears two terminal hairs. The inner branches of the first pair of swimming feet are considerably longer than the outer branches, they are two-jointed, the first joint reaches to about the end of the outer branches, the second is equal to about three-fourths of the length of the first joint, and is also more slender and provided with two apical setæ—one very long, the other about half the length; the marginal spines of the outer branches are moderately stout and elongate; a moderately stout spine springs from the interior distal angle of the second basal joint, and extends to about the middle of the first joint of the inner branches (Fig. 5). The inner branches of the second, third, and fourth pairs are also two-jointed and much shorter than the outer branches, and the first joint of all the inner branches of these three pairs is considerably shorter than the second joint; in the fourth pair the inner branches are furnished with only one seta, which is terminal and spiniform (Fig. 6). The secondary joint and the inner produced part of the basal joint of the fifth pair are subquadrangular in outline: the secondary joint does not extend much beyond the end of the basal

joint, and is provided with five setæ, four at the apex and one on the outer margin,—the middle seta is short, but the others are elongate and plumose; the inner produced part of the basal joint is also furnished with five setæ, all of which are plumose and arranged as shown by the drawing (Fig. 10). Caudal stylets narrow, subconical, and equal to about three-fourths the length of the last abdominal segment: they each bear a long spiniform terminal seta and several very small hairs (Fig. 12).

*Male.* — Fig. 3 in the plate is a drawing of one of the male antennules, which are strongly hinged, as shown. In the male the second pair of swimming feet have the inner branches slender and two-jointed: the second is of considerable length, and reaches to nearly the end of the outer branches (Fig. 7). The inner branches of the third pair are three-jointed, the first two joints are short, but the second joint has the inner angle produced into a long spiniform appendage that extends considerably beyond the end of the third joint (Fig. 8). In the fourth pair the inner branches are two-jointed, and scarcely longer than the first joint of the outer branches: the two terminal setæ are bent inwards at an obtuse angle, which seems to be the normal position of them; the second joint in the outer branches is not only armed with a stout, elongate, and somewhat curved spine, but has also the exterior distal angle produced into a strong, conical, and slightly bent tooth-like process (Fig. 9). The male fifth pair are much smaller than those of the female: the basal joint is only slightly produced interiorly, and bears two setæ, one moderately long and stout and one very short; the secondary joint is furnished with three moderately stout setæ (Fig. 11). The caudal stylets are considerably shorter than those of the female, and the terminal setæ are more elongate (Fig. 13).

*Habitat.*—Amongst mud by the shore at the west end of Loch Leven, Kinross-shire; collected, June 1890.

Remarks.—*Canthocamptus schmeilii* was described and figured by Dr. Mrazek in the "Zoologische Jahrbücher" in May 1893, from specimens obtained by him in two different localities in the neighbourhood of Pribram, in Bohemia, in 1891-92. The species is quite distinct and easily recognised. The peculiar angularity of the specimens is so characteristic that they can be identified with certainty with an ordinary hand-lens. The species differs from its nearest allies by the elongate form of the two-jointed inner branches of the first pair of swimming feet. The female also differs further in the form of the fifth pair of feet and of the caudal stylets, and the male in the structure of the inner branches of the second, third, and fourth pairs of feet. Dr. Mrazek in his description appears to have inadvertently taken the fourth pair of the male for the second, and he also represents the inner produced part of the basal joint of the male fifth pair as furnished with three setæ instead of two, but

otherwise his description and figures agree very well with the Loch Leven specimens. There can be no doubt that our drawings of the second, third, and fourth swimming feet in the male are correct, and represent them in their proper sequence. The difference in the number of hairs in the fifth pair of the male may be due to local variation.

Loch Leven, so far as we know, is as yet the only British locality where *Canthocamptus schmeilii* has been obtained; and though collected in 1890, the gathering in which the specimens occur was somehow overlooked until the present year.

### Canthocamptus minutus, *Claus*, Plate IV. Figs. 14-20.

1863. *Canthocamptus minutus*, Claus, "Freileb. Copep.," p. 122, Taf. XII. Figs. 1-3, Taf. XIII. Fig. 1.

1893. *Canthocamptus minutus*, Schmeil, "Deutschlands freileb. Sussw. Copep.," p. 31, Taf. II. Figs. 1-14.

Description.—*Female.*—Length .6 mm. ($\frac{1}{42}$ of an inch). Body slender, rostrum small. Antennules moderately stout, shorter than the first cephalothoracic segment, eight-jointed; the fifth joint being shorter than any of the others. The proportional lengths of the various joints are as follow:—

| Proportional lengths of the Joints | 10 | 10 | 9 | 8 | 5 | 9 | 8 | 10 |
|---|---|---|---|---|---|---|---|---|
| Number of the Joints | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8. |

The secondary branches of the antennæ are small and two-jointed, the end joint is shorter than the other, the first joint bears one and the end joint three setæ (Fig. 16), the mandible-palp is very small and one-jointed. The inner branches of the first, second, and third pairs of swimming feet are three-jointed. The inner branches of the first pair are rather longer than the outer branches, the first and third joints are nearly equal in length and rather longer than the middle joint, the three joints are each furnished with a small seta near the distal end of the inner margin, and the end joint is also armed with two setæ—one long and slender and one short and spiniform; a moderately long plumose hair springs from the middle of the inner margin of the second joint of the outer branches, and the exterior marginal spines of the outer branches are stout and elongate (Fig. 17). In the second and third pairs the inner branches are considerably shorter than the outer branches. In the fourth pair the inner branches are two-jointed, and only extend to a little beyond the end of the first joint of the outer branches (Fig. 18). The fifth pair has the inner produced portion of the basal joint broadly but irregularly rounded and provided with six setæ: the setæ are divided into two groups of three setæ each, and with a comparatively wide space between each group; those of the

inner group are all elongate and plumose, the middle one being rather longer than the other two; the outer group consists of one elongate and two very short setæ. The secondary joint is narrow, subcylindrical, and extends somewhat beyond the end of the basal joint; it also bears six setæ—three on the distal half of the outer margin, one small seta on the inner margin, and two apical setæ, one of which is long and stout and one very short (Fig. 19). The caudal stylets are short, and the anal operculum carries a fringe of short bifid spines on the posterior margin (Fig. 20).

*Habitat.*—Loch Leven, Kinross-shire, along with *Canthocamptus schmeilii*, but not nearly so common.

Remarks.—This is a more typical *Canthocamptus* than the one previously described, and may be distinguished from other species of the same group by the structure of the first pair of swimming feet, as also by the bifid spines on the anal operculum, which appear to be peculiar to this species.

Loch Leven is, so far, the only Scotch locality where *Canthocamptus minutus* has been obtained; but since its discovery in Loch Leven we have obtained information of its occurrence in several localities in England. Mr. D. J. Scourfield obtained it last year at Wanstead Park and in the Isle of Wight, and this year in Wales; while one of the authors of the present memoir (Mr. A. Scott) has recently discovered it in a marshy drain near Leasowe Lighthouse, Cheshire.

The genus *Canthocamptus*, as described by several authors, seems to us to be too inclusive, and to contain forms so diverse in structure that a revision of the genus will ere long become necessary in order to facilitate the study of the various divergent species of which it is composed. We need only refer to the following among other diversities of structure to show how heterogeneous are the forms at present included in this genus. Thus, for example, in some species the secondary branches of the antennæ (posterior antennæ) are one-jointed, and in others two-jointed. In some species again the inner branches of the first pair of swimming feet are composed of two equal or nearly equal joints, while in others they are three-jointed: these inner branches are in various species either equal in length to, or considerably longer than, the outer branches. Moreover, in some species the inner branches of all the first four pairs of swimming feet are two-jointed or three-jointed, while in some the inner branches of the first pair or the first two or three pairs are three-jointed, and of the other pairs two-jointed. In 1880 Dr. Brady established the genus *Attheyella* for one or two aberrant forms of the *Canthocamptinæ;* but objection is taken by Continental authors to this genus, who regard it as synonymous with *Canthocamptus*. But *Canthocamptus* as it at present stands is not, as we have indicated, a very satisfactory genus.

The following are the notes on two species of Marine Copepods :—

DERMATOMYZON GIBBERUM, *T. and A. Scott.*

1894. *Dermatomyzon gibberum*, T. and A. Scott, "Ann. and Mag. Nat. Hist." (vi.), vol. xii. p. 144, Plate IX. Figs. 10-14.

This species was described from a single specimen obtained in a tow-net gathering collected in the vicinity of the Bass Rock, Firth of Forth. Its structure seemed to indicate parasitic habits, but there was nothing at the time of its discovery to show what animal formed its host. In the early part of this year one of the authors, while superintending some line-fishing experiments in the Firth of Forth, collected a number of specimens of the common Starfish (*Asterias rubens*) that were brought up attached to the hooks. These starfishes were subsequently washed in a bottle containing methylated spirit, and the result was that nearly one hundred specimens of *Dermatomyzon gibberum* were obtained, most of which, however, appeared to be immature, and only a few of them carried ovisacs. A short time after the capture of these specimens in the Firth of Forth, several examples of this starfish obtained in Liverpool Bay were examined, and these also, on being washed in methylated spirit, yielded a number of specimens of *Dermatomyzon gibberum;* but in this case, though the specimens were not so numerous as those taken in the Forth, a greater proportion of them were mature and carried ova. From these and other investigations made by us, we are inclined to think that this Copepod is probably parasitic on *Asterias rubens*, but whether it is confined to that starfish we are as yet unable to say.

The colour of the animal is brick-red, with a few whitish streaks, so that in the fresh state *Dermatomyzon gibberum* is not unlike the young of the mollusc *Pectunculus glycimeris*. The colour, however, soon disappears when the animal is put into methylated spirit.

LICHOMOLGUS HIRSUTIPES, *T. Scott.*

1893. *Lichomolgus hirsutipes*, T. Scott, "Eleventh Annual Report of the Fishery Board for Scotland," part iii. p. 286, Plate IV. Figs. 1-12.

This is a comparatively large Copepod, being in some cases at least $\frac{1}{20}$ of an inch in length. It was first obtained among some trawled material collected in the Firth of Forth at the "Rath Ground," a shallow bank situated a short distance north of the Bass Rock. *Lichomolgus hirsutipes*, like the *Dermatomyzon* just described, appears to be more or less parasitic in its habits, but at the time of its discovery we did not know of any animal with which it was likely to be associated. During the same line-fishing experiments that are referred to in the notes on *Dermatomyzon gibberum*, various


Andrew Scott, del ad nat. R & R Clark, imp.

Figs 1-13 canthocamptus schmeilii mrazek.
Figs. 14-20 canthocamptus minutus, claus

other things besides the starfishes mentioned were brought up on the hooks, and among others were a few large Annelids, probably belonging to a species of *Sabella*. These Annelids form tubes of fine mud, which is mixed with and held together by a glutinous substance secreted by the animal. These tubes were found to be invariably more or less covered by a growth of *Alcyonium*. In some instances these tubes contained the living Annelid, but several of them were empty. It was only when fishing in moderately deep water—15 to 20 fathoms or so—that these large worm-tubes were obtained. Though the *Alcyonium* had usually spread itself over a large portion of the tubes, the upper end—the end that corresponded with the head of the worm—was generally free from the enveloping Zoophyte. White specks were observed on nearly all the specimens, and were sparingly scattered over the upper part of the tube. These white specks all proved to be Copepods, which, when examined under the microscope, were without exception found to belong to the species mentioned above, viz. *Lichomolgus hirsutipes*.

Though we have not yet been able to ascertain if *Lichomolgus hirsutipes* is only to be obtained in the Firth of Forth associated with this Annelid, or whether it is associated with the same Annelid elsewhere in the British seas, the facts mentioned seem to indicate an association between the Copepod and Annelid not altogether accidental, and, if so, they may probably occur associated in the same manner in other localities where the conditions are suitable.

## Description of Plate IV.

*Canthocamptus schmeilii*, Mrazek.

| | | | |
|---|---|---|---|
| Fig. | 1. | Female, lateral view | × 80 |
| ,, | 2. | One of the Female Antennules | × 253 |
| ,, | 3. | One of the Male Antennules | × 253 |
| ,, | 4. | One of the Antennæ | × 253 |
| ,, | 5. | Foot of first pair | × 380 |
| ,, | 6. | Foot of second pair (female) | × 253 |
| ,, | 7. | Foot of second pair (male) | × 380 |
| ,, | 8. | Foot of third pair (male) | × 253 |
| ,, | 9. | Foot of fourth pair (male) | × 253 |
| ,, | 10. | Foot of fifth pair (female) | × 253 |
| ,, | 11. | Foot of fifth pair (male) | × 380 |
| ,, | 12. | Last Abdominal Segment and Caudal Stylets (female) | × 127 |
| ,, | 13. | Last Abdominal Segment and Caudal Stylets (male) | × 127 |

*Canthocamptus minutus*, Claus.

| | | | |
|---|---|---|---|
| ,, | 14. | Female, lateral view | × 80 |
| ,, | 15. | One of the Antennules | × 253 |
| ,, | 16. | One of the Antennæ | × 253 |
| ,, | 17. | Foot of first pair | × 380 |
| ,, | 18. | Foot of fourth pair | × 190 |
| ,, | 19. | Foot of fifth pair | × 380 |
| ,, | 20. | Last Abdominal Segment and Caudal Stylets | × 190 |

# CONTRIBUTIONS TOWARDS A FLORA OF THE OUTER HEBRIDES. No. 2.[1]

By Arthur Bennett, F.L.S.

Since my first notes on the flora of these islands, various additions have been made, more especially by Mr. W. S. Duncan and Dr. W. A. Shoolbred. The latter's visit last year produced an interesting series of plants, the results of which he has embodied in a paper in "The Journal of Botany" (1895), pp. 237-249.

In this paper, remarking on my former one, he says: "Mr. Bennett's estimate of the number likely to be added to the flora will, I think, prove to be under the mark." My estimate of the probable addition of fifty or sixty species was based on a study of that of the Inner Hebrides, the mainland adjoining, and general conditions of climate and distribution. But those fifty or sixty species took no notice of the *Rubus* or *Hieracium* "species," so that the forty species added by Dr. Shoolbred must be reduced to twenty-four to fairly be taken in comparison with my remarks. Since 1892 the West of Scotland has been shown to produce several species not then considered elements in its flora; and I would now raise my estimate to about sixty-six species beyond the 1892 records as likely to occur.

Of published information relating to the Islands may be named:

Mr. Gorrie's *Notes on a Tour to Atholl, The Lews*, etc., "Edin. Nat. Field Club," 1876; and Mr. T. Scott's *Barra Ferns*, "Ann. Scot. Nat. Hist." (1894), p. 187.

I notice here not only actual additions, but confirmations of old records which Watson had doubted, and either ignored or placed in square brackets as errors or doubtful.

Thalictrum.—Undoubtedly two forms occur in Benbecula. The one is T. dunense, *Dum.;* the other one I cannot at present give a name to.

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[1] First paper, "Ann. of Scot. Nat. Hist." (1892), pp. 56-64.

Ranunculus marinus, *Fr.?*—I have seen no British specimens that I could refer with certainty to this; all seem rather forms of *Baudottii* without floating leaves, and not having the nearly sessile and shorter and stouter leaves of *marinus*.

R. petiolaris, *Marshall*.—N. Uist, Dr. Shoolbred. Dr. Shoolbred also gathered a form that decidedly tends to form a step towards typical *Flammula;* and after seeing a large series of forms of *Flammula*, I am inclined to alter my opinion as to *petiolaris* being a species, and would now prefer to call it a sub-species. Dr. Shoolbred also gathered a curious small form near Scalpeg, N. Uist; but he says it shaded off towards the ordinary plant as the ground became damper.

Caltha palustris, Guerangerii (*Bor.*)—West side of N. Uist, Dr. Shoolbred. Under the nomenclature of Dr. Huth this is v. *typica*, forma 2 *cornuta*, Schott, Nyman, and Kotschy, "Analecta bot.," tom. 1 (1854); he also says it is *C. croatica*, Schur. I suppose that most would prefer to write it *C. palustris*, var. *serratus*, Breb., "Fl. Norm.," ed. 2, = *C. Guerangerii*, Bor.: a name Dr. Huth has failed to note.

Nuphar luteum.—Lake Larnvagha in Lewis; Gorrie, *l.c.* In fair quantity in several small lakes on the east side of N. Uist, Dr. Shoolbred. This confirms Macgillivray's record. On the mainland this seems to fail to reach so far north as *Nymphæa alba*. I know of no record higher than W. Ross; while *alba* reaches Shetland, though rare there, and is unreported for Orkney. In Scandinavia their distribution is almost identical, as it is in Finland, failing to reach only the far northernmost provinces.

Brassica campestris.—West shore of Benbecula and N. Uist.

Draba incana.—On Capval in Harris, W. S. Duncan, *sp.* Confirms Macgillivray's report for same mountain.

Raphanus maritimus.—Harris, Sept. 1892, W. S. Duncan, *sp.* Also confirming Macgillivray's record.

Lychnis alba.—"Seen in meadows near Balleloch, N. Uist, but no specimen gathered" (Dr. Shoolbred).

Cochlearia grœnlandica, *L.*—N. Uist and Benbecula. I am unable to concur in the naming of some of Dr. Shoolbred's specimens in this genus; but I give it as he reports it.

Spergularia marginata.—Valley Strand, Loch Maddy, N. Uist, Dr. Shoolbred.

S. rupestris.—West side of Benbecula, near Loch Maddy, N. Uist, Dr. Shoolbred. A form of this plant not nearly so glandular as usual, and nearly the var. *glabrescens*, Lebel, and not so robust as usual, takes the plant further west, but not quite so far north as previously on record, viz. W. Ross.

Cerastium triviale, *var.* pentandrum, *Syme.*—Near Loch Maddy, N. Uist, Dr. Shoolbred.

Cytisus scoparius, *Link.*—E. Tarbert Bay, near the Manse, undoubtedly originally planted, Dr. Shoolbred. Wanting only in the Outer Hebrides, Orkney (planted?), and Shetland. Common and extending farther north than *Ulex* in Scandinavia, and in S. Norway.

The following "species" of *Rubus* were determined by Rev. Moyle Rogers for Dr. Shoolbred:—

Rubus rusticanus, *Merc.*—Castle Bay, Barra.

R. villicaulis, *var.* insularis, *F. Aresch.?*—Cliffs at base of Rogneval, S. Harris.

R. gratus, *Focke.*—Plentiful near Obbe, S. Harris. "The first Scottish specimens of *R. gratus* I have seen or heard of" (Rogers to Shoolbred).

R. carpinifolius, *W.* and *N.*—Cliffs near Scanlisle, Benbecula.

R. mucronatus.—N. Uist and Benbecula.

R. radula, *Weihe.*—Near Castle Bay, Barra.

R. rosaceus, *W.* and *N.*—Barra: "a form apparently of this" (Rogers to Shoolbred.)

Rosa canina, *L.*, subcristata, *Baker.*—Cliff, E. Tarbert Bay, S. Harris, Dr. Shoolbred. Name nearly certain; though in the north it is difficult to determine this group without good fruit.

Alchemilla arvensis.—Cultivated fields at Scarp, W. S. Duncan, *sp.*

Chrysosplenium oppositifolium.—South of Tarbert, Harris, W. S. Duncan, *sp.*, May 1894. "Ann. Scot. Nat. Hist.," 1894, p. 186.

Epilobium angustifolium.—"Just out of reach on sea-cliffs near Loch Maddy, N. Uist; not in flower, but I have no doubt of identity" (Dr. Shoolbred).

E. anagallidifolium, *Lam.*, × palustre, *L.*—Ben Eaval, N. Uist. Dr. Shoolbred.

Œnanthe Lachenalii, *C. Gmel.*—Freshwater loch near Bovey, Benbecula (and others), Dr. Shoolbred. Reported for W. Ross, but not confirmed, so far as I know; otherwise its most northern station is in the S. Ebudes of Watson.

Galium palustre, Witheringii.—N. Uist, Dr. Shoolbred.

Galium sylvestre, *Poll.*—Shore of sea loch near Loch Maddy, N. Uist, Dr. Shoolbred.

Valerianella dentata.—Sandy fields near Balleloch, N. Uist, Dr. Shoolbred.

Solidago Virgaurea, *L.*, *var.* cambrica.—Head of Glen Laxendale, Harris.

*Var.* angustifolia.—Croagony; More, N. Uist, Dr. Shoolbred.

Anthemis Cotula, *L.*—N. Uist, Dr. Shoolbred.

Gnaphalium sylvaticum.—Meadow land on east side of Benbecula, Dr. Shoolbred.

Petasites vulgaris.—Plentiful in sandy ground, and by ditches about Tighain and Balleloch, N. Uist. Recorded by Balfour and Babington, but doubted by Watson.

Hieracium cerinthiforme, *Backh.*—Tarbert, Harris, Col. Rimmington; Linton, "Journ. Bot.," 1893, p. 198.

H. sparsifolium, *Lindeb.*—River Creed, Stornoway, Lewis, Col. Rimmington; Linton, *l.c.*; cliffs near Tarbert, S. Harris, Dr. Shoolbred.

H. lasiophyllum, *Koch.*—Gilval Glas, N. Harris, Dr. Shoolbred.

H. caledonicum, *F. J. Hanb.*—Gilval Glas, N. Harris; Barra, Dr. Shoolbred.

H. rubicundum, *F. J. Hanb.*, *var.* Boswelli, *Linton.*—Clisham, N. Harris; Beesdale, Luskentyre, S. Harris; and Tarbert, Dr. Shoolbred.

H. oreades, *Fries.*—Loch Maddy, N. Uist, Dr. Shoolbred.

H. stenolepis, *Lindeb.*—Ben Eaval, N. Uist, Dr. Shoolbred.

H. euprepes, *F. J. Hanb.*—Cliffs near Tarbert, S. Harris, Dr. Shoolbred.

H. Orarium, *Lindeb.*—Cliffs near Tarbert, S. Harris, Dr. Shoolbred.

H. clovense, *Linton, f.*—Plentiful on cliffs at Ben Eaval, N. Uist, Dr. Shoolbred.

H. Schmidtii, *Tausch.*—Scarp, W. S. Duncan, *sp.*; N. and S. Harris, Dr. Shoolbred.

H. Schmidtii, *Tausch*, *var.* crinigerum, *Fr.*—Rueval, Benbecula, and cliffs near Obbe, S. Harris, Dr. Shoolbred; Scarp, W. S. Duncan, *sp.*

H. anglicum, *Fr.*, *var.* longibractealis, *F. J. Hanb.*—Gilval Glas, N. Harris; Luskentyre, S. Harris, Dr. Shoolbred.

H. murorum, *L.* (pt.), *var.* cordigerum (*Norrlin*) (*H. silvaticum*, L., sub-sp. *cordigerum*, Norrlin).—Mr. Hanbury is inclined to refer to the above name a plant with very silky rotund leaves, and with umbellated peduncles from Scarp, W. S. Duncan, *sp.*

H. CORYMBOSUM, *Fr.*—Scarp, Duncan, *sp.* Some of these specimens I should have been inclined to refer to *crocatum*, Fr.

H. IRICUM, *Fr.*—Very typical, and abundant in Scarp, W. S. Duncan, *sp.* Some specimens from Scarp Mr. Hanbury would place under *iricum* as an abnormal form. I am quite unable to see their affinity with *iricum*, and have seen nothing exactly like them from any part of Britain.

ASTER TRIPOLIUM, *L.*, *var.* ARCTICUM, *Th. Fries*, in "Bot. Notiser" 1865.—I think that specimens from wet sandy ground, Croagony, Benbecula, belong to this variety, of which, however, I have been unable to see an authentic specimen. Hartmann says this was sent from E. Finmark in 1840 by N. Lund under the name of *var. succulenta.*

CAMPANULA ROTUNDIFOLIA, *L.*, *var.* LANCIFOLIA, *M.* and *K.*—Balleloch, N. Uist, Dr. Shoolbred.

C. ROTUNDIFOLIA, *L.*, *var.* SPECIOSA, *A. G. More.*—Sand dunes near Croagony, Benbecula, Dr. Shoolbred. Smaller, and with a less number of flowers than the Irish plant, but certainly the same. An interesting addition to the flora.

VERONICA PERSICA, *Poir.* (*Buxbaumii*, Ten.)—Small stunted specimen near Rodil Lodge, Harris, Dr. Shoolbred.

V. ANAGALLIS, *L.*, *var.* AQUATICA, *Bosch*, "Fl. Bat.," 1850.—A robust form of the plant, on sea-shore, Benbecula, Dr. Shoolbred.

EUPHRASIA OFFICINALIS, *var.* GRACILIS, *Fr.*—Benbecula, N. Uist, Dr. Shoolbred.

E. OFFICINALIS, *L.*, *var.* NEMOROSA, *H. Mart.*—Glen Lacusdale, N. Harris, Dr. Shoolbred.

BARTSIA ODONTITES, *Huds.*, *var.* SEROTINA, *Reichb.*—Benbecula, N. Uist, Dr. Shoolbred.

RHINANTHUS CRISTA-GALLI, *L.*, *var.* FALLAX, *W.* and *G.*—Near Loch Maddy, N. Uist.

R. CRISTA-GALLI, *L.*, *var.* PUBESCENS, *Wallr.*—East coast of Benbecula, Dr. Shoolbred.

ARCTOSTAPHYLOS UVA-URSI, *Sprengl.*—Reported by Macgillivray, and confirmed by Mr. Duncan in 1892. Obbe, Harris, *sp.*

MONESES GRANDIFLORA, *Gray.* — No confirmation of this as a Hebridean plant has reached me. It has been sought in Harris without success, but not, I believe, in Bernera, its other reported station.

MELAMPYRUM PRATENSE, *L.*, *var.* MONTANUM, *Johnst.*—On Clisham at 1000 feet, N. Harris. An interesting little form, with fruit out of all proportion to its size.

GENTIANA CAMPESTRIS, *L.*—Reported from St. Kilda by Macgillivray, Benbecula, N. Uist; Barra, Harris, Dr. Shoolbred. Common in Scarp, W. S. Duncan, *sp.*

GENTIANA BALTICA, *Murbeck.*—Plentiful in turf by the coast near Hacklett, east side of Benbecula, Dr. Shoolbred.

PRUNELLA VULGARIS, *L.*, *forma* ALBA.—Scalpeg, N. Uist, Dr. Shoolbred.

SCUTELLARIA MINOR, *Huds.*—With glandular-pubescent calyx and corolla (as in *S. hastifolia*). All the Floras I have consulted insist on the calyx being non-glandular. The shape of the leaves is also not quite that of the normal form, and the flowers are larger, and more open at the throat. I proposed to Dr. Shoolbred the name of var. *glandulosa*, as this seems a departure from the type of an unusual form. I can find no specimens to match it among my British or foreign examples.

CENTUNCULUS MINIMUS, *L.*—Several localities in Scarp, W. S. Duncan, *sp.*, 1892; N. Uist, Dr. Shoolbred.

UTRICULARIA NEGLECTA, *Lehm.* (?)—Loch near Loch Maddy, N. Uist, Dr. Shoolbred. There were no flowers or fruits on these specimens, hence their positive determination is dubious; but in habit, leaves, bladders, etc., they seem to belong to this. They are certainly not *minor* or *intermedia.*

PLANTAGO MARITIMA, *L.*, *forma* PUMILA, *Kjell.*—Sea-cliff near Scalpeg, N. Uist, Dr. Shoolbred. Seems to agree with the specimens so named.

SUÆDA MARITIMA, *L.*, *var.* PROCUMBENS, *Syme.*—East shore of Benbecula, Dr. Shoolbred.

SALSOLA KALI, *L.*—Near Bovey, Benbecula, Dr. Shoolbred.

POLYGONUM PERSICARIA, *L.*, *var.* ELATUM, *G.* and *G.*—Coast near Obbe, N. Harris.

P. LAPATHIFOLIUM, *L.*—Benbecula, N. Uist, Dr. Shoolbred.

†EUPHORBIA PEPLUS, *L.*—One stray specimen on a rubbish-heap at the quay, Castle Bay, Barra, Dr. Shoolbred.

JUNIPERUS COMMUNIS, *L.*—Scarp, W. S. Duncan, *sp.*

J. COMMUNIS, *L.*, *var.* INTERMEDIA, *Nyman* (*J. intermedia*, Schur., "*communis* × *nana*").—Scarp, W. S. Duncan, *sp.*, 1892.

ALISMA RANUNCULOIDES, *L.*—Loch Scalpeg, N. Uist, Dr. Shoolbred.

SPARGANIUM RAMOSUM, *Huds.* (agg.)—Seen on the west side of N. Uist when driving past, Dr. Shoolbred. In the note in "Ann. Scot. Nat. Hist.," 1892, p. 61, the reading should be: "In his 'Geog. Dist.' Watson recorded *simplex:* I have seen no specimen of either species from the islands."

Scilla nutans.—North side of Barra, Scott, "Ann. Scot. Nat. Hist.," 1894, p. 187; N. Uist, Dr. Shoolbred. Given by Balfour and Babington in 1841; but not considered native by Watson.

Zannichellia pedunculata, *Reichb.*—Benbecula, Dr. Shoolbred.

Zostera marina, *L.*, *var.* angustifolia, *Fr.*—Loch Stronmore, N. Uist, Dr. Shoolbred.

Potamogeton filiformis, *Nolte.*—Loch Stronmore, N. Uist; Loch near Castle Bay, Barra. Reported from Benbecula by Dr. Stirton. Dr. Shoolbred's specimens confirm it for the islands.

Scirpus uniglumis, *Link.*, *var.* pumila, *Boenning.*—Loch near Nunton, Benbecula, Dr. Shoolbred.

S. maritimus, *L.*, *var.* compacta, *Koch.*—Sea-shore on west side of Benbecula, Dr. Shoolbred.

Carex paniculata, *L.*—In great quantity near shallow end of loch on west side of Benbecula, Dr. Shoolbred.

C. goodenovii, *Gay*, *var.* juncella, *Fr.* (sub. *vulgaris*).—Loch Maddy, N. Uist.

*Forma* atra, *Blytt.*—Loch margin near Nunton, Benbecula, Dr. Shoolbred.

C. limosa.

C. extensa, *L.*, *var.* pumila, *Anders.*—Scarp, W. S. Duncan, *sp.*, 1892; Benbecula, Dr. Shoolbred.

C. xanthocarpa, *Degl.*—Glen Lacusdale, N. Harris, Dr. Shoolbred.

C. rostrata, *Stokes*, *var.* elatior, *Blytt.* (sub *ampullacea*).—Near Loch Maddy, N. Uist, Dr. Shoolbred.

C. Œderi, *Ehrh.* (non *auct. mult.*)—Scalpeg, N. Uist; loch side near Munton, Benbecula, Dr. Shoolbred.

C. salina, *Wahlb.*, *var.* ?—N. Harris, W. S. Duncan, *sp.*, August 1895. Mr. Duncan has just lately (26th August 1895) sent me a turf with living specimens of this interesting *Carex*. It corresponds with nothing I have under the species for Asia, America, or Europe, and *ex descrip.* seems to come between *C. flavicans*, Nyl., and *C. spiculosa*, Fr., but wanting the rough apex to the glumes of the latter. I have not been able yet to see authentic specimens of the "species" Nylander describes in his works on the Flora Fennica, but hope to.

Phalaris arundinacea, *L.*—Near Balleloch, N. Uist, Dr. Shoolbred.

Avia caryophyllea, *L.*—N. Uist, Dr. Shoolbred, confirming Macgillivray's record.

AVIA CRESPITOSA, *L.*, *var.* PSEUDO-ALPINA, *Syme.*—Clisham, Dr. Shoolbred.

A. FLEXUOSA, *L.*, *var.* MONTANA, *Hook, f.*—Clisham, Dr. Shoolbred.

CATABROSA AQUATICA, *Beauv.*, *var.* LITTORALIS, *Parn.*—Sea-coast, west side of Benbecula, Dr. Shoolbred.

POA NEMORALIS, *L.*—Old wall of Hotel Garden, Tarbert, Harris, Dr. Shoolbred. Native?

GLYCERIA FLUITANS, *R. Br.*, *var.* TRITICA, *Fr.*—Marsh near Loch Maddy Hotel, N. Uist, Dr. Shoolbred.

FESTUCA SCIUROIDES, *Roth.*—Wall top, east side of Loch Maddy. This is reported in "Top. Bot.," ed. 2; but I cannot learn on what authority.

AGROPYRON JUNCEUM, *Beauv.*—Coast near Balleloch, N. Uist, Benbecula, Dr. Shoolbred.

ELYMUS ARENARIUS, *L.*—Small islet in Loch Maddy, N. Uist. ("Of very rare occurrence," Macgillivray.) Dr. Shoolbred confirms this old record of 1831.

Dr. Shoolbred's paper and Mr. Duncan's additions show that time spent in these islands will not be without good results; there is yet more to be done by willing hands.

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## *CAREX FUSCA*, ALLIONI, IN SCOTLAND.

By ARTHUR BENNETT, F.L.S.

IN a parcel of plants kindly sent me by my friend Mr. W. F. Miller from Inverness (Westerness, Co. 97) I was much pleased to find a specimen of the above *Carex*. It has been known as an Irish plant (as *C. Buxbaumii*, Wahl.) since 1835, in which year it was discovered by Mr. D. Moore on an island in Lough Neagh, near Toom-Bridge.

In its Scottish habitat it occurs in five distinct places around and near a loch in the district of Arisaig. I cannot do better than give, in my friend's own words, his account of his second visit to the loch to see its extent and surroundings:—"I went to the place again last evening, and thoroughly explored the loch, a matter of some difficulty, as, besides the swampy nature of the ground, there are several deep water-courses too wide to jump, which have to be taken in flank

I examined all round the lake thoroughly, and crossed and recrossed the boggy ground, and was rewarded by finding four additional patches of the plant. Three of them, like the first station, are on the west side of the loch, and close to it; the other is on the north side, in the midst of the swamp, and 20 or 30 yards from the lake. Each of the patches is, roughly speaking, about the same size (8 or 10 square yards), but not any of the new stations are so full of the plant as the first one. So far as I could see, there are no connecting links between the different stations; stragglers from the main body do not extend far."

It grows associated with such plants as *Eriophorum angustifolium*, *Drosera*, sps., *Carex filiformis*, *C. fulva*, a var. (?) of *C. Goodenovii*, *Rhinanthus*, *Galium palustre*, *Equisetum limosum*, a very narrow-leaved form of *Orchis maculata*, *Rhynchospora alba*, a form of *Agrostis* (?), of the name of which as yet I do not feel certain, etc.

The loch is situated "in a slight hollow amongst the low hills (or rather knolls), many of them wooded, which are one peculiarity of the district. Its height above sea-level is certainly under 100 feet. The highest land above the side of the loch where the *Carex* grows is about 400 feet; but it does not rise directly from the loch—there is a considerable breadth of boggy moorland, with a very slight rise. The loch itself seems to have a peaty bottom. It is a great place for white Water-Lilies, also for *Scirpus Tabernæmontani*.

My friend has, with living specimens of the *Carex*, kindly sent a list of the plants (and numerous vouchers) of the district, which seems to be a very interesting one. I hope he will publish this list after I have collated it with "Topographical Botany," etc.

In "English Botany" Dr. Boswell Syme mentions (under *Carex vulgaris*), from Clackmannanshire, a plant as greatly resembling some of the dark-spiked forms of *C. Buxbaumii*, but proving to be a form or monstrosity of *C. vulgaris*.

No record of the species has hitherto been made from Great Britain. On the Continent it is recorded from thirteen provinces of Sweden, North and South Norway "to 70° 7′, Th. Fries," Lapland, nineteen of the botanical provinces of Finland to "Paatsjoki, 69°" *teste* Wainio; (but it does not seem

to be recorded from Iceland or the Faroes). Central (Alps, etc.) Europe to middle Russia and France.

In Asia—East, West, and Southern Siberia; Kamtschatka.

North America—from the Saskatchewan and Lake Winnipeg southwards to Virginia, and across the continent from east to west.

Australian Alps.

The principal names it occurs under are :—

*Carex fusca*, Allioni : "Fl. Ped.," vol. 2, 269 (1785).

*C. polygama*, Schkuhr : "Riedgräser," 1, 84 (1801).

*C. subulata*, Schumacher : "Enum. Pl. Sæll.," 270 (1801).

*C. Buxbaumii*, Wahl. : "Vet. Akad. Stockh.," 163 (1803).

*C. canescens*, Lin. herb., *fide* Hook. and Arnott, "Brit. Flora," ed. 8, p. 507 (1860).

"English Botany Supp.," t. 2885.

Moore and More : "Cybele Hibernica," p. 329 (1866).

Bailey, in "Memoirs Torrey. Bot. Club," No. 1, 63 (1889).

Certainly one of the most interesting additions to the Scottish Flora that have been made in late years, and a promise of others when all its lochs shall have been carefully and systematically examined.

Of our species, *C. fusca* most nearly resembles in appearance a *vulgaris* form without the male spikes, and the fruit without a beak (or an exceedingly short one), and the stigmas three. I have seen specimens for Sutherland with much the facies of *fusca*, but they were only *vulgaris* forms.

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## ZOOLOGICAL NOTES.

**Capture of a Badger on the Pentland Hills.**—On the 26th of May last a fine male Badger (*Meles taxus*), which I saw shortly afterwards, was dug out of a deep burrow on Boghall Hill, near the eastern extremity of the Pentlands, and within four miles of Edinburgh, by the shepherd and other servants on Boghall Farm, who, up to the last moment, were under the impression that the "earth" was tenanted by a fox. There can be little doubt the animal is one which made its escape a week or two before from Craiglockhart, where it had been kept in confinement for some time. The occurrence is therefore scarcely worth putting on record, except to prevent future misunderstanding.—William Evans, Edinburgh.

**Common Hare in Mull.**—The Common or Red Hare was at one time very plentiful in Mull, where it thrived well until some few years ago; but, so far as I am aware, they are now completely exterminated. There was one, probably the very last in the island, shot on the Laggan Beat on this estate on the 13th December 1882, by Mr. Rossell Barnett, which weighed 12 lb. It is difficult to account for the total disappearance of this animal. In my humble opinion the want of cropping has had much to do with it. I have imported on several occasions some fresh blood, and, I regret to say, without success.—Maclaine of Lochbuie, Lochbuie, Isle of Mull.

**Occurrence of Sowerby's Whale in the Firth of Forth.**—About the end of April of this year a notice appeared in the newspapers of a Bottle-nose Whale having come ashore at Morrison's Haven. It was immediately taken possession of by some men who towed it to the shore at the village of Cuthill, near Prestonpans, and divested it of the blubber. The carcase lay on the shore until the authorities gave orders for it to be cut up in pieces and buried. About the end of June, at the request of Sir William Turner, I visited the burial spot and had the remains exhumed, when I was agreeably surprised to find it was a Sowerby's Whale (*Micropteron* (*Mesoplodon*) *bidens*). The remains, as far as possible, were secured for the Anatomical Museum of the University of Edinburgh, and are now being prepared for preservation and description. Until the skeleton is articulated, it is impossible to give correct data as to the dimensions of the specimen; but it will be probably about 15 feet in length, and is a male.

Another specimen of this species was obtained at Dalgetty Bay, Firth of Forth, in October 1888, for an account of which see "Proc. Roy. Phys. Soc. Edin." (vol. x. p. 5), by Sir William Turner.—James Simpson, Anatomical Museum, University of Edinburgh.

**Scottish Stag-Horn Statistics.**—The following statement should prove interesting to naturalists. It represents the point values of the first 500 Stags' heads received by us for preservation during each of the past six seasons.

| Season. | Number of Points. | | | | | | | | | | | | | Switch. | One Horn. | Hummed. | Malform. | Under Six Points. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 18 | 20 | | | | | | |
| 1889 | 40 | 35 | 83 | 65 | 87 | 55 | 54 | 15 | 5 | 1 | — | — | — | 2 | 3 | — | 4 | 51 | 500 |
| 1890 | 57 | 37 | 90 | 64 | 94 | 49 | 32 | 6 | 2 | — | — | 1 | — | 16 | 2 | — | 1 | 46 | 500 |
| 1891 | 49 | 32 | 91 | 69 | 111 | 38 | 45 | 4 | 1 | 1 | — | — | — | 2 | — | 2 | 1 | 54 | 500 |
| 1892 | 56 | 44 | 87 | 72 | 100 | 46 | 49 | 6 | 4 | 1 | — | — | — | 10 | 2 | 1 | 1 | 21 | 500 |
| 1893 | 33 | 23 | 79 | 62 | 97 | 70 | 71 | 13 | 2 | 2 | 1 | — | 1 | 11 | 1 | 3 | 7 | 24 | 500 |
| 1894 | 38 | 43 | 97 | 64 | 102 | 54 | 38 | 8 | 5 | 1 | 1 | — | — | 12 | — | 6 | 7 | 24 | 500 |
| | | | | | | | | | | | | | | | | | | | 3000 |

W. A. Macleay & Son, Inverness.

**Bird Notes from the Island of Tiree.**—The first young ducks I saw this year were a brood of Pochards (*Fuligula ferina*) on Loch Vassapol, and there were several other pairs on this loch. I also saw a pair of Tufted Ducks (*Fuligula cristata*) on the same loch through the breeding season, but as I was busy rearing Partridges I had not time to ascertain whether they bred or not. There are hundreds of Pochard on Loch Vassapol and Loch a Phuil every winter, and scores of Tufted Ducks. The Gadwall (*Anas strepera*) has not bred here yet, so far as I know; but they are the latest among the migratory birds to leave here, and the first to appear in the autumn. I have not seen any Sandwich Terns (*Sterna cantiaca*) or Scoters (*Œdemia nigra*) this year, owing, I believe, to the fact that every man, woman, and child takes the eggs of every bird they find near the shore and elsewhere. Snipe (*Gallinago cœlestis*) have been very scarce all summer, and very few have bred here. I saw a pair of Smew (*Mergus albellus*) in Gott Bay on the 23rd of August, which I thought had returned earlier than usual.—Peter Anderson, Tiree.

**Garden Warbler in Perthshire.**—With regard to the distribution of this species (*Sylvia hortensis*) in Scotland ("Annals of Scottish Natural History," 1895, p. 194), I heard one in June singing near the keeper's lodge, by the roadside, in the Black Wood of Rannoch in Perthshire. I also heard and saw the Tree Pipit (*Anthus trivialis*) in the same locality.—John Cordeaux, Great Cotes, Lincoln.

**Goldfinch in Perthshire.**—On 8th July I observed a pair of Goldfinches (*Carduelis elegans*) on a cherry tree at Ballinluig in the parish of Logierait, Perthshire. During the succeeding fortnight I saw a single bird almost daily, and frequently several times during the day, in the same locality. As the birds were always observed about the same place, I have little doubt that they were nesting in the immediate vicinity, but I was not fortunate enough to find the nest.—Bruce Campbell, Edinburgh.

**Swallow and Blackbird in Shetland.**—On 7th May 1895 I saw a solitary Swallow (*Hirundo rustica*) flying up and down the shore of the Isle of Noss, opposite Bressay. The weather was very fine, and the bird was apparently obtaining numbers of insects. On the 9th of May the powerful and sweet notes of the Blackbird (*Turdus merula*), a strange sound in Shetland, attracted my attention while approaching Lerwick from the south. The song was first heard at fully a third of a mile's distance. The singer proved to be perched on one of the fairly tall trees at Helendale near Clickahimen Loch. The Blackbird is best known in Shetland as an autumn visitor. Vague reports of its having nested near Lerwick do, however, exist. —Harold Raeburn, Edinburgh.

**Short-eared Owl (*Asio accipitrinus*) as a Breeding Species in the South of Scotland.**—With the view of endeavouring to estimate the number of birds which may remain in parts of the South of Scotland on suitable ground during the summer, we have been paying some attention to occurrences during last and the present seasons. Not a bird was seen last summer; but during the past summer I have seen three birds. The first occurrence was in Deloraine Shiel, Ettrick, where Mr. W. Eagle Clarke and I saw a bird on 21st June. The second occasion was at Ericstane, Moffat, on 11th August; and the third at Carterhope, Tweedsmuir, on 15th August. I have not seen a Field Vole either during the summer of 1894 or of the present year, though I have passed over a considerable area of suitable ground within the area of the recent "plague."—PETER ADAIR, Edinburgh.

**Hobby captured at Sea off the Firth of Forth.**—On the 10th of July I received in the flesh a fine adult male specimen of the Hobby (*Falco subbuteo*), which had been captured while seeking rest on a trawler at sea, about fifteen miles east of the Isle of May. —R. SMALL, Edinburgh.

**Montagu's Harrier in Lanarkshire.**—On the afternoon of Saturday, 8th June, this year, a male specimen of Montagu's Harrier (*Circus cineraceus*), not quite mature, was shot on Dungavel Hill, Avondale Parish, Lanarkshire. The bird was sent to Mr. Blair, Gordon Street, Glasgow, for preservation. I had an opportunity of comparing it with some skins of the Hen Harrier in the possession of a local taxidermist, also with examples of both species of Harrier in the reference collection in Kelvingrove Museum.—JOHN PATERSON, Glasgow.

**Inland Breeding of the Merganser in N.E. Scotland.**—On 3rd June last I found a nest of the Merganser (*Mergus serrator*), on a sandy island in the Spey at Cromdale, a point distant at least thirty miles in a direct line from the sea. The nest was placed in a hollow under a juniper-bush, and contained 14 eggs, slightly incubated. A few of the eggs were of a different colour (greener) than the rest, and may have been contributed by another bird. Five other Mergansers, of which three were certainly drakes, were seen on the river above and below the island. I am not aware whether the Merganser has been hitherto recorded as nesting so far inland in the East of Scotland.—LIONEL W. HINXMAN, Edinburgh.

**White-fronted Goose in St. Kilda.**—The Rev. H. A. Macpherson has presented to the collection of British Birds in the Museum of Science and Art, Edinburgh, a fine adult male specimen of the White-fronted Goose (*Anser albifrons*), which was shot in St. Kilda between the 6th and 22nd of June last by his keeper, Mr. Ellis

Malcolm. The locality—it is an addition to the avifauna of the island—and the date are both interesting and worthy of record.—Wm. Eagle Clarke, Edinburgh.

**Red Grouse in Shetland.**—It appears that a few survivors of the 1882 introduction are still in existence in Yell. While in that island this spring I picked up some grouse-feathers in Lumbisterdale, which had evidently only been lost within an hour or so, and have lately received information that a nest of the Red Grouse (*Lagopus scoticus*) had been found this year (the eggs having probably been eaten) in that locality. The Grouse have had many enemies to contend with, and have received no protection whatever since a short time after their introduction. That they should still survive and breed shows considerable powers of adaptability and self-protection in the bird.—Harold Raeburn, Edinburgh.

**Great Bustard washed up on the Ayrshire Coast.**—On the 20th of June this year, while walking on the beach at Irvine, I observed a large bird floating in the water, which I managed to secure, but was quite puzzled with it, having never seen one like it before, nor was I able to ascertain its name from any one in the district to whom I showed it. Finally I submitted it to Mr. J. A. Harvie-Brown, who pronounced it to be a specimen of the Great Bustard (*Otis tarda*)—a bird that has been extinct as an indigenous species in S.E. Scotland for over three centuries, and now only an extremely rare casual visitor from the Continent of Europe, and one which it is believed has never before been recorded for Ayrshire. The bird was considerably decomposed when found, and had evidently been in the water for some days. From its comparatively small size it was evidently a female.—John Pringle, Irvine.

**Green Sandpiper in Argyleshire.**—On the 19th of August last, I received for preservation a male specimen of the Green Sandpiper (*Totanus ochropus*), which had been shot at Strontian by Mr. Stewart.—C. H. Bisshopp, Oban.

**Greater Weever (*Trachinus draco*) in the Firth of Forth.**—A specimen of this fish was captured in the trawl-net of the Fishery Cruiser "Garland," while at work at the "Fluke Hole," off St. Monans, on the 29th of August of this year. The specimen measured 12 inches in length, and was very prettily marked. The depth of water at the "Fluke Hole" ranges from about 13 to 15 fathoms; the bottom consists in some parts of fine sand and comminuted shells, in other parts it is somewhat gravelly. This is only the second specimen of the Greater Weever that I know of that has been captured in the Firth of Forth: the first specimen was also taken by the "Garland," on the 21st of May 1889, in Largo Bay, and was smaller than the one now recorded, being only 9 inches in length. It is referred to in some notes on "Rare and Uncommon

Fishes," by Dr. T. Wemyss Fulton, F.R.S.E., in the "Eighth Annual Report of the Fishery Board for Scotland," part iii. p. 357 (1890). —T. Scott, Leith.

**Helix hispida, *var.* sinistrorsum, in Berwickshire.**—On the 2nd of July last I found at Eyemouth a reversal specimen of *Helix hispida*—a variety of this species which I do not think has ever been recorded before, at least it is not in the Conchological Society's List of British Land and Freshwater Mollusca. I have named it, according to precedent, monstrosity *sinistrorsum*.—Janet Carphin, Edinburgh.

**Geotrupes typhœus** (*L.*).—Referring to my note in the July "Annals" (p. 198) on the occurrence of this beetle in Scotland, I see that Don includes the species in his account of the plants and animals of Forfarshire appended to Headrick's "Agriculture" of the county, which was published in 1813.—William Evans, Edinburgh.

**Salda Muelleri in Perthshire.**—During a visit to Ballinluig I had the good fortune to meet with six specimens of *Salda Muelleri*, Gmelin. These have been very kindly identified by Mr. Edward Saunders, F.E.S., who at first informed me that the insect was new to the British List; but he now tells me that, "as a matter of fact, *Muelleri* is the one hitherto known under the name of *S. Morio*, Zetterstedt. It has been taken at Aviemore by G. C. Champion; Scarborough by Wilkinson; Horning by G. C. Champion. Apparently I [E. Saunders] am the only one who has met with the true *Morio* in this country, which I took at Buxton, on the moors, but only a very few males; and in my "British Hemiptera" I described the ♂ *Morio* and ♀ *Muelleri* as one species, under the name *Morio*. The two species may be known apart thus: *Morio* is more shining, almost burnished, and the elytra are so smooth as to show no definite punctuation; whereas in *Muelleri* there is a distinct though irregular punctuation on their disc. The eyes in *Morio* ♂ are smaller than in *Muelleri* ♂, each being narrower than the intervening space between them. Dr. Reuter has recently published a work on the *Saldæ* of the Palæarctic region, and it is from his book that I have gleaned the characters which distinguish the two species."

Since my stay referred to, I paid a flying visit to Ballinluig, in search of more specimens. I was again successful in obtaining four ♂ *Muelleri* and a damaged ♀. In the sunlight the insect is of a bright bronze blue colour, and is sluggish in habit, making no attempt to leap or fly like our *S. Scotica* and many other species of Saldæ, which are so difficult to capture. The specimens seemed to avoid open places, and were only found by careful searching at the roots of the grass. I had also the good fortune to add *S. Cocksii* to the Perthshire list, the species being apparently common in this locality.—T. M. M'Gregor, Perth.

**Argulus foliaceus in the Edinburgh District.**—On the 26th of August my daughter, Miss Carphin, found among the *Anacharis* in the canal, near Meggatlandgate, several specimens of this curious Crustacean. About six of them were free, while one was attached to a Stickleback. This, the only British representative of the Branchiura, has not, so far as I know, been hitherto recorded for the Edinburgh district.—JANET CARPHIN, Edinburgh.

**Echinus acutus, *Lamk.*, on the East Coast of Scotland.**—This rare "Urchin," which was first made known as British by Dr. Fleming, under the name of *Echinus miliaris*, and which was according to the same authority "found in deep water off Zetland," has of late been brought into Aberdeen by the trawl-fishers. Some of the specimens were taken off the Pentland Skerries, and two were brought in by one man, which had been procured forty miles off Aberdeen. And on 23rd August last I had the pleasure of seeing another specimen, in the possession of Mr. Thomas Scott, which he had caught on Smith's Bank while conducting experiments in the interest of the Fishery Board of Scotland. In the excellent "Catalogue of the British Echinoderms in the British Museum," published in 1892, and written by Professor F. Jeffrey Bell, in speaking of the distribution of this form, he mentions amongst other places the "North Sea." By these additional captures we are now able to speak more definitely as to the actual parts of the Scottish East Coast off which this fine Echinoderm may be obtained.—GEO. SIM, Aberdeen.

**Notes on Mollusca collected in South Perthshire and Clackmannan.**—In the "Annals" for July Mr. Roebuck gave a list of shells collected by me in the Bridge of Allan, Abbey Craig, and Blairlogie districts of South Perthshire and Clackmannan. I now send you the names of a few more which have been authenticated, collected in the same localities:—*Pisidium amnicum*, from the river Forth, Cornton and Lecropt burns; *P. pusillum*, v. *edentula*, from a mill dam at Pendreich; *Unio margaritifer*, from the Forth; *Limnæa truncatula*, from a ditch in Cornton and Manor Pow where it joins the Forth; *Amalia marginata* (M'Lellan), from Inchmahome, Lake of Menteith; *Limax maximus*, from railway and hedge banks in Cornton; *L. cinereo-niger*, one specimen was found in October 1892 on the Abbey Craig; *Helix aspersa*, found about Blairlogie and Bridge of Allan; *H. nemoralis*, v. *rubella*, found about Bridge of Allan; *H. rufescens*, found in the garden of Dr. Paterson, Bridge of Allan (this snail appeared to be very partial to the decayed leaves of the *Yucca gloriosa*, for nearly all the specimens seen were feeding upon them); *H. hispida*, v. *nitidulus*, collected on Abbey Craig, and about some hedgebanks; *Pupa cylindracea* and v. *albina* (the common form is widely diffused throughout the district, but a few specimens of the v. *albina* have been found on the Abbey Craig only, as were one or two speci- of the v. *edentula*).—GILBERT M'DOUGALL, Stirling.

**Carsia imbutata in "Moray."**—With reference to Mr. R. Thomson's note in the last number of the "Annals" (p. 199), I may mention that in August 1889 I found this pretty moth common on a bit of Moorland behind Kincraig near Kingussie, and in August 1891 in abundance among *Vaccinium Vitis-Idæa* in fir woods at Cromdale below Grantown. *V. Vitis-Idæa*, which I have no doubt is the food-plant of the larvæ, is very abundant in the woods and commons of Strathspey, where it is known as the "Cranberry," and its fruit gathered and sold as such.—William Evans, Edinburgh.

**Nisoniades tages and Thecla rubi in "Moray."**—Mr. H. H. Brown's note in the last number of this journal (p. 199) reminds me that in May 1893 I found the Dingy Skipper plentifully in several localities in the neighbourhood of Aviemore. It was chiefly observed on rather bare or stony places where the food-plant *Lotus corniculatus* grew in spreading patches. I should say that *N. tages* and *Fidonia piniaria* are *not* generally found in company.

Another little butterfly, the Green Hairstreak (*Thecla rubi*), was also abundant at the same time in the same neighbourhood, but invariably among *Vaccinium Vitis-Idæa*, which I have not the slightest doubt is the food-plant of the larva in that district. Those who know the plant and the butterfly will readily understand how difficult it is to detect the latter when settled among the leaves of the former.—William Evans, Edinburgh.

**Crambus geniculeus in the Forth Area.**—In a paper on the Scottish *Crambi* published in the "Annals" for 1893, p. 87, the author, Mr. Reid, states that he has never seen a Scottish example of *C. geniculeus*, and seems to doubt the only record (from "Clyde"?) of its occurrence on this side of the border. It may be well, therefore, to put on record the fact that I have twice met with the species in the Forth area; namely, a single specimen on the Isle of May, 13th September 1888, and about half a dozen on the Tyninghame side of the Tyne Estuary, East Lothian, 23rd August 1894. The May example and one of those from Tyninghame have been shown to Mr. C. G. Barrett of London, so that there can be no question as to the correctness of the identification.—William Evans, Edinburgh.

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## BOTANICAL NOTES AND NEWS.

**Ranunculus petiolaris.**—My statement that "Mr. Ewing's *R. petiolaris* is evidently not my *R. petiolaris*," needs some qualification. Mr. Ewing has since kindly sent me his specimen, which is one collected by myself in the original station (1889) and forwarded to him by a mutual correspondent. Unfortunately it is one of a very

few plants which appeared to me, when gathered, to be an extreme form tending towards typical *Flammula*, and which were not meant to be circulated. Mr. Ewing's Loch Leven form is probably the same thing; and he is, therefore, not without good grounds for his opinion. I am, however, now very doubtful whether these specimens belong to *true R. petiolaris;* if so, they are considerably "off type."—Edward S. Marshall.

**Callitriche autumnalis in Nairnshire.**—A bed of this plant was discovered by me on the 3rd November 1894 in the Coulmony Burn, Ardclach. It is new to the flora of Nairnshire. — R. Thomson, Ferness.

**Salix Lapponum, *L.*, in Midlothian.**—When reading Walker's "Essays of Natural History," published 1808, though supposed to have been written between 1764 and 1774, it struck me that the origin of *Salix Lapponum*, L., being in its anomalous station of Colinton, Midlothian, was probably to be found here.

In the Essay named "Salicetum" he mentions *Salix Lapponum* as first observed in July 1762 on the Moffat hills. Mr. J. T. Johnstone informs me it is still to be found in the place given in the Essay. Walker also states having kept it in his garden for many years, as he did several other willows. Dr. Walker was minister of Moffat from 1762 to 1783, at which latter date he was appointed to the Parish of Colinton. That he took an interest in his garden here also is evident, as Lord Woodhouselee in his "Life of Lord Kames" mentions "having passed many pleasant hours with Dr. Walker in his garden at Colinton." It seems most probable that he would take some of the plants which he had kept for years at Moffat to Colinton with him, especially an Alpine like *S. Lapponum*.

Dr. Walker appears to have been fond of transplanting roots, so he might probably like to naturalise *S. Lapponum* in the low-lying grounds of Colinton and neighbourhood.

Dr. Walker, who acted as Professor of Natural History in Edinburgh University for some years, has not, I think, received the attention his botanical discoveries deserve. He discovered some plants in Britain at dates anterior to those given by Mr. W. A. Clarke in his paper at present being published in the "Journal of Botany."

Dr. Walker in his "Statistical Account of the Parish of Colinton," an abstract of which was published in Sir John Sinclair's work, gives a list of "the most unfrequent species" occurring in the parish. *Salix Lapponum* is not mentioned. He would have been sure to have mentioned this Alpine willow if it had been a native in the low-lying ground of his district, as it could hardly have been otherwise than unfrequent.—Symers M. Macvicar.

**Allium paradoxum near Edinburgh.**—It may interest some of your readers to hear that I found *Allium paradoxum* in flower on 27th April within a short distance of Edinburgh. Hooker gives it under "excluded species" reported to have been found at Linlithgow. The specimens I found were about half a mile from a cottage which was the nearest dwelling-house, and was growing on a rather damp piece of ground.—A. F. Imlach, Edinburgh.

[This is an introduced plant, and has been found on several occasions in different localities round Edinburgh. It seems now to have become naturalised in woods near Binny Crag, twelve miles west from Edinburgh, where it was discovered about thirty years ago by Mr. A. Craig Christie—Eds.]

**Rynchospora fusca, *R. and S.*, in Westerness.**—I have found the above plant this year in the districts of Ardnamurchan, Sunart, and Moidart, the two former being geographically in Argyleshire, the latter in Inverness-shire: they are all in Watson's V.-C. 97. It grows in great abundance in Kintra Moss and in the "mosses" of Loch Sheil at nearly sea-level; also, more sparsely, at the side of a few small lochs, the highest being at 180 feet altitude. With one exception, the stations are all in what is practically the Loch Sheil valley, although the Ardnamurchan locality is now separated from the others by a raised beach which has deflected the course of the loch. The brownish-yellow patches of *R. fusca* can often be recognised at a distance of a hundred yards in late summer; *R. alba* also turns that colour, but does not grow in such dense patches. I have looked in other watersheds of this locality for *R. fusca*, but so far without success. I think, however, it will most probably be found in more localities on this coast in low-lying and wet ground, where *R. alba* is so plentiful. It has hitherto been known in Scotland only from Wigtown, V.-C. 74 (Mr. M'Andrew).—Symers M. Macvicar.

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# CURRENT LITERATURE.

**The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—July-September 1895.**

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

## ZOOLOGY.

Observations on the Fauna of St Kilda. By J. Steele Elliott. *Zoologist* (3), vol. xix. pp. 281-286 (August 1895).—Two species of mammals and forty-six species of birds are noted.

White Moles in Aberdeenshire. G. M. *The Field*, 22nd June 1895, p. 928.—Records the capture of six females.

Spread of the Roe-deer in S.-W. Scotland. Robert Service. *Zoologist* (3), vol. xix. p. 346 (September 1895).

The Marsh Tit in Dumfriesshire. Robert Service. *Zoologist* (3), vol. xix. pp. 349-350 (September 1895).—Compares the status of this species in 1840 and the present time.

White-fronted Goose in St. Kilda. H. A. Macpherson. *Zoologist* (3), vol. xix. p. 348 (September 1895).—An adult male shot on St. Kilda in June of the present year.

Arctic Tern and Common Gull breeding in Shetland. Robert Godfrey. *Zoologist* (3), vol. xix. p. 349 (September 1895).—Breeding colonies found on a small island in the loch of Grumnavoe on 24th June last.

Natterjack Toad in Dumfriesshire. Robert Service. *Zoologist* (3), vol. xix. p. 350 (September 1895).—Specimens found at Southerness.

Alterations in "British Conchology." By J. T. Marshall. *Journ. of Conchology*, vol. viii. pp. 24-41 (January-April 1895).—Refers to Scottish species.

Notes from the Books of the Exchange Baskets. *Ent. Record*, vol. vi. pp. 234-236 (15th June 1895), and vol. vii. pp. 13-17 (15th September 1895).—Notes are included on Lepidoptera from Aberdeen, Montrose, Luss, Milngavie, etc.

Note on Hepialus humuli in Orkney. H. M'Arthur. *Entomologist*, vol. xxviii. p. 204 (July 1895).

Nyssia lapponaria in Scotland. Mrs. Cross. *Entomologist*, vol. xxviii. p. 207 (July 1895).—Caterpillar taken on birch at Rannoch in 1894.

Coleoptera at Stornoway, N.B. By James J. Walker, R.N., F.L.S. *Ent. Mo. Mag.* (2), vol. vi. pp. 182-184 (August 1895).—Seventy-three species are recorded, and mention made of four species of Lepidoptera.

Coleoptera near Dumfries. W. Lennon. *Ent. Mo. Mag.* (2), vol vi. p. 174 (July 1895).—Eighteen species recorded, of which seven are probably new to the Solway district.

On New and Obscure British Species of Diastata. By R. H. Meade. *Ent. Mo. Mag.* (2), vol. vi. pp. 169-170 (July 1895).—Notes on D. obscurella, Fln., basalis, Meig., and fumipennis, Meig. D. unipunctata, Ztt., is here recorded as British for the first time, having been taken by Mr. Beaumont at Pitlochry in 1892.

The Hydroids of St. Andrews Bay. By Rev. J. H. Crawford, F.L.S. *Ann. and Mag. Nat. Hist.* (6), vol. xvi. pp. 256-262 (September 1895).—A table is given comparing the species of Hydroids found at St. Andrews with those of Plymouth and Heligoland.

## BOTANY.

Plants observed in the Outer Hebrides in 1894. By W. A. Shoolbred, M.R.C.S. *Journ. Bot.*, August, pp. 237-249.—North Uist, Benbecula, and around Tarbert in Harris, were the localities chiefly worked, but short visits were paid to other places also. *All* the species and varieties observed are catalogued, with the localities added for all but the commonest.

Altitude of Ajuga pyramidalis in Scotland. By Symers M. Macvicar.—As low as 15 or 20 feet above sea-level in Moidart.

Excursion Notes. *Proc. East of Scotland Union of Nat. Socs.*, 1891-95, pp. 9-11.—Enumerates plants collected at excursions in Forfarshire, in July 1891, to the Red Head, Rescobie Loch, and Clova.

The Beatitudes of Breadalbane. By the late F. Buchanan White, M.D. *Proc. E. S. U. N. S.*, pp. 57-61, read in 1893.—After a short general sketch of the district, several of the plants to be looked for are mentioned.

Plants of Kirkcaldy. By W. S. Blackstock. *Proc. E. S. U. N. S.*, 1891-95, pp. 61-65.—An interesting sketch of the scarcer plants of southern Fifeshire, with remarks on increasing rarity or abundance of several.

Note on the Acclimatisation of Valeriana aurea near Alford (at Breda). By William Wilson. *Proc. E. S. U. N. S.*, 1891-95, p. 25.—This relates probably to the variety of *V. Phu* usually cultivated in gardens.

List of Mosses found on the Sidlaw Hills. By James Fulton. *Proc. E. S. U. N. S.*, 1891-95, pp. 12-19.—In this all the species known to the author (156) from the district are included, with localities for the scarcer species.

The Desmidieæ of the Stormont District. By the late John Roy, LL.D. *Proc. E. S. U. N. S.*, 1891-95, pp. 19-25.—A list of all species found in material collected by Mrs. Farquharson, in 1891, from the district named, near Alyth, with introductory remarks.

## OBITUARY NOTICES.

**Charles Cardale Babington, M.A., F.R.S., etc., Professor of Botany in the University of Cambridge.**—Professor Babington was one who did so much to widen our acquaintance with the flora of Scotland that, though not himself of Scotch descent, nor officially connected with the country, his death ought not to be passed unnoticed in our columns.

Born at Ludlow in 1808, he studied at Cambridge, where he graduated B.A. in 1830, and M.A. in 1833. His first original work in science was entomological; and between 1829 and 1844 he published a number of papers on insects. Among these was one of two pages, entitled "Catalogue of Insects found at Berwick-upon-Tweed in August 1834, which was read to the Berwickshire Naturalists' Club in 1834. Somewhat later he became absorbed in Systematic Botany; and he has long held a high rank in this study in Great Britain. His "Manual of British Botany" has passed through eight editions, and is held in high esteem because of the clearness and accuracy of its descriptions. It has had a great influence during a long period on the advancement of botanical investigation among us; and it will continue to be used, even though not now fully representative of the results, both extensive and valuable, of the critical work of recent years—work with which the author's age and health prevented so close a familiarity as in former years. Besides the "Manual," Professor Babington contributed largely to botanical literature in numerous papers on critical genera or species of British plants. Among the longer of such contributions were his "Synopsis of the British Rubi" contributed (like many others of his papers) to the *Transactions of the Edinburgh Botanical Society* (ii.-iii.) and to the *Annals and Magazine of Natural History* (1846-48), and his "Notes on Rubi" in the *Journal of Botany* (1878). In these and similar papers he noted the occurrence of the plants under discussion in Scotland where known to him. In 1834 he published "An Account of some Additions to the Flora of Berwickshire" (*Trans. Berw. Nat. Club*); and in 1891 a "List of Plants found in the Valley of Braemar and on Morrone" (*Scot. Nat.*, 1891, pp. 81-85, 132-136, 174-184). He also, in conjunction with the late Professor J. H. Balfour of Edinburgh, published (*Trans. Ed. Bot. Soc.* 1844), an "Account of a Botanical Excursion to Skye and the Outer Hebrides during the month of August 1841" (pp. 133-144), followed by a "Catalogue of the Plants gathered in the Islands of North Uist, Harris, and Lewis" (pp. 145-154).

During several years, till his health rendered him unable to do so, he used to spend part of each summer in Braemar. Since 1861 he has held the Professorship of Botany in Cambridge, where he died on 22nd July 1895.

**Dr. Paul Howard Macgillivray.**—Though it is so many years since Dr. P. H. Macgillivray emigrated from his native land that his name will probably be familiar to few of those now interested in the natural history of Scotland, it would be unfitting that we should pass unnoticed the death of one who, even while a student, published a local Scottish Flora. He was the (only surviving) son of Dr. William Macgillivray, the eminent Professor of Natural History in the University of Marischal College in Aberdeen, who, though best known as an ornithologist, wrote numerous excellent works on several other branches of natural science, and in his scientific views more nearly approached those that now prevail than did all save a very few of his contemporaries. P. H. Macgillivray was born in 1834, and he received his education in Marischal College, where he took the degree of M.A. after a distinguished course as a student. He had intended to devote himself to a scientific career; but the death of his father while he was still a student in Arts compelled him to turn to Medicine as a profession. Yet in 1853 he published "A Catalogue of the Flowering Plants and Ferns growing in the Neighbourhood of Aberdeen," a duodecimo of viii. and 44 pages. The district treated of extends over an area of about twenty-four miles from north to south, and sixteen from east to west, and shows a very considerable diversity of surface. The "Catalogue" was preceded by Dr. Dickie's "Flora Aberdonensis"; and probably the author was aided in its preparation considerably by his father, who had studied the botany of the district with some care. But, after such aid has been allowed for, it is very creditable to one who was under twenty years at the date of its publication; and it gave promise of good results had circumstances permitted him to devote himself entirely to scientific pursuits. This, however, as already said, he was unable to do, as he had to devote himself wholly to the medical profession for a livelihood during a number of years. About 1855 he went to the colony of Victoria, where he at first practised in Williamstown. He obtained the appointment of surgeon to the Bendigo Hospital in 1857. He died in Bendigo on 9th July 1895, of erysipelas, at the age of sixty-one.

He had a high reputation in Victoria as a surgeon and physician. He found time also to resume work in Natural Science, and contributed largely to Sir F. M'Coy's "Prodromus of the Zoology of Victoria." He devoted himself especially to the study of the Polyzoa, both recent and fossil, of Australia, describing and figuring many new species. At the time of his death he had almost completed a large work on the "Polyzoa of Victoria," to be published by the Royal Society of Victoria. In 1889 the University of Aberdeen conferred on him the degree of LL.D., in recognition of his merits.

**Dr. Hugh F. C. Cleghorn,** of Stravithie, Fifeshire, though a native of Madras, may be claimed as a Scottish botanist, as he

received his medical training in the University of Edinburgh, was a Fellow of the Edinburgh Botanical Society since 1837, and from 1867 onwards resided in Scotland, taking a warm interest in all that could aid in the progress of Botany in the country. He took a peculiarly warm interest in Forestry, advocating the national importance of the subject. He spent a considerable part of his life in Madras, where he held the Professorship of Botany in Madras University, and aided largely in establishing the Indian Forest Department, to which he contributed valuable reports. He published numerous papers, chiefly on economic botany, to the *Transactions of the Edinburgh Botanical Society*. He died at an advanced age at Stravithie on 19th May 1895.

**Dr. David Lyall, R.N.**, who died at Cheltenham on 2nd March 1895, is the subject of an appreciative obituary notice by Sir Joseph Hooker (*Journ. Bot.*, July 1895, pp. 209-211). Dr. Lyall was born at Auchinblae, in Kincardineshire, on 1st June 1817, and was Assistant-Surgeon and Botanist on H.M.S. Terror during the famous expedition of Sir John Ross from 1839 to 1842, of which Sir Joseph was also a member. He served in subsequent expeditions, and on all occasions devoted attention to botany, bringing home valuable collections. The herbarium made by him in duties on the western slopes of the Rocky Mountains afforded materials for a valuable contribution to the *Linnean Society's Journal* in 1863. He retired in 1873, and attained the rank of Deputy Inspector-General of Hospitals and Fleets before his death.

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# REVIEWS.

Heligoland as an Ornithological Observatory: the Result of Fifty Years' Experience. By Heinrich Gätke. Translated by Rudolph Rosenstock, M.A. Oxon. (Edinburgh: David Douglas, 10 Castle Street, 1895.)

It is with the greatest pleasure that we have to notice the English edition of Mr. Gätke's "Birds of Heligoland." This was first published in German at Brunswick in 1891; the manuscript having been completed, after the labour of years, by the author on 19th May 1890, on his seventy-seventh birthday. The present English edition is a literal translation of the original, made with great care by Mr. Rudolph Rosenstock, M.A. Oxon., the proof-sheets having been revised by Mr. Gätke himself.

It is impossible to exaggerate the value and importance to English ornithologists of this admirable work—a work which is the outcome of fifty years' observations, carried on day by day and season after season in one of the very best bird observatories in the

world; for Heligoland unquestionably ranks *par excellence* as the foremost ornithological station in the west of Europe.

It is certain that one result of the author's observations and his vast accumulation of facts will be to sweep aside for ever the crude theories, visionary speculations, and hasty deductions which in recent years have been put forward in the name of science in explanation of the various phenomena connected with migration; and in this way the book will do good service in preparing the ground for the appreciative student, so that he may be better able to grapple with and understand some of those great problems which are yet only partly solved.

To the ordinary reader the work is made attractive by the facile pen of the author. Mr. Gätke is a distinguished marine painter, with keenest gift of observation and intense love of nature in all her changeful moods as watched day after day from the lonely sea-girt rock. His exquisitely descriptive word-pictures of bird-life are not surpassed by ornithological writers in any land; and in this English edition the beauty of the original language has been well preserved and rendered by the able translator.

The first portion of the volume (148 pages) treats generally on the Migration of Birds, and this is divided into nine chapters under the various headings :—(i) Course of Migration in Heligoland; (ii) Direction of Flight; (iii) Altitude; (iv) Velocity; (v) Meteorological Conditions; (vi) Order of Migration according to Age and Sex; (vii) Exceptional Migration; (viii) What Guides Birds; (ix) The Cause of the Migratory Movement.

Then we have a chapter on "Changes in the Colour of the Plumage of Birds without Moulting." The second portion of the book (pp. 167-588) is an exhaustive account, under the head of each separate species, of all birds observed in Heligoland. This list, which now includes a female Great Bustard (*Otis tarda*) shot on 18th April 1895, makes the total which have occurred stand at 398, an extraordinary number for an island of so small an area in the gray North Sea—a bird-nesting station which may not inaptly be compared to the central office of a telephone system, where winged messengers from all quarters meet again to diverge.

Space will not allow us to remark upon or criticise the author's facts or deductions: these will bear the most careful reading and supply much material for thought. The subject is of the very highest interest not only to naturalists, but to the English-speaking people of every land.

The illustrations which have been introduced are from photographs taken on the island, and also pen-and-ink sketches by the author. Much praise is due to all those who have been connected with the production of this beautiful volume. First and foremost to the firm of Mr. David Douglas, the publishers, and then to Mr. J.

A. Harvie-Brown and Mr. Wm. Eagle Clarke for the correction of proofs and revising the synonymy, and their share in bringing the work to a satisfactory issue.

We cannot better conclude this notice than by quoting the last words of the author on the completion of this his great life-work: "With this my report on the Birds of Heligoland closes. It is not without a certain feeling of sadness that I take my leave of those dear companions of many years, whose voices, manifold and familiar, have come down to me like friendly greetings from the heights above during many a late hour of night spent at my desk over these leaves, whilst over the skylight of the room which serves me at once for museum and for studio their countless hosts were speeding onward towards their distant homes."—JOHN CORDEAUX.

BRITISH BIRDS. By W. H. Hudson, C.M.Z.S. With a chapter on Structure and Classification by Frank E. Beddard, F.R.S. Illustrated. (London: Longmans, Green, and Co., 1895.)

This work is intended by the author not as a text-book for the use of the scientific ornithologist, but for general readers seeking information, and more especially for the young. It differs from all other books on British Birds with which we are acquainted, in the fact that it treats of the appearance, language, and life-habits only of such species—about 210 in number—that reside permanently, or for a portion of each year, within the British Isles; accidental or irregular visitors being incidentally mentioned but not described.

Amongst the multiplicity of works on British ornithology there was room for one of this description · for, since the appearance of John's "British Birds and their Haunts" in 1862, no book has been issued from the press at a reasonable price and in a condensed form, so well suited as a guide to the study of birds in a state of nature, and at the same time one less weighted and encumbered with technical matter in connection with nomenclature and generic and specific distinctions. The volume commences with a chapter on Structure and Classification by Mr. F. E. Beddard, F.R.S., and then follows a short life-history of each species from the pen of the very capable author.

A great feature is the many very excellent illustrations by the best-known bird artists. These include eight chromo-lithographs from original coloured drawings by A. Thorburn, eight plates and one hundred figures in black and white from original drawings by G. E. Lodge, and three illustrations from photographs from nature by R. B. Lodge. All these are charming in their way, and add greatly to the beauty, interest, and value of the volume.

The descriptive portions are nicely written, and there are remarkably few inaccuracies, and these such as may be readily corrected in a future edition. The Redstart *is* a common summer visitor to Scotland, being *extremely* abundant in certain suitable haunts.

The Song Thrush (p. 39) is grouped with the Ring Ousel as a summer visitor. The Hobby is said not to range to Ireland; it is certainly a rare summer visitor, but has been recorded several times in that country. The only breeding station of the Fulmar, we are informed, in the United Kingdom is St. Kilda; it now, however, breeds in great and increasing numbers on Foula. The Sanderling figured at p. 308 is in autumn, not winter plumage. But we have no wish to be hyper-critical, and will only add that no prettier or nicer book can be found than this as a suitable and very acceptable gift to a young student or inquirer wishing to know something about the birds of the British Islands.

British Fungus Flora. By G. Massee. Vol. IV. 1895.

We have already had occasion to call the attention of our readers to the importance of Mr. Massee's "Fungus Flora" as embodying the results of much careful investigation by the author. The fourth volume, just issued, shows equal signs of painstaking and conscientious labour, and will, like its predecessors, be found indispensable by all British mycologists. It covers the groups of *Ascomycaceæ*, *Hysteriaceæ*, and *Discomycetes*, and is illustrated by excellent figures of the genera recognised by the author as valid. There are very considerable changes in nomenclature as compared with Phillips's "British Discomycetes"; but this is inevitable owing to different estimates of the limits of genera, where these limits are so difficult of recognition as they often are among the Discomycetes and other lower cryptogams. It cannot be expected that the limits of genera and species, and the names employed by Mr. Massee, will in all cases meet with acceptance; but the care with which his work has been done will be recognised by all who use the book, and the indication in each case of the material examined by him gives additional value to his conclusions.

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