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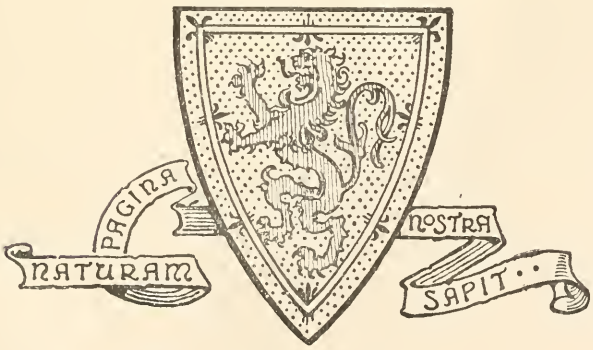

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ROBERT SMITH, B.Sc.

WE have rarely to record the death, at an early age, of one who has already made his mark in science; but the death of Robert Smith, on 28th August 1900, in his 26th year, has deprived Scotland of one who had given promise of an honoured and useful life in the advancement of the science of botany. A student of Dundee University College, he took his B.Sc. in 1895 "with distinction," and became Demonstrator of Botany in the College. A botanist by taste from boyhood, he devoted himself to the science with ever-growing love for it. As Research Scholar of the Franco-Scottish Society, he studied during a session under Professor Flahault in the University of Montpellier, giving especial attention to the associations shown among plants in their native habitats; and he resolved to work out the distribution of the flora of Scotland from this side. On his return to Scotland he began this work, and continued it with unceasing industry until his death, taxing his strength by the journeys he made, often on foot for great distances, and by the labour involved in recording his observations. He was fortunately able to make public a part of the results of his labour. His first publication was a paper on 'Plant Associations of the Tay Basin,' published in the "Proceedings of the Perthshire Society of Natural Science" in 1898. A paper

'On the Study of Plant Associations' appeared in "Natural Science" in 1899; and the Scottish Geographical Society undertook to publish in its journal the results of his work on Plant Associations in Scotland. These began to appear in 1900—Midlothian being the subject in July, and Northern Perthshire in August. For each he issued a most carefully prepared map, and a description, no less careful, illustrated by excellent views from photographs. What has appeared may serve in some measure to show how great is the loss sustained by Scottish botany in his death.

NOTE ON LOCAL VARIATION IN THE COMMON HEDGEHOG.

By G. H. Barret-Hamilton, B.A., F.Z.S., etc.

The attention of naturalists has of late years been directed to the study of the local variations of animals, and there are certainly few subjects which are likely to produce more useful results in throwing light on the conditions which influence the origin of species. It has been my own lot to touch upon the variations of our common European mammals, with results which are certainly anything but disappointing. One of the first results of my study is the discovery that many of our British mammals are distinguishable from those of continental Europe.

The common hedgehog (*Erinaceus europæus*, Linn.) would not at first sight appear to be a promising subject for a study of this kind, since its colours are sombre, and do not seem to offer much scope for variation. I find, however, that in the case of the skulls of hedgehogs contained in the collection of the British Museum of Natural History, all those of British may be distinguished from those of continental specimens. I had therefore no choice but to regard the two as distinct subspecies, and in the "Annals and Magazine of Natural History" for April 1900, p. 362, I proposed for the British form the subspecific name of *occidentalis*, taking as the type a fine male from

Innerwick, Haddingtonshire, presented by Mr. W. Eagle Clarke.

The following are the distinguishing characteristics of the two subspecies :—

E. europæus occidentalis.

"Skull with conspicuous frontal processes to the premaxillæ, with a blunt or nearly square posterior termination, and seldom showing a sharply defined point or angle ; these processes usually extend backward for more than half the length of the nasals."

E. europæus typicus.

"The skull may be distinguished by the frontal processes of the premaxillæ, which, although extending backward half the length of the nasals, ends in a sharply defined point."

NOTES ON *PRODELPHINUS* AND OTHER DOLPHINS IN SCOTTISH WATERS.

By Wm. Taylor.

In the "Annals" of last October, Mr. Boyd Watt of Glasgow says there is no "record" of this Dolphin in British waters. I think it should have been recorded long ago from various places along the coasts of Scotland. Mr. True, in giving the habitat of *Prodelphinus euphrosyne*, mentions Shetland and Orkney, giving the late Professor Bell as the authority. I hardly think Mr. True (a specialist in Cetacea) could have made a mistake, but Bell may have had little material at hand to compare his skulls with, and may have mistaken these Orkney specimens of *Prodelphinus* for *Lagenorhynchus acutus*, and named his Dolphins accordingly.

The skeleton of *Prodelphinus* in the University College, Dundee, was prepared from a "Tay" specimen. I am certain I saw two skulls of *Prodelphinus* in the Hunterian Museum, Glasgow. They are easily distinguished from the

skull of *Steno*. I never heard of any species of *Steno* being found in the seas of Europe, but many are brought, as curiosities, from the Indian Ocean.

Other skulls of *Prodelphinus* are in Scottish museums. I have one which I think is from the Moray Firth, but I cannot prove it. I do not know of a single adult skull of *Lagenorhynchus acutus* in any of the larger museums in Scotland. It must be a rare species. I may mention that Sir Wm. Turner puts *Delphinus*, *Prodelphinus*, and *Lagenorhynchus* all in one genus = *Delphinus;* and really *Lagenorhynchus acutus* and *Prodelphinus euphrosyne* are nearly allied species, and can only be distinguished by careful examination, for they are both "white-sided" Dolphins. Unless the skull of the Ardrishaig example has been preserved, or seen by Sir Wm. Flower or Sir Wm. Turner, I should doubt its being a *Lagenorhynchus acutus*. Probably *Prodelphinus* is not the only Cetacean in British seas that has failed to be recorded. I think the identification of nearly half of the ordinary records of Cetaceans is open to doubt. It is high time that something should be said about the recorded sizes of Dolphins. It is strange that Mr. Beddard's "Book of Whales" (1900) is the first popular book that gives the correct size of the full-grown porpoise (*Phocæna communis*), namely $5\frac{1}{2}$ feet. I have measured it, Mr. Lydekker says, from 4 to 5 feet. Worse still, Mr. Boyd Watt quotes: "*Delphinus tursio*, from 12 to 15 feet in length." *Delphinus* (*Tursiops*) *tursio* is only 12 feet long when *not* measured. A friend of mine told me that the largest of four stranded individuals of this species was about 12 feet long. It measured 9 feet 2 inches! The average adult *Tursiops tursio* does not exceed 9.5 feet long, in a straight line. If the "Great Dolphin" was from 12 to 15 feet long, it must have been some other species. Neither Sir Wm. Flower nor Sir Wm. Turner have ever demonstrated that species of Cetaceans vary more in size than species of land mammals do. If we paid more attention to the works of these authors, and less attention to the ordinary records, we would soon make headway in our knowledge of the Cetaceans of our shores.

ON SOME MIGRATORY AND OTHER BIRDS OBSERVED IN SOUTHERN SHETLAND IN SEPTEMBER 1900.

By Wm. Eagle Clarke, F.L.S., and T. G. Laidlaw, M.B.O.U.

The following notes are offered as a small contribution to our knowledge of the migratory birds visiting Shetland in the autumn. A few of the observations are added relating to certain resident species.

This northern archipelago has for long years past been the happy hunting-ground of the egg-collector, with the result that its breeding birds are almost as well known as those of any of the Scottish counties.

In remarkable contrast with this is our knowledge of the various species which visit the islands during the periods of the spring and autumn migrations. It is strange that so few ornithologists have thought it worth their while to visit Shetland at these seasons, and thus our knowledge relating to the birds of passage—with the notable exception of those visiting Unst—is very slight, and much remains to be accomplished ere it can be regarded as satisfactory. Yet it may be said without fear of contradiction that there is no more important area within the British Isles in which to make observations, and none for which an accurate knowledge is more to be desired.

It is necessary to know what species, or what proportion of the species, travel thus far north in spring before striking across the waters of the North Sea to reach their summer haunts in Northern Europe, or travel *viâ* the Shetlands in the autumn when *en route* for their winter retreats. More than this, a particular acquaintance with the distribution of these birds in the various isles of the group and in the various districts of the great main island is a desideratum, for not all of the *voyageurs* reach the northern portion of the archipelago —the song Thrush, for instance, is known to occur annually in the extreme south, is rare further north, and finally at Unst, the *Ultima Thule* of the islands, is practically unknown.

Our present knowledge regarding the birds of passage is

based almost entirely upon Saxby's "Birds of Shetland,"—a work which is the result of long years of residence and hence of extreme value,—but this only affords data relating to the island of Unst. The other contributions are few, and with the exception of Harvie Brown's "Notes from Dunrossness," made in the autumns of 1891 and 1892, and published in this magazine ("Annals," 1893, pp. 9-25), and the observations made at the lighthouses during the years of the inquiry on the migration of birds instituted by the British Association, consist of odd items, among which those communicated by Mrs. Traill and her son for Foula, and others by Mr. Thomas Henderson, jun., of Scousburgh, are particularly useful.

Fortunately all these records, indeed we may say all that is known relating to the avifauna of the islands, have been gathered together with a completeness that is remarkable by Messrs. A. H. Evans and Buckley, and form an important section of their volume on "The Vertebrate Fauna of the Shetland Islands," published in 1899.

Our observations were made between the 9th and 24th of September last in the southern portion of the main island and of the parish of Dunrossness.

A few words may be devoted to this district as one suitable for witnessing migratory movements.

Situated as it is at the south extremity of the group, many birds which have struck the islands further north find their way here and congregate before departure, which is an important advantage to the observer; while for migratory waders it possesses an attraction which is not to be found commonly in the islands, namely, a shallow bay, known as the Pool of Virkie, where, when the tide is out, a considerable extent of somewhat muddy sand is exposed. Thus it afforded an attractive feeding ground for Limicolæ, and it was here that we observed practically all the wading birds that came under our notice.

In the following detailed account of the species observed, it will be noted that there is an almost entire absence of information relating to the migratory Passeres. The White Wagtail was indeed the only species actually observed on passage. Wheatears were abundant, but we did not notice

any marked signs of migration ; and the bird was as abundant as ever at the end of our stay. Mr. T. Henderson, jun., told us that it is not until October that the birds of passage of this order commence to arrive in numbers ; and this is fully borne out by Harvie Brown's valuable notes made during the autumns of 1891 and 1892. On the other hand, we were certainly too late for certain migratory Limicolæ.

White Wagtail, *Motacilla alba.*—One of the objects for visiting Shetland was to endeavour to obtain some information regarding this species as an autumn bird of passage. Clarke, in his report on the movements of this bird presented to the meeting of the British Association at Bradford on the 6th of September, had expressed a decided opinion that the flocks of Pied Wagtails said by Saxby to arrive in Unst in the autumn would be found to be composed of White Wagtails. This surmise proved to be correct.

Within an hour of our arrival on the 9th, we observed this bird on the shore a little to the south of Lerwick, and saw it daily down to our departure on the 24th.

It was chiefly found in parties of from ten to fifteen individuals, consisting of adults and young, and on one occasion, the 18th, from forty to fifty were seen together.

These birds chiefly frequented the shores of the bays of Voe, Virkie, and Grutness on the eastern coast of Dunrossness Parish ; but a few were observed at Spiggie Voe and Quendale Bay on the west side. We did not see the bird anywhere inland ; it was strictly confined to the coast.

There was an emigration of White Wagtails on the 19th, after which date the species became less numerous, and parties of about half a dozen individuals only were seen.

At Voe the numerous flies in the neighbourhood of the fish-curing stations seemed to be a decided attraction, while at Virkie and Grutness the birds were always busy hunting for insects among the debris at or above high-water mark.

After our departure a single bird was observed at Spiggie Voe down to the 3rd of October : the latest date on which this species has hitherto been recorded in the British Islands. It must be remarked, however, that we have much, very much, to learn regarding the migrations of the White Wagtail on all parts of the British and Irish coasts.

There can be little doubt, from the accounts furnished to us by Mr. Thomas Henderson, jun., that a pair of White Wagtails bred this year (1900) at Spiggie. Strange to say, the nest was placed in a boat used for visiting the neighbouring

island of Colsay. Although this craft made several journeys to that island during the period of incubation, yet a brood of five was hatched, four of which the birds successfully reared. Mr. Henderson had many opportunities of seeing the birds at close quarters and naturally took considerable interest in them, and he assures us that they were not of the Pied species, but Wagtails similar to the specimens of *Motacilla alba* which we showed him in the flesh, and obtained by us to place their identification beyond dispute.

We did not observe a single example of the Pied Wagtail (*Motacilla lugubris*) during our visit.

Linnet, *Linota cannabina*.—We observed small parties of Linnets on several occasions in the neighbourhood of Scousburgh.

There are only, as yet, a few records for this species in Shetland, and its precise status in the islands remains to be determined.

Tree Sparrow, *Passer montanus*.—A party of five Tree Sparrows were seen on some cultivated land at the base of the Scatness promontory—the south-western limit of Shetland—on the 18th.

The only previous record for this species in the islands refers to two pairs seen in Unst in June 1898, and which were thought to be nesting ("Fauna of Shetland," p. 87).

Raven, *Corvus corax*.—As an illustration of the abundance of the Raven in Southern Shetland, we may mention the fact that we saw twenty-five together on the hill above the west side of Channerwick Voe on the 16th.

Pintail, *Dafila acuta*.—A female was observed feeding close to edge of the rocks at the mouth of the Pool of Virkie on the 17th. It was remarkably unsuspicious, and permitted a close approach to be made to it before taking wing.

It is a somewhat remarkable fact that this species does not appear to have hitherto been observed in the islands during the autumn. Saxby mentions its visits in small numbers to Unst in the spring, and remarks that so far as he has been able to learn, the bird is never seen in Shetland in autumn or winter. It has also been observed, on more than one occasion, on Loch Spiggie in the spring.

Teal, *Nettion crecca*.—As the information regarding the occurrence of the Teal in the autumn and winter is considered to be both meagre and unsatisfactory ("Fauna of Shetland," p. 135), it may be useful to remark that we found the bird present in small numbers on all the freshwater lochs and pools, whose margins afforded suitable cover, throughout our stay.

Wigeon, *Mareca penelope*.—Seven Wigeon were observed by us on Loch Spiggie on the day of our arrival, the 9th, but their

numbers did not increase on this loch during our stay, nor were they numerous elsewhere. The largest number seen was eighteen on a small loch near the east shore on the 20th. Several were noted in the bays of Troswick and Virkie—feeding at the edge of the tide.

The birds seen were evidently only a few of the van, the great flight not arriving from the north until later in the autumn —a remark which also applies to all the species of duck that came under our observation. With the exception of a few males in change, all the Wigeon seen were in the plumage of the female.

Scaup-Duck, *Fuligula marila.*—An adult male and female arrived on Loch Clumlie—a sheet of freshwater in Eastern Dunrossness, and near to the sea—on the 13th, and were to be seen there up to the date of our departure.

This note may be useful, since there appears to be little or no definite information regarding the date of arrival of this species in Shetland in the autumn.

Golden-Eye, *Clangula glaucion.*—A pair of Golden-eye, in the plumage of the female, arrived on Loch Spiggie on the 14th, and were observed there, without their numbers being added to, during the remainder of our visit.

This duck is a common winter visitor to Loch Spiggie, and above-mentioned date records its arrival for the autumn of 1900.

Quail, *Coturnix communis.*—A nest of this species, containing nine fresh eggs, was discovered, and the bird seen, among some oats which were being cut near Scousburgh on the 13th. The eggs were shown to us.

Although a remarkably late date for such an occurrence, yet it is not unprecedented; indeed, it is eclipsed by an Unst record of a nest and eggs found on the 25th September 1868 (Saxby, "Birds of Shetland," p. 155).

Waterhen, *Gallinula chloropus.*—We found the Waterhen fairly common at Hillwell Loch. This is apparently a new locality for this species in Dunrossness. The bird is increasing in numbers in Southern Shetland, and is now quite common in the marsh at the head of Loch Spiggie.

Coot, *Fulica atra.*—This is another species which is spreading and increasing in Dunrossness. It is now not uncommon on Loch Clumlie, an unrecorded haunt for the bird in the district.

Grey Plover, *Squatarola helvetica.*—A bird of the year was obtained at the Pool of Virkie on the 18th. It was alone, and, when examined with the aid of binoculars, was taken for

a Golden Plover, so strikingly pronounced were the yellow spots on the upper plumage. On the wing, however, the conspicuous dark axillaries demonstrated that it could not be that species, and we thought of possibilities in the shape of *Charadrius dominicus*.

The Grey Plover is apparently a very rare bird in Shetland, inasmuch as it has not been recorded for the islands since the autumn of 1870, when a party of about a dozen examples was observed in Unst, the only isle of the group which has hitherto been known to have been visited by it. On this occasion the birds came under the notice of Saxby, and were the only Grey Plovers seen by him during his long residence in that island.

These facts warrant one in supposing that this species crosses the North Sea in spring and autumn by a passage lying to the east of the Shetlands. This may be so, but one would scarcely expect the bird to be of such extremely rare occurrence in the islands as our present knowledge would lead us to believe.

Dotterel, *Eudromias morinellus*. — An adult female was shot on moorland ground lying to the south-east of Scousburgh on the 26th, and was forwarded to us in the flesh by our friend Mr. Charles Anderson.

There are only two previous records of the occurrence of this species in Shetland, but further investigations may lead to its being regarded as more or less frequent during passage in Southern Shetland.

Lapwing, *Vanellus vulgaris*.—The Lapwings that breed in Dunrossness had departed before our arrival on the 9th, but we saw a few birds of passage during our visit.

The first observed was a pair which appeared on the 17th —a date on which the numbers of other migratory Limicolæ showed a decided increase. One was seen at Flack on the 18th, and a party of five near Loch Brow on the 22nd.

Turnstone, *Strepsilas interpres*.—We were surprised at the practically entire absence of the Turnstone from the eminently suitable haunts for this species, which were almost everywhere at hand. We only saw a single individual—on the rocks at Virkie on the 18th.

Knot, *Tringa canutus*.—The only Knots observed were a party of three on the shore at Virkie on the 14th, and a pair on the 18th in company with Ring Plovers, Dunlins, and Sanderlings.

This species is regarded as a somewhat rare visitor in Southern Shetland, and did not come under the notice of Harvie Brown in the autumns of 1891 and 1892. It is, however, regular on autumn passage in Unst.

Sanderling, *Calidris arenaria*.—The Sanderling was undoubtedly the commonest wader observed by us, though, apart from Saxby's information for Unst, where the bird is described as a spring and autumn visitant, there appear to be only two records, each referring to single individuals only, of the bird's occurrence in Shetland.

On visiting Quendale Bay on the 10th, the day after our arrival in the islands, we saw from forty to fifty Sanderlings in a flock. At the Pool of Virkie we found them more numerous, and consorting with Ring Plovers and Dunlins. Here we observed a hundred or more during each visit down to the 19th, after which date they became less numerous both at Virkie and Quendale. They were present, however, in both haunts, but in smaller parties, down to the end of our visit.

Ruff, *Machetes pugnax*.—The Ruff was one of the species which appeared with the slight increase of migratory birds on the 17th. A young male was shot on that date from the marsh at the head of Loch Spiggie. Another, also a male from its size, was observed by us feeding on the margin of Pool of Virkie on the following day.

Although there are but few actual records of the occurrence of this species in the Shetlands. yet, from the information afforded us by Mr. Thomas Henderson, jun., there can be little doubt that this species is a regular autumn visitor to the south portion of the main island.

Bar-tailed Godwit, *Limosa lapponica*.—This species was not abundant, but several small parties frequented the sands of the Pool of Virkie. Usually four or five were noted, and on no occasion were more than a dozen seen. They appeared to be less numerous after the 19th, but six of these birds were still there on the occasion of our last visit on the 22nd.

Though regarded as an irregular visitor to Shetland, we suspect that it might be observed annually on passage in suitable haunts, such as the sands at Virkie.

Whimbrel, *Numenius phæopus*.—Not only had the Whimbrels which summer in Shetland departed prior to our visit, but the passage of the birds which arrive in the autumn was also apparently over, for we only came across a single individual, in company with Curlews, at Grutness Voe on the 14th.

Arctic Tern, *Sterna macrura*.—Two parties of three birds seen at the Pool of Virkie on the 18th were the only Arctic Terns observed. This Tern breeds in the district, but had taken its departure prior to the 9th.

Lesser Tern, *Sterna minuta*.—The Lesser Tern is an addition to the fauna of the Shetland Isles.

On the 20th, after several days of strong southerly winds,

about six adult examples were observed fishing at the mouth of Grutness Voe.

This species appears to be a summer visitor to the Orkneys, so that its appearance at the southern extremity of Shetland cannot be regarded as a matter for surprise.

Great Skua, *Megalestris catarrhactes*.—Single examples of the Great Skua were observed down to the 20th. As we did not see this species daily, it is quite possible that it tarried in Southern Shetland beyond that date. Saxby, however, remarks on one brought to him on the 26th September that it was a most unusually late date for it to occur.

Little Grebe, *Podicipes fluviatilis*.—A pair was seen at the head of Loch Spiggie on the 9th.

There can be little doubt that Mr. T. Henderson's opinion that it breeds there is a correct one.

NOTES ON THE WHITE WAGTAIL (*MOTACILLA ALBA*, L.) IN THE SOUTH-EAST OF SCOTLAND.

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

Mr. Eagle Clarke's most instructive summary of the Movements of this bird, contained in the Migration Committee's Third Interim Report (1900) to the British Association, calls attention once more to the lack of records regarding it from the east coast of Britain. Perhaps, therefore, the following notes with respect to the Forth area, put together a couple of years ago, may not be devoid of interest at this time.

Status in Forth.—A regular spring and autumn visitor, occurring, as a rule, in considerable numbers at both seasons.

The true *Motacilla alba* of Linnæus, of which our familiar Pied Wagtail (*M. lugubris*, Temm.) is little more than a dark western race, evidently came under the notice of Macgillivray, in the south of Scotland, nearly three-quarters of a century ago; and Gray, in his "Birds of the West of Scotland," claims to have shot an example on the shore at Dunbar "in the winter of 1847," while, according to an entry in his MS. note-book, two were seen by him at Burnt-

island Fife, on October 2, 1875. In 1876 Cordeaux observed "a remarkably fine example" a few miles north of Dunblane on September 7 ("Zoologist," p. 5167). Turnbull regarded it as "a very rare summer visitor" to East Lothian, but gives no particulars. I believe, however, I was the first to recognise it as an annual visitor, when on migration, to this part of Scotland—on which point see my note in "Proceedings of Royal Physical Society," 1885-86, p. 186.

During the second half of April—or even earlier—and the first half of May, groups of from two or three up to as many as a score, *en route* for their summer homes (presumably in Scandinavia), are annually to be met with on the coasts of East Lothian and Fife—certain spots where rotting seaweed or other refuse produces an abundance of insect food being favourite halting-places. Other Wagtails—the Yellow or the Pied, or both—are frequently in company with them. In August and September they reappear on the return journey, but owing to the number of young birds and the less conspicuous dress of the adults at this season, they are more apt to be overlooked.

The localities in which I have myself most frequently observed them are in the vicinities of Dunbar and Aberlady, on the coast of East Lothian, where they frequent the margins of muddy or sandy bays and creeks. From a favourite haunt immediately to the south-east of the first-named town, I have a number of specimens, mostly secured in the springs of 1885 and 1886 through Mr. G. Pow. They are in various phases of plumage, including one or two males shot in April, in perfect breeding dress. These, however, are the exception, and the backward state revealed both in the plumage and by dissection of some procured well into May, seems to indicate that those which linger longest with us on their passage north are non-breeding birds.

As we leave the seaward portion of the area and proceed westwards, we cease to meet with the bird with any regularity. I have, however, occasionally noticed single examples, or at most a pair, as at Loch Ard, in the upper portion of the valley, on April 18, 1896.

The following is a transcript of the records I find in my note-books :—

1875, *Oct.* 2.—Two seen at Burntisland by R. Gray, as stated in his MS. note-book.

1876, *Sept.* 7.—One, "remarkably fine," seen at a shooting lodge north of Dunblane, by J. Cordeaux ("Zool.," p. 5167).

1881, *May* 3.—One seen near Old Cambus, Berwickshire, by J. Hardy ("Proc. Berw. Nat. Club," ix. p. 553).

1885, *April* 25.—A beautiful ♂ (and also one of *M. raii*) seen by Mr. Gray and myself in a little bay about a mile west of Aberlady. Another was identified by me near Aberlady on May 17.

1885, *May* 2.—Eight, all apparently in full summer dress or nearly so, and some doubtful birds, seen by me on the shore between Dunbar and Skateraw. On the 15th two, and on the 19th one (all ♀s not in particularly bright plumage), were shot there by Mr. Pow and sent to Mr. Gray. Several were seen on the 17th also, and on the 23rd I went down to the locality again but only saw two, one of which I secured and found in a backward condition.

1885, *Sept.* 16.—What I took to be a few of this form were seen feeding on the Luffness salt-marshes to-day along with some of *M. lugubris* and a *raii*.

1886, *April and May*.—A good many seen on April 26, on the shore east of Dunbar, by G. Pow, who shot two—♂ and ♀—in good plumage. The birds—sometimes to the number of 15 to 20—were present in the neighbourhood for fully a fortnight, and were daily under observation by Pow, who sent Mr. Gray and myself further specimens (and also some of *lugubris* and *raii*) shot on April 29, May 4, 6, and 12; nearly all being in a more or less backward state both as regards plumage and reproductive organs. On May 1, when I visited the locality, only two birds that I could say were adult males were seen. During the same fortnight several were seen by me in the neighbourhood of Aberlady.

1886, *May* 16.—One, a ♂, seen by me at Edenmouth, Fife, a few miles north of St. Andrews.

1886, *Aug.* 22.—Among a dozen or more Wagtails, chiefly young birds, noticed on the salt-marshes at the Luffness end of Aberlady Bay to-day, one was certainly an old *alba*. On 29th, some were still there, and on September 10 I shot a male in winter dress.

1886, *Sept.* 1.—Pow met with a small flock, with which were a few *raii*, in the old haunt near Dunbar (specimen secured).

1887, *April* 3.—Three in nearly full breeding dress, consorting with some full-plumaged *lugubris*, seen by me at the mouth of Belhaven Burn, west of Dunbar.

1887, *April* 18.—One observed by the side of Linlithgow Loch.

1887, *May*.—Pow reports them as less plentiful about Dunbar this spring than in the two previous years. He obtained one at Dunglass, and saw another near the Pease Dean, Berwickshire.

1887, *Aug.* 21 and *Sept.* 9.—Several on the salt-marshes at Aberlady.

1888, *Sept.* 3.—One or two at Luffness, with other wagtails and pipits.

1889, *April* 25.—A male in perfect breeding dress—the finest example I have yet seen—was obtained at Dunbar to-day. Another was got on the 30th. The birds are present this spring as usual in the old places of call on the Haddingtonshire coast.

1893, *April* 23.—Two seen at Aberlady Bay.

1893, *Aug.* 27.—Observed at North Berwick by Mr. Clarke.

1894, *Sept.* 4.—One or two seen by me in Tyne Estuary, near Dunbar.

1896, *April* 18.—Near the west end of Loch Ard, Upper Forth, I met with a pair of unmistakable *M. alba*—the ♂ was in beautiful plumage. When put up from the loch-side they both flew to a tree close at hand and alighted on it.

1897, *April* 29.—One seen at Comiston, near Edinburgh, by Mr. Clarke.

1897, *Aug.*—Observed by me on the beach, near North Berwick, several times during the second half of the month.

1897, *Sept.* 9.—Saw a fine adult bird on the Isle of May to-day.

NOTES ON THE GREAT SHEARWATER.

By Howard Saunders.

In a very interesting article in the "Annals" for 1900, pp. 142-147, Professor Newton has recorded his observations in Scottish waters upon the species which was formerly known as *Puffinus major* (Faber), but now bears the earlier name *Puffinus gravis* (O'Reilly). In a footnote (p. 145) Professor Newton remarked that he did not know upon whose authority it was stated in my "Manual of British

Birds" (2nd ed., p. 738) that, on alighting, this species "strikes the water with great violence, in a manner quite different from that of a Gull, and then dives"; such behaviour not having come under his notice. The reference to the principal source of my information was promptly given, but it subsequently occurred to me that there might be other ornithologists who were unfamiliar with a very valuable paper upon this Shearwater. It is to be found in the "Annual Report of the Commissioner of Fish and Fisheries [of the United States] for 1882," and its full title is 'Notes on the Habits and Methods of Capture of various species of Sea Birds that occur on the Fishing Banks off the Eastern Coast of North America, and which are used as Bait for catching Codfish by New England Fishermen,' by Capt. J. W. Collins. The author, whom I had the pleasure of meeting for the first time in 1882, when he gave me much information about sea-birds, had enjoyed with his brother, Capt. D. E. Collins, exceptional opportunities, extending over many years, for observing the aforesaid Shearwaters upon the fishing-banks, and he was, I believe, the first to give his reasons for believing that *P. gravis* did not breed in the northern hemisphere. He had noticed that the arrival of the "hagdons," as these Shearwaters are locally called, began towards the end of May, and that the birds remained until the middle of October, and occasionally later. Sometimes they became scarce on the fishing-banks in July, owing, it was surmised, to an abundance of squid and other food in the offing. "When or where the hagdon breeds is unknown to me," says Capt. Collins. "My opinion is that it breeds in [our] winter. I have opened many hundreds of these birds, but have never found their sexual organs in a condition that would indicate they were incubating." Capt. Collins told me that his experience was confirmed by the bait-purveyors, and also that, shortly after the arrival of the birds, the sea was strewn with their body-feathers—the primaries and other flight-feathers being shed and renewed, somewhat abruptly, from the end of June to the latter part of July. The late Baron d'Hamonville stated, a few years ago, that this rapid moult of the flight-feathers took place in the Manx Shearwater (*P. anglorum*). When the Great

Shearwater arrives on the American fishing-banks, it seems to be listless and disinclined to feed, passing most of its time in sitting on the water; but later, "when feeding, it displays a dash and pugnacity which is perfectly astonishing. When in pursuit of food, it plunges suddenly down into the water, striking on its breast with great violence, and in a manner quite different from that in which Gulls alight. Its method of diving is also different from that of any other species. It never plunges head first into the water, but it first alights upon the surface, as just noted, disappearing almost instantly. It is an active swimmer under water, and when in pursuit of food passes rapidly from one object to another. It is a common occurrence for a number of these birds to chase a boat for half an hour or more at a time, diving like a flash, every few minutes, after the bubbles made by the oars, which these winged rangers seem to imagine some kind of food beneath the surface of the water. They will also persistently follow a dory from which a trawl is being set, and, diving in the wake of the boat after the sinking gear, make desperate endeavours to tear the bait from the hooks." This evidence will probably suffice to show the manners of this Shearwater on the other side of the Atlantic, and reference may now be made to the experiences of Mr. Robert Warren, of Moyview, Ballina, as set forth in "The Zoologist," 1894, p. 22. On 23rd April [1893] a flock of eleven Great Shearwaters were beating about amidst the crowd of Gulls and Guillemots in Killala Bay, and fishing in a manner quite different from that of the other birds; "for while in full flight close along the surface of the water, and without the slightest pause, they would suddenly dash into the water with a splash, and disappear beneath the surface for some moments, reappearing some yards farther on."

My own experience of the Great Shearwater has been mainly on sailing vessels, during the month of August on a voyage to Rio de Janeiro, and again on my return from Pará in October-November, when not one of the species was seen to the north of the Azores. I have also seen the species on both sides of the North Atlantic and in the Channel in our autumn. Then, to quote Capt. Collins again, "it may be

seen skimming over the waves, passing from the top of one sea to another, scarcely moving a muscle; but by trimming its wings, if such an expression is allowable, first poised on one wing and then on the other, it is apparently propelled without an effort on its part, but simply by the action of the wind beneath. This method of flight, however, is frequently varied; for, when necessary, the hagdon can and does move its wings with great power and considerable rapidity."

The breeding-place of *P. gravis* has yet to be discovered; we only know that the bird is found throughout the Atlantic, from Iceland and South Greenland, during our northern summer, to the vicinity of Cape Horn on the west, and the Cape of Good Hope on the east.

NOTES ON BRITISH SALMONIDÆ.

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

For upwards of thirty-five years I have been a salmon angler. During much of that time I have kept very careful notes upon certain aspects of the natural history of the Salmonidæ which were presented to my mind and observation whilst prosecuting my sport. And, for many years past, I have thought that much matter so collected, if brought together, might, as likely as not, supplement the work of our Salmon Commissioners. Without in any way wishing to grumble or to find faults, still it seems to me that the *modus operandi* hitherto applied has followed too closely the mere commercial aspects, and has—somewhat vainly I think—tried to appease conflicting interests with a sacrifice of scientific truth. A gentleman who has had very considerable experience of stocking a salmon river in Ireland, and a personal friend, writes to me as follows:—"I do not know anything more difficult to get than accurate information about White Trout, or any fish which is more different in its habits according to locality. In one river I know there is a very distinct run early on the season—*fish like spring fish;* but then there are a lot of subsequent

runs of fish, and they are apt to run in far greater numbers than Salmon."[1]

I entirely agree with all he says; and I think that these few facts alone, and unattended with many others in different directions, are enough to warrant some endeavours to fill in blanks in the histories of many (if not all?) of our salmon and sea-trout rivers.

The following notes are, for the most part, confined to the two small rivers, and their "catchment basins," of Ailort and Loch Eilt, and of the Morar and Loch Morar.

The rivers Ailort and Morar are two short rivers of the west coast of Inverness-shire. The distance between them, along the coast-line, approximately as the fish swim, is about twenty miles—measured by means of a "Wheelomephna." To the southward of the river of Ailort there are no sea-nets nearer than Eilean Shona, close to the mouth of the River Shiel, and, to the northward of the river of Morar there are no sea-nets nearer than Torridon on the mainland, and the Sound of Sleat in Skye. It cannot be said, therefore, that these two rivers are nearly so severely depleted by net-fishing as most other west coast rivers are.

The Ailort river is about $1\frac{1}{4}$ miles long, and flows from Loch Eilt. There is a widening of the river into a dark deep lochlet called Dhuloch, about 300 yards below the outflow of Loch Eilt. Between the two lochs is a fall pool or a resting pool for the ascending fish, and well known as a deadly trap if fished in an unsportsmanlike way. The Ailort has many good "catches" and temporary resting pools below the Dhuloch, where fish rise to the artificial fly. On the deep Dhuloch, except where the stream runs in, and where it runs out, salmon and sea-trout rarely move to either flies or minnows. The keeper has seen it tried with the latter, but never knew of a fish killed upon that bit of water, which goes down to depths of from 14 to 24 feet. When the sea-trout get into the fall pool, coming from the sea at their regular seasons, they will not look at a fly nor take any lure except a worm, but that

[1] In connection with these remarks, it may serve a good purpose to study an article lately published at the Government Printing Bureau at Ottawa, written by H.M.I. of the Canadian Fisheries (*vide* "Special Appended Reports," iii. p. 27), 'On the Habits and Life History of Canadian Salmon.'

they take most savagely. That is—they will not take fly *before the summer run makes its appearance* in Loch Eilt. But after that first appears, then baskets may be made from any and all the pools between Loch Dhu and Loch Eilt, with fly. These statistics seem, to the writer, to be so intimately relative, that they cannot be left out; and perhaps this may become more apparent further on.

Continuing:—On the Ailort sea-trout run as early as April and May—as I am assured by both the keeper and the two watchers. These earlier running fish often reach weights up to 10 lbs., as I am also told, though they are very rarely known to take a fly. The keeper and watchers tell me that the large sea-trout—probably old fish—spawn in September, but that the smaller (younger) fish, which are due to run with the grilses and salmon and "finnocks," spawn in November and December. Further, the bigger fish do not occupy the best spawning grounds in the burns running into the loch, but are seen spawning in the bays of the loch itself. The upper and best spawning grounds are occupied *later* by the fish which run in the summer.

Now, in the summer run, sea-trout, and "finnocks," and salmon and their grilses, all run together, though the salmon *not in great numbers*. At the time of the "rush," which takes place with singular precision as to time—viz. with the highest tides nearest to the date of the middle of July—and when, for the first time, these fish begin to rise freely upon Loch Eilt—in other words, when the fall pool gets rid of the earlier runs, say of June and earlier half of July—then, for the first time, will they rise freely upon the fall pool at the artificial fly. The change comes often with startling suddenness. Before that time all fish are "stiff to rise" on the loch, and will only take a worm in the resting pool; and in this unsportsmanlike way many, alas, are killed. The change, as I have said, takes place concurrently with the mid-July "rush," when high tides and high floods occur together. But even should heavy spates take place, say in June or even in early July, the fish which run up the river as far as the resting pool will not move on to the loch; or, if any do, their numbers are inappreciable

there to the angler, or, otherwise they will not rise to the surface.

Any of the large fish which are caught in Loch Eilt earlier than the summer run are invariably (what I call) "black fish," *i.e.* they are fish which ran in April and May; and even the fish of about 1 lb., which are got then, are also black. Nearly all got in the loch are captured by spinning baits and not with fly, though, some days, fly kills a few.

On the Ailort any fish over $\frac{3}{4}$ lb. are looked upon by natives and fishermen as adult, if small, sea-trout, and any of lesser sizes are reckoned their grilses or "finnocks."[1]

The watchers tell me that "finnocks" continue to run till, or into, September, by which season the big, old fish have taken up their spawning grounds mainly in the sandy and gravelly bays of the loch.

Having thus so far endeavoured to give some facts about the Ailort river, I propose now to say a few words about the Morar. For these I am mainly indebted to my friend Mr. T. E. Buckley, who collected the information when fishing there during May, June, and July 1900.

In reading these notes it may be well to compare them with the notes on the Ailort; and to facilitate this being done, I will try to keep them in a similar order.

The Morar river is about 700 yards long in all (Ailort $1\frac{1}{4}$ miles), and flows from a large loch of the same name. There is no intermediate loch like the Dhuloch of the Ailort, but there is a fall pool, or resting pool, as on the sister-river. This is situated only about 250 yards from the sea, and between it and the sea there are only two pools where salmon are usually caught by fly. As on the Ailort, sea-trout, after reaching the resting pool, will hardly ever look at anything but the worm, of which they are inordinately fond. After these fish leave the fall pool and go up into Loch Morar, they are of no further use to the angler with fly, and indeed of very little use at all to the sportsman. Therefore, it may be more permissible to take toll with worm in the resting pool of Morar than to do so in that of Ailort.

On the Morar sea-trout do not appear in the river at all

[1] "Finnock" is really a word better known on our east coast as expressing the young of the sea-trout.

until about the 20th of June, and go up to weights of from 5 to 6 lbs., but they are not all big, old fish, as many are young fish about 2 and 3 lbs. On the Morar salmon run as early as February, and Buckley killed six fish prior to the date of 28th May 1900. I forgot to say before that, so far as I could learn from the keepers and watchers on the Ailort, there were no salmon to be seen "on the run" in early spring nor before the middle of July; thereafter they continue to run into September—a very short season. But salmon do not appear to be at all abundant in Loch Eilt or on the River Ailort at any time. This may well account for these minor differences in this respect between the histories of the two rivers. The runs of sea-trout on Morar, on the other hand, are sooner over than on the Ailort; and all fishing may be considered over there by the end of July.

Buckley, whilst revising the MS. notes for this paper, says:—"Kelts are seen descending the Morar in February and March, and salmon have been recorded up to 24 lbs." The largest I could hear of on Loch Eilt or River Ailort was 18 lbs. (*auct.* Carr, the keeper, and the watchers). I have not ascertained with certainty the actual dates of the descent of kelts on Ailort, but I have seen kelts both of salmon and sea-trout descending the Gruinard river as late as June, and into the third week of that month. It may prove interesting to ascertain whether there is any difference in the time of the descent of kelts on the Ailort, which I hope to do yet; anyhow, it would appear that salmon are actually descending Morar at the same time that others are ascending. On the Gruinard river a friend and myself were literally shaking the sea-trout kelts off our salmon hooks at every cast, in one pool at the foot of the "Rockies." Another angler, the same day, bagged some 30 lbs. of them in the sea-pools and Garden pool 5 or 6 miles lower down, and "kindly" (?) offered us some for a fry, which I hope we did not *too indignantly refuse.*

On the Morar, while sea-trout fishing may be said to be over by the end of July, finnocks can still be got, but these become smaller as the season advances beyond that time. I cannot say that this was noticeable by our party on Loch Eilt

to any appreciable extent; but then it must be remembered that we left there on the 1st of August.

Now, one other remark should be made regarding both these rivers in the season of 1900. Both Buckley and I observed what poor state all the sea-trout and even the finnocks, usually so curdy and delicious, were in. Though beautiful as ever and apparently in fine condition, they were *utterly devoid of any curd between the flakes.* In fact, no improvement in this respect was traceable until the last two or three days of July on our water. Also, *in fact perfectly demonstrable*, these fish *did* enter these rivers before they had attained to perfect condition. Of what we may learn from the facts given above, I may have more to say.

Meanwhile I will make a few remarks, as shortly as possible, to try whether any things of real interest can be garnered from the above main statements.

First, it seems to me that the earlier spawning of these large, old sea-trout in September—having come up in March and April—goes to indicate, if I may not say prove, that these constitute, not an early run of the coming season, but a late run of the passing season. If I have not clearly explained what I mean, I may try to do so in another way, *thus*—These old fish are the last of the run of the season of 1899-1900, and not an early run, except as regards the calendar, of the year 1900. Still, in other words, the old, big fish are the west coast representatives of the autumn runs of *most* east coast rivers. And the summer runs on west coast rivers as a rule, are equivalent to the spring runs on such rivers as the Dee, Deveron, Spey, etc. etc.

The consideration of the causes of these differences in the times of the runs, on the east coast and on the west, as well as the runs *inter se* of the rivers of the same coast, is also a part of this inquiry; but I reserve any discussion of the facts until a later portion of these "Notes."

Next, the significance of the relationship between the several different runs of fish upon the same river—touched upon slightly already—requires further consideration and elucidation; and thereby I believe one or two important points can be brought out, later, in the natural history of the Salmonidæ.

Lastly, the questions of food and condition, as against the *nidus generaticus*, being the primary cause of fish leaving the salt water, still requires more complete treatment, and I think I can lay before the readers of the "Annals" further facts which cannot be easily refuted. The only one spoken of above is that referring to the unseasonal condition of the sea-trout of the two rivers under discussion—the Ailort and the Morar—in 1900.

(*To be continued.*)

ON A SPECIES OF *STENOLOPHUS* APPARENTLY NEW TO BRITAIN AND TO SCIENCE.

By the Rev. H. S. Gorham, F.Z.S.

Among other Clyde species forwarded by the Rev. A. Thornley to me for identification are two specimens of a *Stenolophus* taken by Mr. John Dunsmore near Gourock on the Clyde, which, while somewhat resembling *S. skrimshiranus*, and of the same size, are certainly different. On looking at Schaum's descriptions of this genus in the "Naturgeschichte der Inst. Deuts.," one is naturally drawn to that of *S. discophorus*, Fisch., the only one which our insect could possibly be associated with, and which is supposed to have occurred in Germany and in the south of France; and on examining the collection at the British Museum a species identical with ours stands under the name *discophorus*, Fisch. The insect, however, as I at once observed from Schaum, does not accord with Fischer's species, which has a common blue-black patch on the apical half of the elytra, and which, it should also be observed, was described from a N. Siberian insect. I possess specimens of *S. discophorus* from Russia, and I may say at once that our insect and that in the British Museum, attributed to S. France, are a wholly different species. They are to be distinguished from both it and from *S. skrimshiranus*, not only by each elytron having a long blackish *plagia* about half the length of the elytron, not reaching the base or the apex, and leaving the suture

yellow; but also by the rather longer, more parallel form, and by having the thorax longer, and narrowed towards the base, whereas in *S. discophorus* it is nearly quadrate (although rounded on the sides)—that is to say, the width at the anterior and posterior angles is about equal, and about equal to the length.

If (as it appears must be the case) this species is undescribed, I would propose for it the name *Stenolophus plagiatus*, which will apply to the French insect in the British Museum as well as to the Clyde insect, from which I take the description.

Stenolophus plagiatus, n. sp.

Oblongus, sub-parallelus, niger prothorace rufo postice subangustato, angulis posticis obtusis, basi utrinque late foveolato et disperse punctato; elytris flavis, singulis plagia juxta suturam, nec basin nec apicem attingente nigricante; profunde striatis, striola scutellari longa. Long. 7 millim.

Hab.—Gourock, ad flumen Clyde, Caledoniæ.

Against the probability that this insect has been recently introduced, it may be remarked that in the collection were no other unusual or doubtful species; the inherent improbability of a species of *stenolophus*, that is confessedly rare in Europe, having been introduced; that it was found under stones above high-water mark, behind an enclosure on the beach or shore fenced in for timber to season in the water—a natural habitat for the insect; and that two examples were obtained together.

S. discophorus is recorded by Heer, as from Bern, Thun, "rarissime"; by Fairmaire from S. France, "Agen, Alpes, Pyr. or., St. Severin (Dufour), Lyon, Saumur, Chinon"; but, as I have remarked, the supposed exponent in the British Museum does not pertain to Fischer's species. All the authors agree in describing *S. discophorus* as having a *common* blue-black patch (possibly, however, in this only following Fischer).

A CONTRIBUTION TOWARDS A LIST OF SCOTTISH ORTHOPTERA.

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

The British Orthoptera are few in number; even in the southern half of England, where they are most plentiful, there are only between thirty-five and forty species that can be reckoned as indigenous or thoroughly established, the few others recorded being merely casual visitors and importations from abroad. Northwards, the number is still less; and here, in Scotland, it is doubtful if we have more than a third of the above number. There is, however, some evidence that one or two species have been lost to us in the course of the last century.

The Order has been greatly neglected by Scottish entomologists, in proof of which I need only point to the fact that the twenty volumes of the present magazine and its predecessor "The Scottish Naturalist," extending over a period of thirty years, have yielded me but three records of Orthoptera—two relating to the German Cockroach, and one to the Migratory Locust. I cannot myself claim to have given much attention to the group, and the few Scottish specimens I possess are merely such as have come in my way when I have been collecting other insects. Few, however, though they be, a list of them, and of the other records that have come to my knowledge, will always be a contribution to the subject, and, it is hoped, may serve the further useful purpose of inducing others to record their observations also.

The following, then, is a list of my own captures—made, of course, chiefly in the Edinburgh district—and of such other recent records as are known to me. The nomenclature is that adopted by Mr. Malcolm Burr in his book on "British Orthoptera" published in 1897.

I. Cursoria.

Labia minor (Linn.).—Comiston (27th September 1897, ♂), Morningside (21st August 1898, ♀), and Craigentinny (22nd August 1898, ♀), all in Edinburgh district. Apparently not common in Scotland: recorded from Forfarshire by G. Don in 1813.

Forficula auricularia, Linn.—The common Earwig is one of the most abundant and generally distributed insects we have. It occurs everywhere on the coasts, plains, and lower parts of the valleys, and I have seen it under stones well up the hillsides, but have not made precise observations on the altitudes to which it attains: these would be interesting. Mr. C. W. Dale has recorded it from North Uist, Outer Hebrides ("Ent. Mo. Mag.," xx. p. 213).

Phyllodromia germanica (Linn.).—In 1897 I obtained two or three dozen examples of this small Cockroach from a hotel in George Street, Edinburgh, as recorded in this magazine for 1899 (p. 117); and Dr. R. S. MacDougall informs me he got it sent from a restaurant in the town three years ago. Its occurrence, in abundance, in a newspaper office, Glasgow, in 1880, was recorded by Professor Trail in the "Scottish Naturalist" the following year (vol. vi. p. 14).

Blatta orientalis, Linn.—Common in kitchens, bakehouses, etc., in most towns. I have found it occasionally even in isolated farm-houses, and Mr. R. Godfrey tells me Cockroaches, no doubt of this species, are common in coal-pits about Bo'ness. I also heard of their presence in a coal-pit near Dalkeith a number of years ago.

Periplaneta americana (Linn.).—The only place in which I have met with this large species, to which the name of "Ship Cockroach" has been applied, is in the palm-house at the Royal Botanic Garden, Edinburgh, where, in July 1879, I obtained several. One which I still possess has been shown to Mr. Burr, who confirms my identification. I have heard of its occurrence elsewhere in Edinburgh or Leith.

Periplaneta australasiæ (Fabr.).—Wishing to know if the previous species was still present at the Edinburgh Botanic Garden, I wrote to Dr. R. Stewart MacDougall, and have received from him the following interesting information: "The Cockroach at the Garden for the last few years is *P. australasiæ*. When I have desired Cockroaches, and they have been trapped for me, this is the one we always get" (*in lit.* 5th December 1900). It would thus appear that *P. americana* has been ousted by this form.

II. Saltatoria.

Stenobothrus viridulus (Linn.).—This Grasshopper, as the members of the genus are popularly called, is common—more especially in hilly or inland districts—on grassy banks having a southern exposure. It doubtless occurs all over Scotland, and, like its congeners, is to be met with in the adult state chiefly in August and September. My specimens are from the following localities:

—Braid and Blackford Hills, Edinburgh; Pentland Hills, at Boghall and Glencorse; Kirknewton, Elvanfoot, Aberfoyle, Falkland, and Blair Atholl.

Stenobothrus rufipes (Zett.).—I have not yet taken this form in Scotland, but it is recorded by Mr. M. Burr from Rannoch in Perthshire ("British Orthoptera," 1897, p. 36). Mr. Burr writes me that he thinks Mr. C. W. Dale was his authority for this locality. According to Eland Shaw ('Synopsis of Brit. Orthop.,' "Ent. Mo. Mag.," 1889-90) *S. rufipes* should be looked for on open heathy spaces in or adjoining woods.

Stenobothrus bicolor (Charp.).—Very common on the sea-banks, links, and coast sand-hills along the east side of Scotland, and doubtless on the west too. My specimens are from Burnmouth, Dunbar, North Berwick, Gullane, and Luffness Links (type and var. *purpurascens*), Port Seton, Kinghorn, and Tentsmuir.

Stenobothrus parallelus (Zett.).—I have taken this form near West Linton, and in September last I found it fairly common in a damp meadow at Elvanfoot, Lanarkshire.

Gomphocerus maculatus, Thunb.—Widely distributed and not uncommon, occurring both on the coast and inland: a bare spot on a railway or other bank is, according to my experience, a favourite habitat. My localities for it are as follows:—Dunbar, Luffness, and Aberlady, Boghall (at foot of the Pentland Hills), Peebles (Rev. A. Thornley, August 1900), North Queensferry, Pettycur, Thornton, Falkland, Glen Farg, and Aberfoyle.

Pachytylus migratorius (Linn.).—At long intervals, small flights, or portions of flights, of locusts reach the east coast of Scotland. In August and September 1846 many were noticed in various parts along the coast of Aberdeen and Kincardine (MacGillivray's "Natural History of Deeside," 1855, p. 447); and I find from the minutes of the Royal Physical Society, that in March 1851 Dr. J. A. Smith mentioned the occurrence of one at Longformacus, Berwickshire. In the autumn of 1880 a sprinkling from another flight reached us. The occurrences were mostly in the Border counties, namely:—two at Lamberton, 31st August; three at Hawick, September; one on Mertoun estate, 23rd September; one, Cessford, near Kelso, 28th September; and several others heard of but not recorded. On 7th September one was taken in a cornfield on Caledonia farm, near Juniper Green, a few miles west of Edinburgh; and a few had even reached Caithness and the Orkneys, one being found near Wick in the end of August, and three on South Ronaldshay in September. Dr. Hardy, who collected these records and published them in the "Proceedings of the Berwickshire Naturalists' Club" (vol. ix. pp. 378-379), states that he examined one of the specimens of

this flight "and ascertained that it was correctly determined." The latest occurrence I know of is that of a specimen caught in a cornfield near Longhaven, on the Aberdeenshire coast, 2nd October 1897, and recorded, after being shown to Professor Trail, by Mr. J. Davidson in this magazine (1898, p. 55).

The above are all recorded under the specific name of *migratorius*, but it is not unlikely that some of them were the closely allied *P. cinerascens* (Fabr.), to which Mr. R. M'Lachlan and others think it probable the greater part of the "migratory locusts" taken in Britain belong.

Tettix bipunctatus (Linn.).—This, the smallest of our "Grasshoppers," is widely distributed and not uncommon, except in the Lowlands, where it is seldom met with. It hibernates, and from spring to autumn may be found on bare sunny spots on heathery banks. It was recorded from Forfarshire by Don in 1813, and thirty years ago Buchanan-White recorded it, under the name of *T. Schrankii*, from Ross-shire, Inverness-shire, and Kirkcudbrightshire, mentioning at same time a specimen taken by J. Allan Harker "in the west of Scotland" ("Ent. Mo. Mag.," viii. p. 15). It has also been taken in the west of Scotland by P. Cameron ("Proc. Nat. Hist. Soc. Glasgow," ii. p. 209). My specimens, which are nearly all females, are from the following localities:—Aberfoyle (23rd April 1896, 11th September 1897, and larvæ, 30th July 1900), Loch Chon (27th April 1896), Blair Atholl (September 1898), Peaton, Loch Long (2nd July 1900), and on railway bank near Thornton, Fife (5th May and 15th August 1900, 2 ♂s.)

Gryllus domesticus, Linn.—The House Cricket is still to be got about bakers' ovens in Edinburgh and other towns, but so far as I can learn it is seldom found in dwelling-houses now. My specimens were taken in a bakehouse in the Newington district of Edinburgh in 1886. Mr. R. Service tells me there are plenty in Dumfries, and Mr. G. Bolam says it occurs in Berwick-on-Tweed, but is not very numerous.

Let me now call attention to three old lists in which there are a number of interesting entries, some of them, however, so unexpected as to be almost incredible.

In Sibbald's 'Historia Animalium in Scotiâ' ("Scotia Illustrata," 1684) we find, on pages 31 and 37, the following:—

Gryllus, the *Grasshopper*.
Gryllotalpa, the *Mole*, or *Fen Cricket*.
Blatta, the *Moth-Fly*. [Assuming that this was the Cockroach, the name "Moth-Fly" is curious.]
Grillus Focarius [*i.e.* Cricket of the hearth, I presume].

We have here, then, what are doubtless very early records of the Common Cockroach—which, by the way, was recorded as common in London wine-cellars fifty years before (Mouffet's "Theatrum," 1634, p. 139)—and the House Cricket.

The next set of names is from a 'List of Insects found in the neighbourhood of Edinburgh,' by C. Stewart, published in the "Memoirs" of the Wernerian Natural History Society for the year 1809 (vol. i. pp. 566-577). They occur on page 572, and are as under:—

Forficula auricularia and *Blatta orientalis.*
Gryllus domesticus and *G. campestris.*
,, *varius* [*Meconema varium* (Fab.)].
,, *biguttulus* [probably *Stenobothrus bicolor* (Charp.)].
,, *grossus* [*Mecostethus grossus* (L.)].
,, *viridulus* [*Stenobothrus viridulus* (L.)].
,, *quadratus* [I cannot make anything of this].

My third extract is from G. Don's Account of the Plants and Animals of the County of Forfar (Headrick's "View of the Agriculture of Angus, or Forfarshire," 1813, Append., pp. 11-59), and is (from page 50) as follows:—

Forficula auricularia; called by the country people *Horned gollich.*
,, [*Labia*] *minor;* this is rather rare.
Blatta orientalis; found in some of the bakehouses in the sea-port towns.
Gryllus bipunctatus [*Tettix bipunctatus* (L.)].
,, *gryllotalpa* [*Gryllotalpa gryllotalpa* (L.)].
,, *domesticus;* these are sometimes found near bakers' ovens, but rare.
,, *campestris.*
,, *viridissimus* [*Locusta viridissima* (L.)].
,, *varius* [as above].
,, *cærulescens* [*Œdipoda cærulescens* (L.)].
,, *stridulus* [*Psophus stridulus* (L.)].
,, *biguttulus* [as above].
,, *grossus* [as above].

As regards *G. gryllotalpa*, which is named by Sibbald and also by Don, I can find no corroborative evidence of its occurrence in Scotland. Sixty years ago the Rev. J. Duncan wrote: "The Mole Cricket is unknown in Scotland" ("Nat. Lib. Entom.," vol. i., 1840, p. 247). Nor can I find any evidence in support of Stewart's and Don's records of *G. campestris* (the Field Cricket), except the statement made by James Wilson in the seventh edition of the "Encyclopædia Britannica" (Entom., p. 158), viz.: "We heard its song near Edinburgh for the first time last summer (1833)."

I should not be astonished to hear of the discovery of *Mecostethus grossus* in some of our Highland marshes, especially in the west, seeing it inhabits Ireland; but it can hardly be admitted to the Scottish list on the strength of the above records alone. *Locusta viridissima* (a large insect with long slender antennæ) and *Meconema varium* (got on trees), though both fairly common in the south of England, seem to have long ago disappeared from Scotland, if, indeed, they ever inhabited it. The two most doubtful cases, however, are *Œdipoda cærulescens* and *Psophus stridulus*—conspicuous insects with blue and black, and red and black wings respectively. The former is common in France and the Channel Islands, where I have myself taken it; and the latter, which I have taken plentifully at Chamounix, is an inhabitant of the mountainous regions of Central and Northern Europe; but neither is known to have occurred in Britain, except perhaps as a very rare casual importation. Curiously enough, both are indicated as British in C. Stewart's "Elements of Natural History," first published, I believe, in 1801; and it is quite possible that Don, who was well known in Edinburgh, was the author's authority on this point.

My best thanks are due to Mr. Malcolm Burr, F.Z.S., the well-known orthopterist, who has kindly examined a set of my Scottish specimens, thus enabling me to make sure of my identifications—an all-important point.

A FORGOTTEN PAGE OF ANTIQUARIAN LORE.

By A. Macdonald, M.A.

The man in the field is familiar with the fact that a few trees left standing alone in the farmer's lands usually indicate the spot where one of the numerous small holdings of former days had its centre and housing. After the last wall has been improved away, and when not a stone is left upon another, there frequently remains a mountain-ash or two, a common ash, a lilac, or a beech, to attest that near this spot there resided and wrought for the natural term of their lives several generations of horny-handed tillers of the soil.

Whether arising from a lost superstition, or from a deep-seated feeling of respect towards the past, there is usually enough of veneration in the heart of the present occupier to refrain from the removal of these ancient landmarks,

which are at once suggestive and ornamental. In many districts, especially those in which there are now large farms, one may count half a dozen such sites on a single possession ; and you can hardly traverse a mile of country without having your memory nudged by those living witnesses of other times :—

> Near yonder copse, where once the garden smiled,
> And still where many a garden flower grows wild,
> There where a few torn shrubs the place disclose,
> The village preacher's modest mansion rose.

It needs but a step or two, however, of the march of time to bear away those objective traces of the homes of our fathers ; and then, though an agriculturalist can sometimes point you the spot where an excess of humus proves the existence of the kitchen garden, or, as its possessors would have more justly termed it, the "kail-yard," of an ancestor six or eight times removed, there is for most people no trace of the homestead, nor sign to show that here or there poor toilworn cottars had their repose and reinvigoration for half a century or more.

The botanist, as he comes over the ground, can frequently tell, after every other observer has failed, that at this spot or at that there stood in bygone times the habitation of human beings. He picks out from the dyke side or the old pathway some plants which our forefathers valued either for food or for medicine. Possessing the power of reproducing their kind, and of planting their sons to reign in their stead for hundreds of generations, they await the time when the man of flowers comes to read their lessons, and to note that they were first sown here by folks long dead, whose sole memorials they now are.

Some herbs included in such a category might appear scarcely worthy of a place, but we must not forget how, with all other advances, the vegetable world has also taken forward strides. As a professor of botany remarked, "We can have little idea of the plants which our forefathers valued, so greatly has the gardener improved the original weeds."

The Smear Dock (*Chenopodium Bonus-Henricus*) is one of the most common of such plants. There are still gardens

in the outlying districts where you will find it sometimes within the walls, and sometimes, as if for more easy access, by the very door of the cottage. But here and there over the country, near some old turf wall or wood-side, you come upon its broad healing leaf, which in former days was applied to many a work-sore, no doubt with good effect.

The picturesque Houseleek (*Sempervivum tectorum*), with its fringed leaves and spreading offsets, adorns the straw roof and clay walls of many a deserted home. Its cooling, succulent leaf is now left to fall to the ground.

Under this heading go Chamomile (*Anthemis nobilis*), Feverfew (*Chrysanthemum Parthenium*), Tansy (*Tanacetum vulgare*), Mints (*Mentha piperita*, etc.), Horehound (*Ballota nigra*), which has been found about the grounds of Castle Fraser, and a long list of others.

One of the most suggestive localities for such finds is the extensive ruins of the Abbey o' Deer, where several medicinal herbs still grow wild among the loose stones. What a living picture of the old monks these little herbs suggest! We can see them going about among the poor half-civilised people of Buchan, with simples for the cure of their bodily ailments, the pioneers of the medical as of several other faculties.

Nor is there wanting proof that fruits and flowers were cared for. The frequent occurrence of London Pride (*Saxifraga umbrosa*), Monkey-flower (*Mimulus Langsdorffii*), Lupine, etc., and of Red and Black Currants (*Ribes rubrum* and *R. nigrum*) fully attests this.

The name *Gooseberry* (*Ribes Grossularia*) suggests, according to De Candolle, that this fruit was first applied as a seasoning, and he compares the French name *Grosseille à maquereaux* (mackerel currant).

Under the heading of food-plants, a number of entries from old sites might be made.

The old songs, those crude literary remains of the past, contain many references to the food then used. We have the trite "Cauld Kail in Aberdeen and Castocks in Strathbogie," of which, whatever may be the figurative meaning, the primary application is clear enough. We often hear of

"reefarts," or "ryfarts"—radish, possibly *Brassica Sinapis*, and "sybous," young onions (*Allium Cepa*).

In "Scornful Nancy," of unknown age and authorship, first printed by Ramsay in 1724, we have :—

"What ails ye at my dad," quo' he,
"My minnie, or my auntie?
Wi' crowdy-mowdy they feed me,
Lang kail an' ranty-tanty,
Wi' chappit stocks fu' buttered weel,
An' isna that richt dainty?"

From this it appears that ranty-tanty, the broad-leaved Sorrel (*Rumex Acetosa*) was used as a pot-herb. That nettles were often made a meal of is well known, and doubtless both *Urtica dioica* and *U. urens* filled the pot. We have often wondered whether the frequent occurrence of *U. urens* on former house sites is an indication that they were planted. Near the railway station of Banchory this plant grows plentifully, just where the old records declare that the first village of Banchory-Ternan stood. You will also find it about the old town of Stonehaven, and the fishing villages of Cove, Collieston, etc.

Wild plants were also made into condiments and seasonings. There are farmhouses to be found where the old practice of using caraway seeds as a flavour exists, but there are very few places where they are now grown. It is more according to our ways to buy such things. On the historical estate of Tilquhillie, at Banchory, the roadside at one point near an old cottage has quite a hedge of *Carum Carui* growing along it for 20 yards, and its seed is used to flavour both cheese and oatcakes.

Myrrh (*Myrrhis odorata*) grows on many banks of our streams, always in places where there is reason to believe that it has escaped from cultivation. It may have been grown for its sweet juice and used as a sort of liquorice; but in some districts, at least, Sweet Cicely was made to serve the purpose of perfume for the more valued articles of cottage furniture.

Such are a few indications of what may be learned from an interesting subject, which appears to have been neglected hitherto.

NOTES ON THE FLORA OF SOUTH ABERDEENSHIRE.

By G. Claridge Druce, M.A., F.L.S.

A few days were spent in 1899 in this interesting vice-county, principally with a view to climb the precipices of Lochnagar in order to look for the forms of *Carex canescens* and for the plants reported as *Poa laxa* and *Poa stricta*. Among the plants noticed were the following :—

*Ranunculus Steveni, *Andrz.* (on which Herr Freyn repoits, "forma 3, latisecta, obtusiloba grandiflora—*R. acris*, J. Vahl, 'Ic. Fl. Danica,' t. 2415"). From the cliffs of Lochnagar at 2600 feet.

Caltha palustris, *L.*, var. *procumbens*, Beck.—On the tableland of Lochnagar and above Glen Callater.

*C. radicans, *Forst.*—Near Invercauld, in a marsh by the Dee.

Cochlearia alpina, *H. C. Wats.*—Lochnagar.

Viola tricolor, *L.* (*V. saxatilis*, Schmidt), var. *Sagoti* (Jord.).—Ballater, Braemar.

Sagina nodosa, *Fenzl.*—Ascends to 1600 feet in Glen Callater.

Alchemilla vulgaris, *L.*, var. *alpestris* (Schmidt).—Ballater, etc.

Taraxacum officinale (*Weber*), *ex* Wigg.—In the Spout of Lochnagar, at 2300 feet, as the var. *alpinum*, Koch, "Syn.," p. 428 (1837), *teste* Freyn. The description is: "Involucri foliola exteriora ovata, patentia, interiora ante apicem non corniculata." It is the *Leontodon alpinus* of Hoppe, in Sturm's "Deutsch. Fl.," heft 41, but is not confined to mountainous localities, as I have it from the neighbourhood of Oxford.

Gnaphalium norvegicum, *Gunn.*—Was in fine condition on Lochnagar.

G. sylvaticum, *L.*—Some years ago I distributed, through the Exchange Club, some alpine forms of this species, with broader leaves and darker involucres, under the name of var. *alpinum*. Having seen the true *norvegicum* from Lochnagar, I should be inclined to refer some specimens which I gathered from Glen Dole and near Killin to this variety, which Professor Babington with some doubt referred to *norvegicum*.

Euphrasia gracilis, *Fries.*—Glen Callater, etc.

E. curta, *Fries.*—Between Castleton and Creag-na-dala-bige.

E. scotica, *Wettst.*—Glen Callater and Lochnagar.

E. brevipila, *Burnat* and *Gremli.*—Braemar.

Rumex Acetosa, *L.*—A form with very thin leaves occurred in the Spout of Lochnagar, at nearly 3000 feet altitude.

Sparganium minimum, *Fries.*—Near Ballater.

†Habenaria viridis, *Br.*, var. *bracteata*, A. Gray ("Man. Bot.," N.U. States, 5th ed. p. 530, 1867) (= *Cœloglossum viride*, Hartm., var. *macrobracteatum*, Schur. = *Peristylus bracteatus*, Lindley).—Herr Freyn agrees with me in thus naming our bracteate Frog Orchis from the cliffs of Glen Callater, etc.

Carex canescens, *L.*, var. *robustior*, Anderss.—On Lochnagar, and on the Clova tableland.

†var. *dubia*, Bailey.—To this variety the Pfarrer Kükenthal refers all my very *helvola*-like sedges from the Clova tableland, where it was particularly plentiful. He remarks: "Strongly recalls *C. helvola*, with dark-coloured spikelets and stiff stalk."

C. aquatilis, *Wahl.*—Between the type and var. *epigeios*, Fries, but nearer the latter. From the tableland above Glen Callater.

C. binervis, *Sm.*, var. *nigrescens*, Druce.—The common form on the cliffs of Glen Callater above 2000 feet.

C. flava, *L.*—A hybrid of this species "with either *C. lepidocarpa*, Tausch, or possibly *C. Œderi*," *teste* Pfarrer Kükenthal, occurred on the cliffs of Glen Callater at 2000 feet. The specimens are barren, the male spike is stalked, and the female spikes are dense. I should think it is *C. flava* × *lepidocarpa*.

C. rostrata, *Stokes.*—In Glen Callater a form occurred which Kükenthal considers to be "a form verging into var. *brunnescens*." Plants have been named as a hybrid of *C. rostrata* with *vesicaria* from Glen Callater; but I have not seen the latter species growing there. Is there any record of its occurrence there?

Agrostis tenuis, *Sibth.* ("Fl. Oxon.," p. 36, 1794).—This name clearly precedes that of *A. vulgaris*, which was given to it by Withering in the "Botanical Arrangement of British Plants," 3rd ed. vol. ii. p. 132, 1796. Sibthorp correctly diagnoses the plant "panicula patente mutica, pedunculis subflexuosis, culmo erecto, membrana foliorum obtusa. Fine panicled Bent-grass"; while in *A. alba* the ligule is given as "*acuminata*." On the cliffs of Corrie Ceannmor a stiff form, with more rigid leaves than usual, occurred.

A. pumila, *L.*—Braemar, etc.

A. alba, *L.*, †forma *coarctata*, Hackel, *in litt.*—On the cliffs of Glen Callater, at 2300 feet.

A. alba, *L.*, †forma *sesquitertia*, Hackel, *in litt.*—A curious form, with a neuter floret above the hermaphrodite one, occurred on

the rocky debris at the base of the great cliffs of Lochnagar in full exposure.

Deschampsia alpina, *Beauv.*—Very plentiful and particularly fine in the Spout of Lochnagar in 1899.

Poa annua, *L.*, var. *supina* (Schrad.).—On the cliffs of Corrie Ceannmor.

P. alpina, *L.*—I again carefully collected all the forms of Poa which I could gather on Lochnagar, and am convinced that the plants we have been calling *P. stricta*, Lindeb., from this locality and from the cliffs of Canlochen, Forfar, and from the Ben Nevis range in Westerness, are not identical with that plant, but are only forms of *Poa alpina*, so far as my own gatherings go, and so far as any specimens yet seen by me from Britain are concerned. In this opinion Professor Hackel quite agrees. It may be worth while to give the varietal name of *angustior* to the more cæspitose plant with narrow panicles, which appears to be always viviparous, and which occurs in Canlochen, on Aonach Mor, and on Lochnagar; but Professor Hackel has not separated these plants from the type. In the case of the occurrence of this variety or form, it appears to be correlated with the factor of greater shade, and, consequently, of lower temperature. *Poa stricta*, Lindeb., should be deleted from our lists.

P. pratensis, *L.*, var. *subcærulea* (Sm.).—Corrie Ceannmor.

Festuca rubra, *L.*, sub-var. *barbata*, Hack.—Lochnagar and Glen Callater.

Arrhenatherum precatorium, *Beauv.*—In uncultivated ground at Ballater.

EIGHTEENTH CENTURY RECORDS OF SCOTTISH PLANTS.

Communicated by Professor I. B. Balfour, M.A., M.D., F.R.S.

(*Continued from p.* 243, *October* 1900.)

July	4.	Dianthus glaucus.	On the eminence at Lochend and on Bredfoord Hill.
		Bromus giganteus.	
		„ ramosus.	
		Stachys palustris.	
		„ germanica [error [1]].	At the Water of Leeth near the new well.

[1] The word "error" is inserted here in Dr. Hope's writing.

Lithospermum officinale.	Found on the west side of the Castle hill & at Arlie Castle.
Caucalis arvensis.	
Cynoglossum officinale.	At Dunbar as also at Roslin.
5. Lonicera periclimenum.	On Salisbury Craigs and a little below the Hermitage.
Agrimonia eupatoria.	
Sium inundatum.	In a Ditch on Leith links.[1]
Sedum reflexum.	
5. Sempervivum tectorum	
Chenopodium maritimum.	
6. Clinopodium vulgare.	On Salisbury Craigs.
Hypericum pulchrum.	
Juncus inflexus.	At the east end of Bredfoord hill by a marsh, and west of a village.
Cochlearia coronopus.	By the sea side.
Asplenium ceterach.	
Allium viniale.	On Salisbury, Duddingstown, and Lochend rocks.
Carduus maria.	On the west side of Castle-hill.
Serratula arvensis.	Among corns and by way sides plentifully.
Carduus lanceolatus.	By the walk of Leeth, on the Castle hill, etc.
7. Epilobium ramosum.	
Verbascum thapsus.	
Carduus palustris.	
Myriophyllum verticillatum.	In Duddingstown Loch.
Lactuca virosa.	On Duddingstown Craigs and at Lochend.
Crepis tectorum.	On Do.
Potamogeton perfoliatum.	In Lochend and Duddingstown lochs.
Ononis spinosa.	On Salisbury and Duddingstown Craigs.
8. Solanum dulcamara.	In a hedge about a mile on this side of Dalkieth.[2]
Circaea lutetiana.	In Achendenny wood.
,, alpina.	In Do.
Pteris aquilina.	On Bredfoord hill and Salisbury Craigs.

[1] In Dr. Hope's writing.

[2] *Idem.*

	Eupatorium canabinum.	In Dunglass den and by Roslin water.
	Scirpus setaceus.	In a marsh near mire side.
	Juncus bufonius.	In Do.
	Nardus stricta.	In the Kings Park.
	Sisymbrium sophia.	At Stock bridge, betwixt it and the water of Leeth.
10.	Stachys arvensis.	
	Lemna minor.	At the north side of the Castle in a ditch.
	Lysimachia vulgaris.	By Dr. R. Ramsay. Also at the Wheom Dr. Hope.[1]
	Galium palustre.	At Duddingstown Loch.
	Myriophyllum spicatum.	
	Chara hispida.	In a ditch by a marsh at mire side.
11.	Thalictrum minus.	A little west from Lord Rosberrys Park among furs.
	Glaux maritima.	On the sea side at Dunglass, and about Cramond Isle.[2]
	Vinca minor.	In Collingtown wood. At the Hermitage on a Rock close to ye house.[3]
	Triglochin maritimum	
	,, palustre.	In a marsh at mire side.
	Parietaria officinalis.	On Colt Bridge and St. Andrews walls. At Roslin.[4]
	Salsola kali.	By the sea side east from Leeth.
	Chelidonium majus.	
	Juncus nodosus.	At Cramond water.
	Cicuta virosa.	On the side of Lochend Loch.
	Ophrys paludosa.	
	Spergula pentandria.	Among Corns and way sides especially in sandy grounds.
	Prunella vulgaris.	
12.	Rosa eglanteria.	
	Malva alcea.	On the road side as you enter Abernethie.
	Sagina procumbens.	
	Juncus bulbosus.	
	Boletus bovinus.	In woods.
	Ononis arvensis.	Salisbury Craigs.
	Scabiosa succisa.	In pastures plentifully.

[1] This is a subsequent interpolation, and may be in Dr. Hope's writing.
[2] Last clause in Dr. Hope's writing. [3] In Dr. Hope's writing. [4] *Idem.*

	Iberis amara.	Near Stockbridge at the steps on which you cross the water.
	Papaver somniferum.	
	Epilobium palustre.	At the marsh near mire side.
	Eryngium maritimum.	On the sand by the sea side betwext Prestonpans and Musselburgh.
13.	Ligusticum scoticum.	By the sea side at Fase Castle den & east from ye Queens Ferry.
	Angelica sylvestris.	In Achendenny wood & all along the water side to Musselburgh.
	Chelidonium glaucum.	At Lumsden shore near Dunglass.
	Paris quadrifolia.	At a rivulet betwext East and West houses near Dalkeeth.
	Pastinaca sativa.	On the Breas west from Crail, Fife.
	Fumaria claviculata.	At Craigleeth Quarrys plentifully.
	Pisum arvense.	
	Vicia faba.	
14.	Atriplex laciniata.	
	Osmunda spicant.	In Achendenny wood. At the Hermitage.[1]
	Phalaris canariensis.	In the north Loch by a dich side.
	Alopecurus agrostis.	On the Bass Island.
	Agrostis spica venti.	Among Corns.
	„ stolonifera.	On wet sea sands.
	Arundo phragmites.	In Duddingstown Loch.
15.	Matricaria parthenium.	At Duddingstown Kirk.
	Artemesia absynthium.	At Dunbar, Burntisland, &c: plentifully.
	Gentiana centaureum.	In a meadow not far from mire side.
	Plantago media.	At East Houses.
	Anchusa sempervirens.	In Dunglass Den in great plenty.
	Tanacetum vulgare.	At mire side.
16.	Malva rotundifolia.	By Leeth Walk.
	Plantago loeflingii.	By the way side betwext Ormistown & Haddingtown.
	Euphrasia odontites.	In the marsh at mire side.
	Arundo epigejus.	At the side of the same marsh.

[1] In Dr. Hope's writing.

17.	Cynoglossum officinale.	
	Marubium vulgare.	
	Ilex aquifolium.	Below Roslin by the water side.
	Fagus castanea.	In Dunglass Den.
	Epilobium angustifolium.	In Fase-castle den plentifully.
	Pimpinella saxifraga.	On Salisbury Craigs.
	Asperugo procumbens.	By Dunbar Church yard by the road side.
18.	Lycoperdon bovista.	
	„ pedunculatum.	
	Hedera helix.	On Salisbury Rocks.
	Veronica.	In Dunglass den.
	Arundo arenaria.	By the sea side.
	Lolium temulentum.	In the north Loch by the ditch side in the middle thereof.
19.	Lavatera arborea.	On the Bass Island.
	Beta vulgaris.	On Do.
	Lithrum salicaria.	At Duddingstown Loch.
	Centaurea scabiosa.	Behind Goolen in a field.
	Anethum foeniculum.	At North Berwick.
20.	Lysimachia tenella.	In a marsh west from Fisherrow.
	Parnassia palustris.	In the well known marsh at mire side.
	Sium nodiflorum.	
	Trifolium m. officinalis.	At Lufness mill by the burn side.
	Spergula nodosa.	In most marshes.
	Gentiana campestris.	Each side of the Society at Hopt: house.
	Atriplex litoralis.	At Lufness mill by the burn side.
21.	Scirpus acicularis.	
	Potentilla reptans.	
	„ verna.	On the craigs by Arthurs seat.
	Apium graveolens.	
	Leonorus cardiaca.	
22.	Sedum telephium.	
	Campanula latifolia.	In Achendenny wood by the water side.
	Hydrocotyle vulgaris.	
	Cichoreum intybus.	
	Thlaspi campestre.	
	„ hirtum.	
24.	Ranunculus flammula.	In marshes almost everywhere.

25.	Asplenium marinum.	In Glass and weems caves.
26.	Narthecium ossifragum.	In Bevely moss.
27.	Lepidium latifolium.	On the breas at the back of St. Andrews.
	Hieracium.	With Do.
	Convolvulus.	With Do.
28.	Asplenium scolopendrium.	On the rocks at Kenly burn, Fife, and at Dunglass Den.
	,, adiantum nigrum.	On Duddingstown Craigs.
	Potomageton gramineum.	In Kenly mill burn.
	Myagrum sativum.	Among flax in Fife and other places.
30.	Mentha verticillata.	
	Aster tripolium.	
	Pulmonaria maritima.	On Fifes ness plentifully.
31.	Beta marina Hud.	By the sea side betwext Roome and Constantines cave Fife.
	Solidago virgaurea.	
Aug. 1.	Allium ampeloprasum.	At Cambo in a park, Fife.
	Ophrys palustris.	In a marsh east of Kenkell breas near St. Andrews.
2.	Astragalus glycyphylos.	In Bleba Den east from Coupar in Fife.
3.	Sambucus niger.	On a rock in a den, north from Aughtermughty, therefore a native.
7.	Ranunculus reptans.	At the north east side of Loch Leven plentifully.
9.	Dipsacus fulonum.	In a Den west from Hopt: house.
	Thalictrum aquilegifolium.	In Dur.
10.	Senecio aquatica.	In the marsh at mire side.
	Oenanthe fistulosa T. B.	
12.	Convolvulus sepium.	
	Juncus squarrosus.	
23.	Geranium rotundifolium.	On the east side of Mr. Masons Garden.
24.	Nepeta cataria.	
	Thalictrum flavum in seed.	
	Bidens cernua.	In the north Loch.
25.	Pyrus malus.	

	Pyrus communis.	East from the Queens Ferry at a park dyke.
26.	Aethusa cinapium.	On the castle hill & by Leeth walk.
	Tordylium nodosum.	By Leeth walk.
	Lysimachia vulgaris.	
27.	Rumex aquatica.	Without the Kings park in the rivulet y^{t} comes from ye Dukes walk.
	Triticum repens.	By the sea side on dry sand.
28.	Bidens tripartita.	In the North Loch.
	Lepidium sativum.	Betwext Restalrig and the sea by a small rivulet.
	Triticum spelta.	In Corn fields.
	,, hibernum.	In Do.
29.	Hordeum distichon.	In Do.
	,, vulgare.	In Do.
	,, hexastichon.	In Do.
30.	Secale coreale.	In Do.
	Cynosurus cristatus.	In meadows.
Sept. 3.	Hypochoris radicata.	Upon the road side on a dyke by a hedge as you enter ye Q: Ferry.
	Lichen calicaris.	
	,, cocciferus.	On the hills near to Reavelstone.
	,, glaucus.	
10.	Lichen vulpinus.	
	,, hirtus.	
	,, deustus.	
	,, cornutus.	
	,, physoides.	
	,, globosus.	
	,, albescens.	Kings Park.
	,, paschalis.	On the castle hill rocks north side.
	,, calcarius.	
1765.		
Jan.	Lichen rangiferinus.	
	,, sanguinarus.	Kings Park.
	Bryum murale.	On walls.
	,, pyriforme.	On walls, stones, and in the Kings Park.
	,, serpyllifolium.	At the water of Leeth near the new well.
	,, pulvinatum.	On stones in the Kings park.
	,, rurale.	
	,, aureum.	On the castle hill rock north side.

Hypnum rutabulum.	
„ filiforme.	
„ lutescens.	
Bryum pomiforme.	Kings Park.
„ trunculatum.	
Hypnum filicinum.	At the water of Leeth near the new well.
Lichen fagineus.	
„ ventosus.	
Spongia oculata Hud.	On the sands of Leeth.
Agaricus.	
Tremella.	
Clavaria pistillaris.	
Boletus versicolor.	In woods on the stumps of Trees.

Here follows in the MS. a couple of blank pages, and the Calendar then resumes with a new heading as follows :—

A Calander of Plants as they were Found and Prepared in the Year 1765.

May	14. Stellaria nemorum.	A little below the garden of Mavice Bank. Road side.
	Lathraea squamaria.	Below Mavice Bank near a small rivulet. Road side.
	Chrysosplenium alternifolium.	Below Roslin in the wood. Marshy Places. T. S.
	Phallus.	Above Leswede by the water side.
	17. Tussilago hybrida.	In Collintown wood on the N. side of the water.
	18. Symphytum tuberosum.	By the water of Leeth opposite to the new well.
	20. Salix alba.	By water sides.
	Cerastium alpinum.	Near Goolen.
	21. Viburnum lantana.	In Dunglass Den.
	Helleborus viridis.	In Do.
	Lycoperdon epidendron.	At Dunglass on old Fir Roots.
	Fucus sanguineus.	In Caverns of the rocks within ye sea mark at Dun.
	„ piperites.	At Do.
	„ ceranoides.	At the Black Rocks.
	22. Silene amoena.	On the sea Breas of Dunglass, Kinghorn. Crammond Isle.

	Allium shoenoprasum.	In a Park on a mount near Fase Castle.
	Crambe maritima.	By the sea side at Lumsden shore near St. Abbs Head.
29.	Bryum fontanum.	In marshes.
June 1.	Boletus igniarius.	On the Root of a Tree near Trifichen.
	Satyrion viride.	On Moorish Ground north from Bancrief.
2.	Fumaria capreolata.	At the Hermitage and by way sides.
	Iberis nudicaulis.	By Jo. Williamson.
2.	Rubus Chamemorus.	On Campsey Fells & on every high Hill in ye Higlands.
7.	Galium parisense?	In the Kings Park among stones.
12.	Dianthus deltoides.	At the Hermitage within the walls in the wood.
	Hieracium paludosum.	At Do. by the water side.
	Carex paniculata.	By a marsh a little to the south of Craig Lockart.
13.	Vaccinium oxiococcus.	In a large Marsh south east of Cross house.
	Rubus saxatilis	Found in Penny cook wood. Auchendenny.[1]
	Peziza acetabulum.	In woods.
	Avena pubescens.	On Salisbury craigs.
18.	Fontinalis antipyretica.	In a rivulet north of Bancrief, W. Lothian.
	Salix pentandria.	Below Roslin on the north side of the wood.
22.	Orobus sylvatica.	At Lanfaugh by Dr. Hope, also in the Island of Sky.
23.	Conferva rupestris.	In Roslin water above Roslin at a foord upon stones.
26.	Ulva lynza.	By the sea shore on stones west of Leeth.
July 1.	Osmunda lunaria.	At Kersol Park near Carnwath by the Road side.
3.	Jasione montana.	Near Lenrick bridge in a wood at Kilseith plent:
5.	Euonymus europaeus.	On Salisbury Craigs.
	Saponaria officinalis.	As you go from Collinton to Dreghorn by a Hedge.

[1] In Dr. Hope's writing.

6.	Sisymbrium irio ?[1] an. altissimum.	Near. St Bernards well on moist rocks.
7.	,, cheiranthoides.	By Jas. Robertson.
8.	Lichen cornucopioides.	On the wall of a large Park south east of Carnwath.
	,, filiformis.	On Do.
	,, spinosus.	On Do.
	,, globosus.	On Do.
	,, cornutus.	In Achendenny wood.
9.	Pisum marinum.	By the sea side near Roistown.
	Conferva plicata.	On shelves of the Rocks at Roistown in sea water.
	Lichen pustulatus.	In Dunglass Den by Mr Urquhart &c.
12.	Byssus candida.	On Rotton Sticks.
14.	Salix caprea.	In woods.
	Hypericum humifusum.	In Segby wood by the Road side, and near Micklour.
15.	Agaricus androsaceus.	In woods and groves among decayed Leaves.
	Lycopodium selago.	On Camsey Fells and other high grounds.
	Polemonum cerulaeum.	Near Mr. Bells of Antremony.
16.	Scutellaria galericulata.	By the North side of Loch Coat Loch in gravel.
	Byssus incana.	Upon Peat ground in Camsey Fells &c.
25.	Oenanthe fistulosa.	In a Ditch by the Road side near the Plaisterers Fife.
31.	Saxifraga autumnalis.	In low grounds at Denhead and by rivulets in ye Highlands.
Aug. 1.	Rumex aquatica.	In a small Lake near Micklour.
9.	Lichen laciniatus.	On Stones going from Cushweil to Foss et v.v.
10.	Mehmilla alpina.	On Morther Hill and other mountains near Megerny.
	Galium boreale.	In a small Island of Lyon water at Megerny &c.
	Lycoperdon tuber.	In the Fir Park above Megerny Garden.
	Polypodium fragile.	In the Crivices of Rock on Megerny Hill at ye largest Hollow.

[1] This interrogation mark interpolated, and in Dr. Hope's writing, I think.

	11. Arbutus uva ursi.	On Migerny Hill & other high dry grounds.
	Trifolium.	A little above Megerny Fir Park & at Dunglass Summer H:
	Rumex digynus.	Amongst gravel in Megerny Fir Park &c: &c: there.
	Carduus helenoides.	In the Meadows at Megerny Plentifully.
	Vaccinium vitis-idaea.	Amongst the Heaths on Morther Hill &c:
	Lycopodium selaginoides.	On Morther Hill south of Megerny.
	12. Sparganium natans.	In the sides of Lyon water at Megerny.
	Salix.	In many places particularly on ye banks of ye Lyon at M[egerny].
	Lycopodium annotinum.	On the East side of a Hill which runs N. from M[egerny] Hill.
	13. Cornus suecica.	On the bank of a rivulet at ye west end of Morther Hill as also on the N: side of Megerny Hill but not in flower
	Saxifraga stellaris.	In the well eyes on the Hills of Morther Corilean & Megerny.
	14. Vaccinium uliginosum.	On Morther and the back side of Migerny Hills.
	Sphagnum alpinum.	In a well eye on the north side.
	Fontinalis minor.	Hanging from the Rocks of a Rivulet on Megerny Hill.
	26. Bromus arvensis.	Among wheat particularly near Abernethy.
	27. Osmunda crispa.	By Dr. R. Ramsay at Birnam Hill upon the Road side.
	Aira flexuosa.	In Moorish Grounds.
	Potomageton compressum.	By Jas. Robertson.
	29. Agrostis minima.	In pastures.
	,, capillaris.	In Do.
	Agaricus companulatus	In Do. after Rain.
	,, muscarius.	On the Clay Know among Planting near Dunglass.
Sept.	5. Mucor glaucus.	On Cattles Dung.
	6. Agaricus campestris.	In the Kings Park &c. &c.
	7. Boletus luteus.	At Dunglass and Alva among Planting.

9.	Bromus ramosus.	At the bottom of Dunglass Glen.
	Triticum repens.	At Do.
10.	Agaricus chantarellus.	In Dunglass Den South side thereof.
	Byssus velutina.	In Dunglass Den.
	„ antiquitatis.	In Do. on the Rocks.
11.	Bromus giganteus.	In Do. plentifully.
	Agaricus verrucosus.	In Do. scarce.
12.	„ mammosus.	At Dunglass among Planting.
13.	Byssus saxatilis.	In Dunglass den upon the Rocks.
	Polytrichum striatum.	On Trees in Auchendenny wood.
14.	Tremella hemispherica.	On the Fuci and Coralines at Dunglass.
	„ nostoc.	In pastures after rain.
15.	Rhamnus carthaticus.	In the Neighbourhood of Dumfreis by Mr. Crosby.
	Phellandrium aquaticum.	On the south side of Carsterfin near the Fortification in a ditch.
	Humulus lupulus.	On Do. near the well.
16.	Festuca elatior.	In the large meadow west of Carsterfen.
	Salix Helix.	In moist ground and Baulks betwext ridges.
	Phalaris arundinacea.	At the side of a marsh near mireside.
22.	Lysimachia vulgaris.	At the whim among ye Duke of Argiles Plantations in a moss.
29.	Briza minor.	In a bog at Woodeslee by Dr. Walker of Moffat.
	Bryum apocarpon.	In the Kings Park on Stones.
Oct. 30.	Convalaria majalis the withered remains.	At Blair of Athol on the Rocky banks of Tilt by Dr. Hope.

ZOOLOGICAL NOTES.

Curious behaviour of Field Voles.—On 10th November, while walking along the shore of the Firth of Forth at Long Green Bay, my brother Charles and I noticed a small object swimming about in the water, a few feet from the edge. On closer examination it proved to be a Field Vole (*Microtus agrestis*). On continuing our walk we came upon another vole, also in the water. After we had gone a short distance farther we observed another vole leave the "bents," at the head of the shore, where these rodents are somewhat common, run rapidly down to the sea and swim out several yards,

then return to the shore and scamper back to the "bents," having evidently enjoyed its bath. Though very familiar with the locality, I have not previously observed this vole acting in this somewhat strange manner.—Bruce Campbell, Edinburgh.

Curious variety of the Jackdaw at the Dean, Edinburgh.—During the late autumn and early winter I have several times seen an abnormally coloured Jackdaw (*Corvus monedula*) on the refuse-heap to the west of the Dean House. It is of a uniform light chocolate colour, and I suspect the same bird that I had seen before the moult in a partly chocolate-coloured plumage.—William Serle, Edinburgh.

Chiffchaff in Clyde.—In Mr. John Paterson's note under this heading in your issue of October last, he states: "The most interesting occurrence of all is perhaps that of a pair of males calling in Cleghorn woods, near Lanark, on the 16th of June this year, the first time I have heard it anywhere in Lanarkshire." It may perhaps be of interest to record that in these same woods, beside the Mouse River, I found a nest of the Chiffchaff (*Phylloscopus rufus*) on 4th June 1890. The nest was placed between the lower branches of a young spruce fir, about 18 inches from the ground, with rank grass growing around, and contained five eggs. I have found the nest in an exactly similar situation here in the south of England, although is it not the most usual one. I may add that on the same date and in the same locality I found a nest of the Garden Warbler with five eggs, in a low, straggling blackthorn.—Robert H. Read, London.

Variety of the Eggs of the Sedge Warbler.—The Sedge Warbler (*Acrocephalus phragmitis*) is becoming very numerous as a breeding species in Kincardineshire, being generally dispersed with a sprinkling of Whitethroats on all our burn sides where whins and broom are growing. On a stretch of a little over half a mile of the Bervie Water I saw nine Sedge Warblers' nests, in one of which, on 11th June 1900, Mr. James Young got a clutch of six eggs of a warm salmon-pink colour; and another one contained three eggs, one of which was very small, measuring 0.42 × 0.35, but quite normal in coloration.—John Milne, Auchinblae.

The Little Stint on the Solway Firth.—The Little Stint is one of those species which visit the Solway Firth every autumn, but generally in very small numbers, and in immature dress. A few odd birds are to be found along the shore from Annan to Gretna, and again from Maryport to Rockliffe Marsh; but the surest place in which to find *Tringa minuta* is a flat of sand on the estuary of the Wampool and Waver. The bird may be found at any time between August and January, but chiefly in September. Our gardener, William Nicol, jun., shot a Little Stint close to our house

at Allonby on the 9th of September 1899; but this species is very local in its preferences. This year we sent young Nicol to the Solway (I could not get away myself) in September; but he failed to find any Stints, though he found *Totanus canescens* more abundant than usual. His father, William Nicol, sen., when shooting on the Wampool and Waver estuary on the 9th of November, fired his punt-gun at a mixed flock of Peewits and Dunlins, as the birds were resting on the sand. When he picked them up, he was surprised to find a single Little Stint among his victims. Its head was shattered; but he sent me its wings, that there might be no doubt as to the species. The date, as he remarks, *is* late for the locality, but I cannot say that it is unprecedented.—H. A. Macpherson, Pitlochry.

Sandwich Tern at Peterhead.—On 7th September, while I was lying at the rocks of Craigievar, north from Peterhead, watching for birds, three adult Sandwich Terns settled on the sand within a few yards of me. I examined them minutely through my glasses, and easily identified them as *Sterna cantiaca* by the beak, legs, and feet, which were black.—William Serle, Edinburgh.

Fulmar breeding at Cape Wrath.—On 10th July last, when in Mr. Henry Evans's yacht "Aster," we passed *close* under Cape Wrath, between an outlying rock and the mainland. Several Fulmars came circling round the yacht, and then went to the grassy slopes, on which we could see, with our glasses, birds which we had no doubt were Fulmars, sitting. This is some confirmation of Mr. W. Eagle Clarke's remarks ("Ann. Scot. Nat. Hist.," 1897, p. 254) on the probability of this being a breeding-place. The Fulmar may well be spreading, for at Soa (St. Kilda), on 22nd of same month, there seemed to be more than ever; and the same might be said of the gannets on the Stacks.—Howard Saunders.

British Snakes.—A new work upon the species of Snakes included in the British fauna is nearing completion, and will be published next year. The author, Dr. Leighton of Grosmont, Pontrilas, near Hereford, is anxious to be favoured with the co-operation of Scottish naturalists, and would welcome any additional notes that they can supply; especially as regards the dimensions of the Viper in different districts.

Opah or Kingfish in Shetland Seas.—On the 14th of September last I came across a fine fresh specimen of this fish at high-water mark on the shore of Samburgh West Voe. The specimen was in perfectly fresh condition, but much mutilated by a large party of Gulls and Gray Crows which had been feeding on it. This species is not nearly so rare in these northern waters as was at one time supposed. In the "Fish Trades Gazette" for 8th September 1900, it is stated that: "Every year, at this season, when the

steam liners are fishing to the west of Shetland, rarely a week passes without a Kingfish, and as many as three have been obtained in one shot. As they frequent very deep water, all have been got on the hook; and further, as they are so easily scaled, it would scarcely be possible that a trawled fish would be fit for exhibiting, unless netted when the gear was about to be hauled up. As to price, scaled and damaged fish have sold as low as 6s. 3d. each, while best specimens seldom fetch more than 30s. nowadays, but all depends on quality and demand. Some years ago, when they were considered very rare, as high as £2 : 10s. was paid."—Wm. Eagle Clarke, Edinburgh."

The Sturgeon in the Solway Firth.—The Sturgeon (*Acipenser sturio*) is a summer visitant to the estuaries of the Solway Firth. In the first part of the nineteenth century, a deep channel ran along the Cumbrian coast to Rockliffe Marsh, and it is very likely that these big fish sometimes succeeded in reaching the rivers in which they presumably desired to spawn, though for many centuries they had to run the gauntlet of the "Haaf-nets." But since the deep channel has become silted up, these large fish almost always fail to force a passage into the Eden or Esk.

On the 2nd of July 1900, John Byers, an old acquaintance of mine (he helped me to disinter a Long-finned Tunny a few years ago), secured a Sturgeon on the sands at Skinburness, near Siloth. It weighed 35 stones (not 45, as locally reported), and measured about 10 feet 6 inches. A portion of this "muckle fish" was sent to the Queen at Windsor. On the 10th of the same month, the same fisherman was setting some nets at night, when he heard a mighty splashing in the water. On hastening to the spot, he found that a second Sturgeon had become partly stranded. He stunned the fish with blows from an iron stake, fastened a rope through the gills, and left it so moored. He returned to secure it by daylight. This was a female fish, measuring about 6 feet 6 inches, and weighing about 16 stones.—H. A. Macpherson, Pitlochry.

Valvata piscinalis and Anodonta cygnea in West Lothian.—Both of these shells occur in ponds on the Hopetoun estate, where I found them on 18th June last. The former occurs in great abundance in the pond nearest Woodend; and the latter, specimens of which measured nearly 5 inches across, is fairly plentiful in another of the ponds. Neither species of shell has, so far as I am aware, been previously recorded from the county.—Robert Godfrey, Edinburgh.

Vertigo antivertigo in West Lothian.—I found a small colony of this minute mollusc in Blackness marshes on 15th August; this is, I believe, an addition to the county list.—Robert Godfrey, Edinburgh.

The Lennon Collection of British Coleoptera.—The Edinburgh Museum of Science and Art has just acquired the extensive collection of British Coleoptera made by the late Mr. William Lennon of Dumfries. This collection contains 23,280 specimens representing 2500 species, or about five-sixths of the entire British list. Of the species, 1500, or more than one-half, were collected by Mr. Lennon from the Solway district; the rest, from various parts of Britain, north and south, having been obtained by exchange.—R. H. Traquair, Keeper of the Natural History Collections.

Chærocampa nerii, *L.*, near Barrhead.—Mr. Thomas Grant of Glasgow brought for my inspection a specimen of this very rare Hawk-moth, and has kindly given me permission to record it. The specimen, if entire, would measure about 110 mm. It has unfortunately lost a small portion of the left anterior wing, otherwise it is in fairly good condition. It was captured by a farm-servant, who saw it alight on a sheaf of corn in a field near Barrhead about the end of September, and might have been in better condition had it not been kept for several days alive under a tumbler. It also has the appearance of being far-travelled, as the beautiful green colour of the species has almost entirely disappeared.

This makes the second record for this rare insect in the Clydesdale district. The last specimen was taken in a house in Paisley Road, Glasgow, on the 10th September 1886, and was recorded in the *Young Naturalist*, vol. vii. pp. 212 and 230. It was also exhibited at the Clydesdale Naturalists' Society by Mr. J. E. Wilson, into whose possession it fell, and, if I remember correctly, was slightly larger than the present specimen.—And. Adie Dalglish, Pollockshields.

Diptera in the Edinburgh District.—Referring to my note in the last number of this magazine (1900, p. 251), the following additional flies taken by me in this district may be worth recording. I have again to thank Mr. Grimshaw for kindly helping me with the identifications.

Stratiomys potamida, Mg.—On 15th July 1898 I obtained a pair of this fine fly at the marsh on Luffness Links: several others were seen. This and the closely allied *S. chamæleon*, L., are both fully described by J. Duncan in the "Magazine of Zoology and Botany" (vol. i. pp. 148-150), but only the latter is stated to have occurred in Scotland (Duddingston Loch, Braid Marshes, etc.).

Oxycera trilineata, Fab.—I took a female of this pretty species at Luffness Marsh on 14th July 1898. In Stewart's list of Edinburgh Insects (1809) the name *Musca trilineata* occurs.

Oxycera pygmæa, Fln.—Two taken same place and date as the last named.

Tabanus bromius, L.—Bavelaw Moss, three captured on 24th June 1895.

Therioplectes tropicus, L.—Specimens probably referable to this form were taken at Kirknewton and Aberfoyle last July; several were also observed near West Linton the same month.

Sericomyia lappona, L.—In the course of the past five or six years I have taken this interesting species in the following localities: Bavelaw, Kirknewton, Silverburn, and West Linton. Sixty years ago it was recorded by James Wilson as occurring "among the Pentland Hills" ("Ency. Brit.," 7th ed., Entom., p. 241). *S. borealis*, Fln., is common in the district.

Volucella bombylans, L.—Specimens of this fine insect in my collection are from Dreghorn, Mid-Calder, Gullane, Tynehead, Heriot, West Linton, and Aberfoyle.

Xylota sylvarum, L.—Last summer I met with this fly near Kirknewton (quite common), Gorebridge, Dunbar, and Aberdour. In August 1895 I took one at Falkland. James Wilson (*l.c.*) has recorded it from near Edinburgh.

Chrysotoxum arcuatum, L.—One captured near Aberdour last August, and another seen near Inverkeithing in June.

Chrysotoxum bicinctum, L.—St. Andrews, July 1890; and near Kirknewton, July 1900.

Gonia capitata, Dg.—One taken near Kilconquhar, Fife, on 26th May 1900.—William Evans, Edinburgh.

Roncus cambridgii, *L. K.*, and other Chernetids in Scotland.—Last summer Mr. R. Godfrey brought me two specimens of a False Scorpion which he had found under turf on a rock-face in a wood at Barbreck, Loch Awe, in June, and rightly conjectured to be something fresh. I identified them as *Roncus cambridgii*, L. Koch, and the Rev. O. P. Cambridge, to whom I have since submitted them, says they undoubtedly belong to that form. The only British localities given for it in Mr. Cambridge's "Monograph" are Bloxworth (Dorset) and Dartmoor. Abroad, it appears to have been met with in France, Italy, Austria, and North Africa. In August a living example of *Chernes nodosus* (Schrank), taken off the leg of a fly in Edinburgh, was brought to me by Mr. James Baxter. The only other Scottish specimen I have seen was got at the Edinburgh Botanic Garden as recorded in a recent paper by G. H. Carpenter and myself on the Arachnids of this district ("Proc. Roy. Phys. Soc."). In Cambridge's "Monograph," "near Berwick-on-Tweed" is given as a locality for *Chelifer latreillii*, Leach (=*degeerii*, C. K.), but this is clearly a mistake for "near North Berwick," where the species was taken in September 1882 among loose earth on the rocks, as recorded in "Science Gossip" for December following. It falls, therefore, to be added to our list of the Chernetidea of the Edinburgh district. Altogether, we now know of six Chernetids that

occur in Scotland, the three others being *Chthonius rayi*, L. K., which I took near Oban in April 1894; *Chthonius orthodactylus* (Leach), which I have taken at Morningside and Aberlady; and the ubiquitous *Obisium muscorum*, Leach. — William Evans, Edinburgh.

Diastylopsis resima (*Kroyer*) **in Scottish Waters.** — This Cumacean, which is abundant in one or two o the Norwegian Fjords, and is probably "distributed along the whole coast of Norway," has not hitherto been recorded from any British locality. I have now, however, to report its occurrence in Scottish waters, a number of specimens having been obtained in a mixed bottom gathering collected 18 to 25 miles eastward of Fair Isle in October last.—T. Scott, Aberdeen.

Diastylis cornuta (*Boeck*) **in Scottish Waters.**—In my 'Notes on Scottish Cumaceans,' published in the "Annals" for October last, I omitted to include *Diastylis cornuta* (Boeck), which Spence Bate described from Shetland under the name of *Diastylis bicornis*. I also noticed this species in the same gathering with *Diastylopsis resima* mentioned above.—T. Scott, Aberdeen.

Campylaspis sulcata, *G. O. Sars*, **in the Clyde.**—My friend the Rev. A. M. Norman informs me that he found a single specimen of this interesting species in 20 fathoms off Cumbrae on 15th August 1888. It is probably a rare form. We should remember, however, that, as Sars remarks, it is "nearly related" to the more frequent *Campylaspis costata*, and may be easily passed over as a form of that species. A more careful examination, if possible, should therefore be made of all these minute Crustaceans. — T. Scott, Aberdeen.

Typhlotanais brevicornis (*Lilljeborg*) **in the Moray Firth.**— This little Isopod, which is only about 1.5 mm. (or $\frac{1}{17}$ of an inch) in length, has not previously been recorded for Britain; indeed, no member of the genus has as yet, so far as I know, been observed in the British Seas. This is the more remarkable, seeing that in the Norwegian fauna *Typhlotanais* is represented by no fewer than nine species. They all appear to be deep-sea forms, and this perhaps may be one reason why they have not hitherto been noticed around our shores. The species mentioned above was obtained recently in some material washed from a quantity of fine mud brought up from a depth of 50 to 55 fathoms about 14 miles N.W. of Buckie.— T. Scott, Aberdeen.

BOTANICAL NOTES AND NEWS.

Schœnus ferrugineus, *L.*—This plant is not yet quite extinct on the shore of Loch Tummel, although I fear that it will soon be so. I paid a visit to the locality in the beginning of August, but was unable to discover any trace of it. Mr. A. H. Evans of Cambridge, who visited the spot a week or two later, was more fortunate. He found a small patch "about as big as your hands would cover, dreadfully mixed with grass, in fact nearly overgrown by it." It is difficult to understand how this plant, which was fairly abundant in its station a dozen years ago, should now have all but disappeared.—W. Barclay, Perth.

Linnæa borealis, *L.*—In the middle of August Mr. Archibald Gray, a local botanist, found this plant on a wooded hill situated a short distance to the north-east of the Hill of Kinnoull. On visiting the place subsequently in the company of Mr. Gray I found the *Linnæa* covering the ground more or less thickly over an area of about 40 feet by 9 or 10. It was growing amidst blaeberry and grass. There were no traces of flowers, as the flowering time was past; but I think flowers will be found at the proper season, for the ground at this part is quite open. The *Linnæa* is recorded in Hooker's "Flora Scotica" of date 1821 as having been found on Kinnoull Hill itself by the Messrs. Brown, who were, I think, nurserymen in Perth; but I do not know of its having been found there or anywhere in the neighbourhood subsequent to that date.—W. Barclay, Perth.

Asarum europæum, *L.*—In May last I found a fine patch of this plant, covering an area of about a yard square, on the right bank of the Tay about $3\frac{1}{2}$ miles below Perth. It must have been brought to the place where it grows either by water or by birds, but where it could come from I cannot say. The plant is, I believe, sometimes cultivated, and it possibly may have come down the river from some garden. At any rate it is well established, and must have been where it is for two or three years at least. When I found it there were plenty of flowers.—W. Barclay, Perth.

Ranunculus acer, *L.*—Mr. Townsend ("Journ. Bot.," Oct. 1900) describes the forms known to him as British, and gives a dichotomous key to the sub-species and forms. He records those from Scotland as follows:—Sub-sp. I. *Boræanus*, form 1, *Boræanus* (Jordan), Aberdeenshire, var. *β tomophyllus* (Jordan), Aberdeenshire and Inverness-shire, form 2, *rectus*, Boreau, Aberdeenshire and Shetland (Beeby), sub-var. *pumilus*, Shetland (Beeby); sub-sp. II. *Steveni*, Andrz., Shetland (Beeby); sub-sp. III. *Friesianus*, form 1, *vulgatus*

(Jordan), Aberdeenshire and Shetland, form 2, *Friesianus* (Jordan), Shetland (Beeby). Specimens should be provided with rootleaves and rootstock, as these afford the best characters for determining the forms. The beak of the carpel should also be shown.

The Moss Exchange Club Reports for 1899 and 1900 form a pamphlet of 63 pages. Upwards of 5300 specimens of Mosses and Hepatics were sent by members for distribution during these years, and as far as practicable, these were submitted to specialists to secure accuracy of nomenclature. The reports enumerate the species distributed, with, in many cases, critical notes by the specialists. These, along with the localities of the plants, render the reports valuable to students of British Mosses. Many of the records are from Scotland. Among the notes Mr. H. N. Dixon states that specimens from Ben More in Perthshire and other Highland localities, formerly distributed as *Webera annotina*, have been recently determined by Dr. Hagen to be *W. commutata*, Schimper.

Scottish Sphagna.—In the later instalments of Mr. Horrell's paper on 'The European Sphagnaceæ' ("Journ. Bot.," Oct.-Nov.) the following are recorded from Scotland: *S. inundatum*, Warnst., Auchmore Burn, Killin (*Cocks*); *S. rufescens*, Warnst., Islay (*Ley*), Glen Rosa, Arran (*Ley*); *S. crassicladum*, Warnst., Canisp, Sutherland (*Dixon*); *S. imbricatum* (Hornsch.), Russ., a form between vars. *cristatum*, Warnst., and *sublæve*, Warnst., Strathgarve, Ross (*Braithwaite*), Lewis (*Smith*), Raplock Moss, Kirkcudbright (*M'Andrew*) Latheron, Caithness (*Lillie*), Lochan-na-Larige and Meall-nan-Tarmachan, Perthshire (*Cocks*).

Scottish Algæ.—In Mr. Batters' paper on "New or Critical British Marine Algæ" ("Journ. Bot.," Oct. 1900) the following are recorded from Scotland: *Plectonema Battersii*, Gom., on rocks near high-water mark, Berwick-on-Tweed; *Phormidium Ectocarpi*, Gom., forming a pink film over *Ectocarpi* or mud at high-water mark, Cumbrae; *Schizothrix vaginata*, Gom., Cumbrae; *Nostoc entophytum*, Bornet and Flahault, in thallus of *Rivularia Biasolettiana*, Cumbrae; *Cladophora corymbifera*, Kütz., near low-water mark, Berwick-on-Tweed; *C. Neesiorum*, Kütz., shallow pools between tide-marks, Berwick-on-Tweed; *C. Sonderi*, Kütz., Orkney, 1840 (?), J. H. Pollexfen; *C. pallida* (Kjellm.), Cumbrae; *C. stolonifera* (Kjellm.), Berwick and Cumbrae; *Myrionema Corunnæ*, Sauvag., on *Laminaria saccharina*, Cumbrae; *Ectocarpus* (?) *helophorus*, Rosenv., in fronds of species of *Cruoria* and *Petrocelis*, Berwick and Cumbrae; *Phæosaccion Collinsii*, Farlow, on leaves of *Zostera*, Cumbrae; *Erythrotrichia ciliaris* (= *Bangia ciliaris*, Carn.), Arbroath; *Dermatolithon hapalidioides*, Foslie, and *Lithophyllum Crouani*, Foslie, both from Berwick.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October-December 1900.

[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.

The Natural History of Ailsa Craig. By John Smith, John Paterson, and Hugh Boyd Watt. *Ann. Andersonian Nat. Soc.*, vol. ii. pt. ii. (1900) pp. 135-154.

Black Rat in Forfarshire. A. H. Baring. *Zoologist* (4), vol. iv. p. 517 (November 1900).—Dead specimen picked up on the bank of the North Esk.

Bird Life on the Sidlaws. By William Whyte. *Trans. Perthshire Soc. Nat. Sci.*, vol. iii. pt. ii. (1899-1900) pp. 55-59.

The Birds of Bute and Arran. By Archibald Craig. *Trans. Edin. Field Nat. & Micro. Soc.*, vol. iv. pt. ii. (1900) pp. 78-87.

A Contribution to the List of Perthshire Spiders. By William Evans, F.R.S.E. *Trans. Perthshire Soc. Nat. Sci.*, vol. iii. pt. ii. (1899-1900) pp. 88-96.—One hundred and fifty-one species are given in the list, three of which are new to science, though not described.

Entomological Reports. By George W. Ord. *Ann. Andersonian Nat. Soc.*, vol. ii. pt. ii. (1900) pp. 108-113.—Reports on the insects obtained during excursions arranged by the Entomological Section during the years 1895-96.

Four Weeks' Collecting in Scotland. By Louis B. Prout, F.E.S. *Ent. Record*, vol. xii. pp. 282-284 (November 1900).—Notes on Lepidoptera taken on the Pitfour estate, Aberdeenshire, and in the neighbourhood of Forres.

Colias edusa in Scotland. John A. Nix. *Entomologist*, vol. xxxiii. p. 354 (December 1900).—A specimen seen in September at Inveraray.

Epinephele (Hipparchia) hyperanthus in Fifeshire. Henry H. Brown. *Entomologist*, vol. xxxiii. p. 351 (December 1900).—A number of specimens seen near Cupar in the first week of July.

Death's-head Moth in the Hebrides. C. V. A. Peel. *The Field*, 22nd September 1900, p. 487.—Occurrence noted at Gramsdale, Island of Benbecula.

Coleoptera at Rannoch in June. By T. Hudson Beare, B.Sc., etc. *Ent. Record*, vol. xii. pp. 288-291 (November 1900).—More than 70 species are recorded in this paper.

Oxypoda longipes, Merts., in Morayshire. A. J. Chitty. *Ent. Mo. Mag.* (2), vol. xi. p. 237 (October 1900).—A single example taken near Forres in September 1892.

Pachyta sexmaculata, Linn., etc., at Nethy Bridge, Inverness-shire. By G. C. Champion, F.Z.S. *Ent. Mo. Mag.* (2), vol. xi. p. 235 (October 1900).—Besides the species mentioned in the title, 45 others are recorded from Nethy Bridge, 10 from Invershin, and 16 from Golspie, all collected by Colonel Yerbury during June, July, and August.

Pachyta sexmaculata, Linn., in Scotland: another record. G. C. Champion. *Ent. Mo. Mag.* (2), vol. xi. p. 287 (December 1900).—Refers to a record in the "Annals" of a specimen taken at Loch Morlich in June 1893.

Aberdeenshire Odonata. E. N. Bloomfield. *Ent. Mo. Mag.* (2), vol. xi. p. 263 (November 1900).—Ten species are recorded.

Dragon-flies in Inverness-shire and Sutherlandshire. R. M'Lachlan. *Ent. Mo. Mag.* (2), vol. xi. p. 241 (October 1900).—Eight species recorded, all taken by Colonel Yerbury during the present year.

Agrion hastulatum, Charp., a new British Dragon-Fly. By Robert M'Lachlan, F.R.S., etc. *Ent. Mo. Mag.* (2), vol. xi. pp. 226 and 263 (October and November 1900).—A male taken by Colonel Yerbury at Aviemore, on the 28th of June.

A few "Neuroptera" from Sutherlandshire. R. M'Lachlan. *Ent. Mo. Mag.* (2), vol. xi. p. 263 (November 1900).—Sixteen species are recorded, all taken by Colonel Yerbury in July and August 1900.

Sirex gigas in Dumbartonshire. J. R. Malloch. *Ent. Mo. Mag.* (2), vol. xi. p. 242 (October 1900).—A female specimen taken at Bonhill on 15th August.

Aculeate Hymenoptera in Scotland. Edward Saunders. *Ent. Mo. Mag.* (2), vol. xi. pp. 266-267 (November 1900).—Twenty species recorded, all taken by Colonel Yerbury in the present year.

Scottish Aculeate Hymenoptera: Additions to the List. William Evans. *Ent. Mo. Mag.* (2), vol. xi. pp. 265-266 (Novem-

ber 1900).—A list of 40 species taken in Scotland during the last six or seven years.

Crabro carbonarius, Dahlb. : an Addition to the British List. By Edward Saunders, F.L.S. *Ent. Mo. Mag.* (2), vol. xi. p. 227 (October 1900).—A male taken by Colonel Yerbury at Aviemore, 28th June.

Vespa austriaca in Scotland. J. R. Malloch. *Ent. Mo. Mag.* (2), vol. xi. p. 264 (November 1900).—Refers to an old record for Glasgow, and to recent occurences at Bonhill and Linwood in the Clyde district.

Vespa austriaca, Panz., in Scotland. William Evans. *Ent. Mo. Mag.* (2), vol. xi. p. 243 (October 1900).—Recorded from Drumshoreland, West Lothian, and Tynehead, Mid-Lothian.

Andrena lapponica, Zett., in Scotland. William Evans. *Ent. Mo. Mag.* (2), vol. xi. p. 243 (October 1900).—A colony discovered on 26th May near Balerno, and a specimen captured on 10th July near Kirknewton.

Tipulidæ in Inverness-shire. By Robert Henderson. *Ann. Andersonian Nat. Soc.*, vol. ii. pt. ii. (1900) pp. 114-116.—Fifty-seven species are recorded.

A New British Anthomyia. By Percy H. Grimshaw, F.E.S. *Ent. Mo. Mag.* (2), vol. xi. p. 252 (November 1900).—A male Hyetodesia aculeipes, Zett., captured by the late Mr. George W. Ord at Strathblane, 19th June 1899.

Chortophila buccata parasitic (?) on Andrena. William Evans. *Ent. Mo. Mag.* (2), vol. xi. p. 240 (October 1900).—Flies of this species observed attacking the bees in an old quarry near Edinburgh.

BOTANY.

Excursions of the Scottish Alpine Botanical Club. By William Craig, M.D., etc. *Trans. Bot. Soc. Edin.*, xxi. pp. 270-277. —Some of the most interesting plants found in past years are enumerated, and the rediscovery of *Saxifraga cæspitosa* on Ben Avon by Dr. Paul in July 1899 is recorded.

Ranunculus acer, L. By Frederick Townsend, M.A., F.L.S. *Journ. Bot.* 1900, pp. 379-383.—Discusses fully the forms met with in Britain, and their distribution.

Artemisia stelleriana, Bess., in Scotland. By G. C. Druce, M.A., F.L.S. *Trans. Bot. Soc. Edin.*, xxi. pp. 307-313.—One specimen found in August 1899 among *Elymus*, *Psamma*, and *Thalictrum dunense* on a sand dune at Lunan Bay, Forfarshire.

Additional Notes on Andromeda polifolia, L. By Symington Grieve. *Trans. Bot. Soc. Edin.*, xxi. pp. 258-269.

On Variations in Lycopodium clavatum, L., with their bearing on phylogeny. By R. A. Robertson. *Trans. Bot. Soc. Edin.*, xxi. pp. 290-298, pls. i.-iii.—Gives an account of numerous forms observed at Craighall in N.E. Perthshire.

Sutherlandshire Mosses. By Wm. Ed. Nicholson. *Journ. Bot.* 1900, pp. 410-420.—Is a valuable contribution to the lists of the mosses of vice-counties, 107 and 108.

The European Sphagnaceæ. By E. Charles Horrell, F.L.S. *Journ. Bot.* 1900, pp. 383-392, 422-426.—Continues the descriptions of the species and their distribution in Britain.

Fossombronia cristata, Lindb. By Symers M. Macvicar. *Journ. Bot.* 1900, p. 400.—Records occurrence of this hepatic in West Inverness, and gives a dichotomous key to the British species of *Fossombronia*.

Lejeunea Macvicari, Pearson, n. sp. *Journ. Bot.* 1900, pp. 409-410, pl. 415.—Describes and figures a new hepatic found in West Inverness by S. M. Macvicar.

New or Critical British Marine Algæ. By E. A. L. Batters, B.A., LL.B. *Journ. Bot.* 1900, pp. 369-379, pl. 414.—Is an important contribution to British Algology.

Preliminary Note on some Witches' Brooms. By R. A. Robertson, B.Sc. *Trans. Bot. Soc. Edin.*, xxi. pp. 313-318, with plates and descriptions of brooms on *Larix europæa* and on *Picea nobilis*, both from Craighall in Perthshire, and descriptions of one on an Ash from West Fife, and one on a Hawthorn, also in Fifeshire.

Obituary Notice of Rev. George Gunn. By Rev. David Paul, LL.D. *Trans. Bot. Soc. Edin.*, xxi. pp. 277-280.

BOOK NOTICES.

The Book of Antelopes. By P. L. Sclater, M.A., F.R.S., and Oldfield Thomas, F.Z.S., F.R.G.S. Illustrated by Joseph Wolf, F.Z.S., and J. Smit. (London: R. H. Porter.)

We have on several occasions noticed the progress of this important work in the "Annals." It is now our pleasure to announce its completion, and to congratulate both the authors and the publisher on the consummation of their labours.

The "Book of Antelopes" is the result of the happiest and highest combination of zoological and artistic talent ever con-

cerned in the production of a monograph of this nature. As an authority it is pre-eminent; while for beauty of illustration it has never been surpassed.

The work forms four handsome demy 4to volumes, contains one hundred hand-coloured plates, and numerous illustrations in the text.

A Treatise on Zoology. Edited by E. Ray Lankester, M.A., LL.D., F.R.S. Part II. The Porifera and Cœlentera. By E. A. Minchin, M.A., C. Herbert Fowler, B.A., Ph.D., and Gilbert C. Bourne, M.A. With an Introduction by E. Ray Lankester. (London: A. & C. Black, 1900.)

In the "Annals" for July last (p. 191) we announced the advent of this standard work on Zoology, and noticed the first part issued. Part II., dealing with the Porifera and Cœlentera, has since appeared, showing that the treatise is making rapid progress. The volume under notice opens with a chapter on the Enterocœla and the Cœlomocœla by Professor Ray Lankester. This is followed by chapters on Sponges (with index, pp. 178), by Mr. Minchin; on the Hydromedusæ and Scyphomedusæ (pp. 81), by Dr. Fowler; on the Anthozoa (pp. 84), by Mr. Bourne; and on the Ctenophora (pp. 25), also by the last-named authority. A useful feature of the work is that a separate index is furnished to each of the groups treated of, and a bibliography of works upon them is also given. The high standard and scientific character of the work, previously alluded to by us, is fully maintained by Part II., and the illustrations are numerous and excellent. The volume is quite indispensable to those engaged upon or interested in the scientific study of the Porifera and Cœlentera.

Text-Book of Zoology treated from a Biological Standpoint. By Dr. Otto Schmeil. Translated from the German by Rudolph Rosenstock, M.A., and edited by J. T. Cunningham, M.A. With numerous illustrations. (London: A. &. C. Black.)

The object of this work is to furnish a text-book of zoology which treats of the subject in such a fashion as to enlist the interest of the taught. Such an aim must assuredly commend itself to all who are interested in natural history and its teaching in schools and other educational institutions. It is claimed for this work that it proceeds by interesting and intelligible steps from simple facts to important conclusions; that structure is always considered in relation to function; that animals are treated of as living beings; and that a sound knowledge is afforded of structure, classification, physiology, habits of life, distribution, and environment. The groups of animals falling within the scope of this work are mammals, birds, reptiles, fishes, and insects; and each family or order is considered in a scientific yet popular manner. The book marks a departure

from the ordinary text-book of zoology, and we trust that it may meet with the recognition it well deserves. It is well got up, profusely illustrated, and extremely reasonable in price, namely 10s. 6d.

Memories of the Months. Second Series. By the Right Hon. Sir Herbert Maxwell, Bart., M.P., F.R.S. (London: Edward Arnold, 1900.)

In the "Annals" for 1898 (pp. 63-64) we noticed the first series of the "Memories" and commended them for their charming style, beauty of illustration, and their certainty to please. Such has also been the judgment of the public, for the book is now quite out of print. A second series, not a second edition, has been called for; and though it is not always easy to follow up one success by another, yet the author may assuredly claim, in our opinion, to have done so. This second series of short essays on sundry natural history subjects, the associations of a country life, various forms of sport, and kindred topics, are most pleasantly and philosophically written, and are in every way equal to their much-appreciated prodrome. There is just one quality in the book that we do not appreciate, namely, its want of uniformity in size and style with the first series.

The Natural History of a Highland Parish (Ardclach, Nairnshire). By Robert Thomson. (Nairn: George Bain, 1900.)

Ardclach, the author tells us, means "The Stony Ridge." Mr. Thomson, however, has clothed its nakedness with its floral wealth, and enlivened its dreariness—as implied by its name—by his observations on its mammals, birds, and insects. Although the writer is no botanist, yet in perusing Mr. Thomson's chapters on the flora, he felt almost as enthusiastic as their author, so much did they appeal to him, and so much did he appreciate the spirit in which they were penned. The chapters on the fauna treat of all the mammals, birds, and reptiles of the parish; while appendices are added on the butterflies and moths, and the flies. There are also chapters devoted to place-names, and on the general characteristics of the parish. The writer has known the author for some years, and he doubts if it would be easy to find a more admirable teacher than Mr. Thomson: forty years a schoolmaster, astronomer, naturalist, topographer, and student of place-names.

The Structure and Life-History of the Harlequin Fly (*Chironomus*). By L. C. Miall, F.R.S., and A. R. Hammond, F.L.S. (Oxford: The Clarendon Press, 1900, 8vo, 191 pp., 1 pl. and 129 figs.)

The authors of this volume have already published a joint study of the genus *Chironomus*; but their previous work was devoted only to the development of the head of the imago, while here we find an exhaustive treatise on the insect in all its stages. Though dealing

with a difficult and intricate subject, Professor Miall and his able *collaborateur* have given us a particularly lucid account of the general and minute structure and life-history of the species known as *Chironomus dorsalis*, while at the same time numerous features of biological interest presented by other species are incidentally referred to. Altogether, the volume is of great value to the student who is desirous of investigating a type of insect which differs materially from the inevitable cockroach.

While fully sympathising with the remarks made by the authors in their preface in regard to the great interest and importance attached to the working out of life-histories, we fear that the average member of a naturalists' club cannot be expected to take up successfully work of the kind indicated in the volume before us. The investigation of the minute structure of dipterous larvæ and work of a similar nature, involving as it does much delicate section-cutting, staining, and microscopical mounting, requires not a little careful training in scientific methods, and such is not usually possessed by the ordinary amateur. On the other hand, systematic zoology *has* its value, and good work of this kind can be (and *is*) done by enthusiastic members of many local societies. Moreover, unless the *species* be accurately identified, of what value is a knowledge of its minute structure and life-history? On the authors' own showing, the various species of the single genus *Chironomus* show important modifications in this respect, so that the aid of the specialist in faunal work, even if he be a maker of lists which "have no particular scientific value," has to be called in.

It is needless to add that the typography and illustrations in this extremely useful contribution to entomology fully sustain the high reputation of the publishers.

The Gaelic Names of Plants (Scottish, Irish, and Manx). By John Cameron. New and Revised Edition. (Glasgow: John Mackay, 1900.)

The substance of this book first appeared in the pages of the "Scottish Naturalist" in the years 1879-82, the author having undertaken the work at the request of Dr. Buchanan-White, while he edited the journal. In 1883 it was published as a book, and we have now the second edition. A comparison of these three stages of its development shows that Mr. Cameron has been a most diligent student of Celtic literature, and that he has brought together information of much interest and value to philologists and lovers of folklore, though, doubtless, some still remains to be gleaned in this field. This new edition shows revision throughout, and the addition of many names, including those in the Manx dialect.

The plants referred to are given under the arrangement employed in British floras, though revision by a botanist would have

prevented such errors as placing the walnut among *Rhamnaceæ*, omitting the globe-flower (*Trollius*) from *Ranunculaceæ* and including it in a footnote under *Leguminosæ*, wrong names, like *Arenaria alsine* for sandwort, and a good many misspelt names. However, these slips affect only a few among the many species named. These fall under two heads—native and introduced. Of the latter, the Gaelic names in many cases are evident modifications of the foreign words, as *lus a phione* for pæony, *fineal greugach* for fenugreek, *daimsin* for damson, *plumbais* for plum, *geanais* for gean, *pearsal* for parsley, and *borrach* for borage. Other names, even of native plants, are evident translations from foreign tongues, as *fàlluing Mhuire* ("Mary's mantle") for the common lady's mantle (formerly "Our Lady's mantle"); *seilachan Frangach*, meaning "French willow," for the plant so named in our floras; *lusan easbuig* for bishopweed; *lus na sithchaine* (meaning "herb of peace") for loosestrife. Other Gaelic names, especially those of common native species, are very expressive of peculiarities of the plants, as *copan an driùchd* ("dew-cup") for the common lady's mantle, and *cnapan dubh* ("black knob") for knapweed. Some of the identifications of Gaelic names with plants may require revision; for example, *Subularia aquatica* is assigned to *ruideog*, defined as "bogawl, a kind of butterweed growing in bogs (county of Monaghan)." The description would suit several other plants more conspicuous than *Subularia*.

But while there is room for yet further revision and advance in the field selected by Mr. Cameron, there can be no question that he deserves and will receive the thanks of all that occupy themselves with this most interesting study.

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THE LATE MR. JAMES BENNIE.

By the death of Mr. James Bennie on the 28th of January, geology and natural science lost a devoted student.

Born in Glasgow in 1821, he had thus almost reached the age of fourscore years. The fact that he was not very robust in health when young, probably explains his short schooldays; still, his education must have been attended to, as we find him at the age of sixteen making careful observations in a diary. It is not unlikely that his association during boyhood with handloom weavers—a community of keen politicians, and of intelligent, clear-headed, hard reading, and hard working men—helped to instil into his mind his love of literature and of nature. Mr. Jolly, in his biography of Duncan, the Alford weaver and botanist, has given us the interesting story of the life of a kindred spirit to that of Mr. Bennie. No doubt the writings and lectures of Hugh Miller were largely instrumental in turning his attention to geology. That he honoured and admired Miller is eloquently proved by the fact that his first-born son bears the name of this great genius.

The Geological Society of Glasgow was founded in 1858, and Mr. Bennie joined the following year. Long before this date, however, we find from his diary that every spare hour was devoted to the geology around Glasgow. Yet up to

the time that he joined the Geological Survey in December 1868 he had not contributed largely to the literature of geology. Still, we think that his papers on the surface geology around his native city are among the best he ever wrote. In one of these he records the discovery of *Bos longifrons* and *Bos primigenius* in the ancient drift of the Clyde. His interest in glacial deposits remained with him throughout his long life; for, after many years of work among the Carboniferous rocks, he gave glacial deposits his undivided attention, with what interesting results we all know, since a summary of them, from his own pen, appeared in this magazine in January 1896. After the retreat of the ice from the lower grounds of Scotland, the surface of the country was dotted over with lakes and tarns. Into these were carried, along with the mud and other detritus, seeds and plant remains. By and by, many of these became silted up either wholly or partially. Several such lakes are to be found in the neighbourhood of Edinburgh, in Fife, and elsewhere. By taking samples of the mud, clay, and peaty layers from different levels of these vanished lakes, and carefully washing and examining the residues, Mr. Bennie found that the lower layers yielded fossils of a pronounced arctic facies; such as the little crustacean *Lepidurus* (*Apus*) *glacialis* now only found living in the fresh-water ponds of Spitzbergen and Greenland, the arctic willow (*Salix polaris*), and birch (*Betula nana*). As the climate ameliorated, the arctic plants appear either to have succumbed in the struggle, or were driven into the mountainous districts to the north, where a few species still maintain a precarious existence.

Much of Mr. Bennie's time was devoted to searching weathered and soft shales for micro-organisms, and from which he reaped a rich harvest of new and rare forms. In this way, the occurrence of Holothurians in the Carboniferous series was first made known to us. Also the great abundance of Eurypterids and Scorpions during the same period.

It would carry us beyond our space to give even a list of new forms discovered by him, and figured and described by specialists, several being named after him in recognition of the value of his researches. To him, as to every true lover

of science, the pleasure he found in the pursuit was more than its own reward ; but some two years ago the Geological Society of London presented him with the Murchison Fund.

As a collector among small organisms he was unrivalled. His patience, like his eyesight, untiring ; his geniality and kindness unfailing—giving as freely from his stores of knowledge as from his stores of fossils. Keenly interested in everything relating to science, he yet found leisure to study the best authors, among whom Tennyson and Carlyle held a foremost place. He was the last of a splendid band of early local geologists who did so much to elucidate the history of the "Rocks around Glasgow"—the like of whom we can hardly hope to see again.

A. M.

REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1900.

By T. G. Laidlaw, M.B.O.U.

A satisfactory increase in the number of schedules returned has to be recorded for the year 1900. From the different Light Stations twenty-seven schedules have been received, while Inland Observers furnish thirty : the total of fifty-seven representing an increase of fifteen as compared with the preceding year. Many important notes have also been received and incorporated in the report.

In thanking our correspondents for their valued assistance, the hope is expressed that their co-operation may be continued in the future ; and also that observers in those areas that are unrepresented may be induced to lend a helping hand, so that all the faunal areas may be included in subsequent reports.

Schedules may be obtained, as hitherto, from Mr. Eagle Clarke, Museum of Science and Art, Edinburgh.

The following list gives the names of observers from whom schedules and notes have been received. The localities are arranged under the different faunal areas, proceeding from north to south, along the East and West Coasts.

Locality.	*Name of Observer.*
Shetland.	
North Unst L.H.	Henry Jamieson, Asst. Lightkeeper.
Dunrossness	Thomas Henderson, jun.
Orkney.	
North Ronaldshay L.H.	John A. Mackay, Lightkeeper.
Noup Head L.H.	Thomas J. Wallace, Lightkeeper.
Sule Skerry L.H.	James Tomison, Lightkeeper.
Sutherland and Caithness.	
Cape Wrath L.H.	Neil M'Donald, Lightkeeper.
Thurso	Lewis Dunbar.
Moray.	
Strathglass, etc.	Lionel W. Hinxman, B.A., H.M. Geol. Survey.
Dee.	
Rattray Head L.H.	Robert Clyne, Lightkeeper.
Peterhead	Rev. William Serle, M.A.
Aberdeen District	Lewis G. Esson.
Tay.	
Fordoun	John Milne.
Blair Atholl	Bruce Campbell.
Pitlochry	Rev. H. A. Macpherson, M.A
Newport and Tayport	William Berry, B.A., LL.B.
Bell Rock L.H.	Robert Clyne, Lightkeeper.
Forth.	
Isle of May L.H.	T. E. Arthur, Lightkeeper.
Callander and Lothians	William Evans.
Edinburgh District	Bruce Campbell.
Dalmeny Park	Charles Campbell.
Bo'ness	Robert Godfrey, M.A.
Musselburgh	Rev. William Serle, M.A.
Tranent	D. Ritchie, M.B.
North Berwick	W. M. Inglis.
Tweed.	
Cramilt	Alexander Sim.
Rodono	Jas. Mc. L. Marshall.
Broughton	A. C. Gairns.
Halmyre	D. G. Laidlaw.
Chirnside	Charles Stuart, M.D.

Outer Hebrides.

Locality.	*Name of Observer.*
Flannan Isles L.H.	James Ducat and William Ross, Lightkeepers.
Monach Isles L.H.	James Black, Lightkeeper.
Island Glass L.H.	James M'Guffie, Lightkeeper.
Barra	William L. MacGillivray.

Argyll and Inner Hebrides.

Scarnish, Tiree	Peter Anderson.
Skerryvore L.H.	John Nicol and David L. Murray, Lightkeepers.
Dhuheartach L.H.	Messrs. Begg and M'Gilvray, Lightkeepers.
Corran L.H.	Neil M'Donald, Lightkeeper.

Clyde.

Lamlash L.H.	James Edgar, Lightkeeper.
Carmichael	Rev. J. D. W. Gibson, B.A.
Various Localities	John Paterson, John Robertson, Hugh Boyd Watt, Robert Wilson, and correspondents.

General Remarks.

The winter and early spring months of 1900 were characterised by weather of an extremely changeable nature, the temperature in most districts being considerably below the average, while the rainfall was largely in excess of the normal. The conditions improved, on the East Coast, towards the end of April and beginning of May, when a period of fair and dry weather was experienced, although the temperature continued low. This again, however, gave place to very variable conditions before the end of the month. The spell of dry weather on the West Coast was of much shorter duration.

The cold and inclement nature of the spring, as last year, retarded the arrival of the summer migrants, and the early movements were unimportant. At Isle of May and Rattray Head, on April 14 and 22, small birds were at the lantern ; and on April 21 many Wheatears were noted at North Ronaldshay.

The spring movements on the West Coast were somewhat late and not so extensive as in 1899. At Skerryvore and Dhuheartach many Larks, Thrushes, and Pipits were passing on Feb. 23 and 25, with S.E. light breeze; while at the latter station a similar movement took place on March 23-24. Rushes of Wheatears, Larks, Thrushes, and small birds are noted for Lamlash, Dhuheartach, Skerryvore, Island Glass, and Monach between April 16 and 23.

The first important movement in the autumn is recorded from Sule Skerry, where, on August 30, many Wheatears and other birds were at the lantern from 10 P.M. until 2 A.M. At the same station, on Oct. 16-17, flocks of Redwings were about all night; several being killed. This movement was also strongly in evidence at the Bell Rock and Isle of May, where great numbers of Thrushes, Redwings, and Starlings are recorded as flying round light, many dozens being killed. Another strong rush is noted from these stations on Nov. 6.

Towards the end of August and beginning of September the usual rush of Passerines was noted at the West Coast stations, where Wheatears, Whinchats, Pipits, Wagtails, and other small birds were recorded at Flannan Isles, Island Glass, Dhuheartach, and Skerryvore. Another movement, though not so pronounced, occurred at the latter station on Sept. 17-21. Many Larks, Thrushes, Fieldfares, etc., were passing Monach and Dhuheartach on Oct. 1 and 4. The great rush of Turdidæ, as on the East Coast, took place on Nov. 6. On the whole, the smaller birds were less numerously observed than usual on the autumn migration.

Among other points of interest, attention may be called to the nesting of the Quail (*Coturnix communis*) at Dunrossness, Shetland, on Sept. 13; the unusual numbers of the Bittern (*Botaurus stellaris*) during the winter in many districts; and the further evidence of the nesting of the Fulmar Petrel (*Fulmarus glacialis*) at Cape Wrath.

The list of rare and casual visitants to Scotland during 1900 includes the Black Redstart (*Ruticilla titys*) at Aberdeen, March 20; Barred Warbler (*Sylvia nisoria*) at Eoligary, Barra, on Oct. 29; Great Gray Shrike (*Lanius*

excubitor), Barra, April 12, and Maxwelltown, Solway, Feb. 17; Redbacked Shrike (*Lanius collurio*), Whitekirk, East Lothian, May 9; and Scops Owl, (*Scops giu*) Foula, late in April.

TURDUS VISCIVORUS (Missel Thrush).

Tay—Bell Rock, Oct. 16, killed at lantern. *Forth*—Isle of May, Nov. 16, killed at lantern (leg and wing sent).

TURDUS MUSICUS (Song Thrush).

Orkney—North Ronaldshay, Nov. 1, a number with Blackbirds, Snow Buntings, etc. Sule Skerry, Oct. 14, at lantern all night with Redwings and Snow Buntings. *Sutherland*—Cape Wrath, April 23, one at lantern. *Tay*—Bell Rock, Nov. 19, one at lantern. *Forth*—Isle of May, Sept. 30, one at light; Oct. 16, hundreds seen, dozens killed (leg and wings sent); Oct. 31, all night, scores seen; Nov. 6, immense numbers with Fieldfares, etc., S.E., light, haze and rain. *Tweed*—Cramilt, Sept. 30, last seen. *Outer Hebrides*—Monach, Feb. 19, at lantern with Larks, Linnets, Goldcrests, and a few Blackbirds; April 16-17, in numbers round lantern with swarms of small birds, Wheatears, Larks, etc.; Oct. 2-3, large numbers, Fieldfares, Blackbirds, and small birds; Nov. 16, at lantern with Blackbirds, Larks, etc. *Argyll and Isles*—Tiree, Oct. 11, have arrived. Skerryvore, Feb. 23, large numbers flying round lantern, with Larks and Pipits; Feb. 26, several striking; March 6, two at light; March 22, at lantern with Larks and Fieldfares; Oct. 31–Nov. 1, great rush of Turdidæ, Thrushes and Redwings very numerous, Blackbirds not so plentiful, E.S.E. gale; Nov. 6, striking; Nov. 16, three at lantern; Nov. 20, flying round all night; Nov. 24, two killed. Dhuheartach, Feb. 23, several with Larks; Feb. 25, one; March 13, in numbers throughout the day.

Principal movements, Oct. 26, 31, and Nov. 6, East; Oct. 2-3, Nov. 1-6, West Coast.

TURDUS ILIACUS (Redwing).

Shetland—North Unst, Oct. 25, at lantern, one killed. Scousburgh, Oct. 17, one; Oct. 23, numerous. *Orkney*—Sule Skerry, Oct. 13, first appearance; Oct. 16-17, flocks at lantern, a few killed; Oct. 24, all night, with Thrushes, Snow Buntings, etc. *Tay*—Bell Rock, Oct. 17, several striking; Oct. 31, at lantern with Blackbirds, Starlings, etc.; Nov. 4-6, large numbers. *Forth*—Oct. 17, heard passing over Morningside at night, foggy; Oct. 19, several near Edinburgh. *Tweed*—Halmyre, Oct. 18, several; Cramilt, Oct. 26, several. *Outer Hebrides*—Barra, April, 3rd week, last seen, numerous this spring; Oct. 30, fairly numerous. *Argyll and Isles*—Tiree,

March 23, many; Oct. 18, plentiful. Skerryvore, April 17, in large numbers, two killed; Oct. 31–Nov. 1, strong rush of Turdidæ, Redwing and Song Thrush very numerous; Nov. 10, four at light; Nov. 14, rush with Fieldfares. Dhuheartach, April 19, in numbers. *Clyde*—March 31, about twelve, Camphill, Glasgow; Oct. 19, Beith and Giffnock. Lamlash L.H., Oct. 20, rush with Fieldfares.

Principal movements, Oct. 17, general; Oct. 31, Nov. 1-6.

Turdus pilaris (Fieldfare).

Shetland—North Unst, Nov. 4, flock. Dunrossness, Nov. 3, two, first seen; Nov. 6, immense flocks. *Orkney*—Sule Skerry, Nov. 1, at lantern with Blackbirds, Snow Buntings, etc. *Moray*—Glen Orrin, Nov. 1. *Dee*—Rattray Head, May 12, one at lantern. *Tay*—Auchinblae, April 30, last seen; Nov. 2, arrived. Blair Atholl, May 6, several. Pitlochry, Nov. 14 and 15, large flocks both days, flying from E. to W. *Forth*—Isle of May, April 22, large flock; Nov. 2, about twenty-five; Nov. 6, many hundreds, two dozen killed; April 29, flock, Rosebery; large flock, Pencaitland; flock of forty-eight near Loch Vennachar; Oct. 29, Kinneil. *Tweed*—Halmyre, April 14, several flocks passing. Rodono, May 5, one. Cramilt, Oct. 11, several. Chirnside, Oct. 24, a flock. *Outer Hebrides*—Monach, Jan. 12-13, large numbers; Oct. 2-3, large numbers at lantern, Thrushes, Blackbirds, etc. Barra, April, 2nd week, last seen. *Argyll and Isles*—Tiree, Nov. 5, flock. Skerryvore, March 22, six at lantern; Nov. 1, flying round light and striking; Nov. 14, a rush with Redwings, several killed. *Clyde*—Lamlash L.H., Oct. 20, rush with Redwings. Auchinleck, April 16, about five hundred, with many Starlings. Campsie, May 12, pair. Beith, Oct. 27. Carmichael, June 7, still here; Nov. 1, return.

Principal movements, April 29, Nov. 1-6.

Turdus merula (Blackbird).

Shetland.—North Unst, Nov. 2, three. Dunrossness, Nov. 6, two, first seen. *Orkney*—Noup Head, Feb. 4, numbers all night with Larks; Feb. 25, all night with Starlings, great numbers on lantern. North Ronaldshay, Nov. 1, a good number with Thrushes, Snow Buntings, etc. Sule Skerry, April 10, last seen; Nov. 1, at lantern with Fieldfares, Snow Buntings, etc. *Sutherland*—Cape Wrath, Feb. 6, one. *Tay*—Bell Rock, Oct. 31, a few at lantern with Larks, Redwings, and Starlings, S.E., haze. *Forth*—Isle of May, Nov. 6, a few dozen seen, two or three killed at lantern (leg and wing sent). *Outer Hebrides*—Monach, Feb. 19, a few with Larks, Linnets, Thrushes, etc.; Oct. 2-3, in numbers at lantern with Thrushes, Fieldfares, etc.; Nov. 16, at lantern with other birds, Thrushes, Larks, etc. *Argyll and Isles*—Tiree, Oct. 17, have arrived. Skerryvore, Feb. 26, two at lantern with Thrushes and Meadow Pipits, N.E.,

fog and haze; July 24, one on rock; Oct. 31–Nov. 1, in rush of Turdidæ; Nov. 10, at light with Redwings; Nov. 29-30, striking, a number must have fallen into the sea, S.E., strong. Corran, Nov. 21 and 28, several, with Thrushes and Starlings.

Principal movements, Oct. 31, Nov. 1 and 6, 28-30.

Turdus torquatus (Ring Ousel).

Orkney—Sule Skerry, Oct. 18, one caught on lantern. *Tay*—Bell Rock, Nov. 7, one on rock. *Forth*—Tyne, East Linton, April 16. Isle of May, Nov. 6, two killed at lantern (leg and wing sent). *Tweed*—Halmyre, April 17, one. Rodono, April 17, three; April 29, numerous. *Clyde*—Lamlash, April 17. Elvanfoot, Oct. 2, a good many feeding on rowans.

Earliest observed, East Linton, April 16.

Saxicola œnanthe (Wheatear).

Shetland—North Unst, May 9, seen. *Orkney*—North Ronaldshay, April 11, one; 21st, many all day. Sule Skerry, Aug. 30, many at lantern with Wagtails, Petrels, etc., haze; Oct. 5, last seen. *Sutherland*—Cape Wrath, April 21-23, several on lantern; May 6, many. *Moray*—Strathglass, April 16. Strathconan, Oct. 14-16, young bird not fully feathered seen for several days. *Dee*—Rattray Head, April 14, one, first seen. Aberdeen, Peterhead, Sept. 26, in good numbers. *Tay*—Bell Rock, Aug. 18, at lantern; Sept. 15, on rock. *Forth*—Isle of May, March 26, one seen, first. Aberfoyle, April 2. Cockenzie, April 7. *Tweed*—Chirnside, April 1, four; Sept. 5. Broughton, April 1, a ♂. Rodono, April 18, several ♂s, no ♀s seen till 22nd. *Outer Hebrides*—Island Glass, April 21-23, all night with Larks; 25th, numbers with Pipits. Flannan Isles, July 19, a ♀; Sept. 1, many at light with Wagtails, Pipits, etc.; Sept. 23, one caught at light. Monach, April 16-17, small birds in swarms round lantern, Larks, Thrushes, etc., S.S.E. breeze; Oct. 2-3, in large numbers round lantern with other birds, a good many killed. Barra, April 2, a ♂. *Argyll and Isles*—Tiree, April 6, have arrived. Skerryvore, April 1, two at lantern; 21st, in large numbers, midnight; Aug. 22-25, several killed, mostly young birds; Sept. 15-17, flying about light; Oct. 9, six. Dhuheartach, April 20-21, very plentiful, flying about in rays, and sitting on rail; May 16-18, several; May 27, have been passing all week; Aug. 17, several young birds; Aug. 28, round lantern in great numbers with other birds; Aug. 29, hundreds about rock; Sept. 15-28, passing. *Clyde*—Lamlash L.H., April 17, three; Sept. 8, several. Lendalfoot, March 23; April 7, few: Campsie Fells, over 1000 feet; Leadhills, Oct. 1, three or four.

Earliest, March 23, Lendalfoot. Principal movements, April 11-21, Aug. 27–Sept. 1, Oct. 2-6.

PRATINCOLA RUBETRA (Whinchat).

Moray—Strathconan, Oct. 6. *Forth*—Callander, April 27, a ♂. *Tweed*—Rodono, April 21, a pair; not in any numbers till May 7. Cramilt, Sept. 5, last. Broughton and Halmyre, May 6. Chirnside, May 8, pair. *Argyll and Isles*—Dhuheartach, April 19, one; May 16, one found dead; May 20, two; Aug. 17, several, all young birds; Aug. 19-26, numbers, several killed; Aug. 29, hundreds about rock; Sept. 18, six. *Clyde*—Lamlash, April 20. Giffnock, April 24, a ♀. Carmichael, May 13.

Earliest, April 19, Dhuheartach L.H.

PRATINCOLA RUBICOLA (Stonechat).

Tweed—Rodono, April 19, "was here on my arrival." Halmyre; May 10, one, "rare in district."

RUTICILLA PHŒNICURUS (Redstart).

Moray—Struy, April 29, late, fewer than in former years. *Tay*—Pitlochry, May 1, a ♂. *Forth*—E. Linton, April 16. Pass of Leny, April 25, a ♂. Dalmeny, April 26. *Tweed*—Rodono, April 21, a ♀; Sept. 30, last seen. Halmyre, April 24. Chirnside, April 24, one, scarce; Aug. 31, last. *Argyll and Isles*—Skerryvore, May 17, two on rock; Sept. 17-21, several at lantern. *Clyde*—Beith, April 22. Queensberry, Sept. 14, one, alt. 2285 feet.

Earliest, April 16, E. Linton; latest, Sept. 30, Cramilt.

RUTICILLA TITYS (Black Redstart).

Dee—Aberdeen, March 20, a ♂ flew into, and was caught in, a house in Aberdeen. "First record" ("Annals," 1900, p. 121).

ERITHACUS RUBECULA (Redbreast).

Shetland—N. Unst, April 17, one. *Orkney*—N. Ronaldshay, Nov. 25, one. *Argyll and Isles*—Tiree, Sept. 26, one in garden; Dec. 27, one. Skerryvore, Sept. 21, four; Sept. 30, two at lantern.

SYLVIA CINEREA (Whitethroat).

Moray—Glen Strathfarrar, May 15, late. *Forth*—Tranent, May 4, a ♂. Blackford Hill, May 6, one. Dalmeny, Sept. 22. *Tweed*—Chirnside, April 27; Sept. 5, left, more plentiful than usual. Halmyre, May 6. Broughton, May 8. *Outer Hebrides*—Barra, June 22, nested in garden at Eoligary (first time). *Argyll and Isles*—Dhuheartach, Aug. 28, one caught. *Clyde*—Fiddler Gill, April 27.

Earliest, April 27, Chirnside and Fiddler Gill.

SYLVIA ATRICAPILLA (Blackcap).

Tay—Pitlochry, April 20, a ♂. Kinfauns, one seen for several days in December. *Forth*—Gorebridge, May 8, a ♂ in full song.

SYLVIA HORTENSIS (Garden Warbler).

Forth—Bridge of Allan, May 1, one in song. Gorebridge, May 8, one. *Tweed*—Whitadder Banks, May 20, several. *Clyde*—Busby, June 2.

SYLVIA NISORIA (Barred Warbler).

Outer Hebrides—Barra. Eoligary, Oct. 29, one obtained.

REGULUS CRISTATUS (Goldcrest).

Forth—Isle of May, Oct. 2, two at light. *Outer Hebrides*—Monach, Feb. 29, in rush with Larks, Linnets, etc. Barra, May 15, seen. *Clyde*—Lamlash L.H., July 30, rested on lantern, midnight; Oct. 11, at lantern.

PHYLLOSCOPUS RUFUS (Chiffchaff).

Forth—May 30, heard in Dreghorn woods ("Annals," 1900, pp. 183-184). *Tweed*—Chirnside, April 10, generally seen or heard before this date. *Clyde*—Lendalfoot, April 20. Lamlash, April 22.

PHYLLOSCOPUS TROCHILUS (Willow Wren).

Moray—Struy, April 29, late. *Tay*—Tayfield, May 2, heard. Auchinblae, May 4; Sept. 1, last seen. Pitlochry, April 28, a pair. *Forth*—Hermitage, Dalmeny, Callander, and Pass of Leny, April 22. Avon and Kinneil, April 24. Isle of May, April 29, nine seen; Sept. 27, one, 11 P.M. *Tweed*—Broughton, April 23. *Argyll and Isles*—Tiree, May 24. Skerryvore, May 7, one caught at lantern; May 17, six resting on rock. *Clyde*—Fiddler Gill, April 20; April 22, numerous all over district. Queen's Park, Sept. 12, one or two in song; Elvanfoot, one, last seen.

Earliest, April 20, Fiddler Gill; latest, Sept. 27, Isle of May.

PHYLLOSCOPUS SIBILATRIX (Wood Wren).

Moray—Strathglass, May 2, abundant. *Forth*—May 6, one in Braid Hermitage. *Tweed*—Chirnside, Sept. 5, last. *Clyde*—Port-Glasgow, May 5, many. *Solway*, Hoddam, May 5.

ACROCEPHALUS PHRAGMITIS (Sedge Warbler).

Tay—Auchinblae, May 3, very numerous. *Forth*—Bo'ness, May 6. Bankhead and Gladhouse, May 8. *Tweed*, Halmyre,

May 7. Chirnside, Sept. 7. *Argyll and Isles*—Dhuheartach, Aug. 28 (leg and wing sent); Sept. 29, one. *Clyde*—Lendalfoot, April 25. Thornliebank, May 1.

Earliest, April 25, Lendalfoot.

Locustella nævia (Grasshopper Warbler).

Clyde—Thornliebank, May 10.

Motacilla alba (White Wagtail).

Shetland—N. Unst, April 26, two; Aug. 18, one. Dunrossness, Sept. 9-24, common; Oct. 3, on Spiggie Voe ("Annals," 1901, p. 7). *Orkney*—Sule Skerry, May 8, several; Aug. 30, at lantern with Wheatears, etc. *Outer Hebrides*—Barra, April 30, one. Island Glass, May 3, several; Sept. 2, a lot all day. Flannan Isles, Aug. 18, two; Aug. 25-30, numbers passing; Sept. 1, at light with Wheatears, Pipits, and Storm Petrels; Sept. 6, one; Oct. 8, one. *Argyll and Isles*—Tiree, May 1, twelve on shore at Heanish; May 4, several; May 14, passing N.; Aug. 27, small flock on way S.; Sept. 1, several. Gott Bay, Sept. 24, small flock going S. Skerryvore, May 13, one; Aug. 30, three. Dhuheartach, May 15-20, several; Aug. 22-25, numbers passing. *Clyde*—Dalbeth and Lendalfoot, April 22. Greenan Loch, Bute, April 28.

Motacilla lugubris (Pied Wagtail).

Dee—Peterhead, Sept. 3, many migrating. *Tay*—Bell Rock, Sept. 15, remained all night. *Forth*—Isle of May, March 27, one. *Argyll and Isles*—Tiree, Oct. 27. Skerryvore, April 22, one. Dhuheartach, April 19, several; Sept. 15, one. *Clyde*—Lamlash L.H., March 30, two; April 1, numerous.

Motacilla melanope (Gray Wagtail).

Tweed—Rodono, April 19, a pair; Sept. 30, last.

Motacilla raii (Yellow Wagtail).

Clyde—Dalbeth, April 20, four ♂s. Lochwinnoch, April 21, four. Dalbeth, Aug. 14, about thirty.

Anthus pratensis (Meadow Pipit).

Sutherland—Cape Wrath, May 20, numbers. *Tay*—Bell Rock, Sept. 12, two on rock; Sept. 20, at lantern. *Outer Hebrides*—Flannan Isles, Aug. 27, numbers all day; Sept. 1, many with other small birds. Island Glass, April 25, numbers with Wheatears, midnight. *Argyll and Isles*—Skerryvore, Feb. 23-26, in rush with Thrushes, Larks, etc., several killed; March 6, at lantern; Aug.

25, at lantern with Wheatears; Oct. 11, many flying about rock. Dhuheartach, April 19, numbers with Larks and Redwings; May 27, have been passing all week; Aug. 26, on lantern; Sept. 1-15, and 20, several. *Clyde*—Elvanfoot, Sept. 23, many passing, going in a southerly direction.

Principal movements, Feb. 23-26, April 9-25, Aug. 25, Sept. 1.

ANTHUS TRIVIALIS (Tree Pipit).

Moray—Strathglass, April 23. *Forth*—Dreghorn, April 23. Callander, April 23, one; April 24, several. *Tweed*—Chirnside, April 22, in all our woods. *Clyde*—Carmichael, April 19. Cadder, April 23, in force.

Earliest, April 19, Carmichael.

LANIUS EXCUBITOR (Great Gray Shrike).

Outer Hebrides—Barra, April 12, one shot. *Solway*—Maxwelltown, Feb. 17, one shot ("Annals," 1900, p. 120).

LANIUS COLLURIO (Red-backed Shrike).

Forth—Whitekirk, E. Lothian, May 9, a ♂ seen ("Annals," 1900, p. 183).

MUSCICAPA GRISOLA (Spotted Flycatcher).

Dee—Aberdeen, May 5. *Tay*—Pitlochry, May 19. *Forth*—Dalmeny, May 19. *Tweed*—Broughton, May 5. Rodono, May 8, one. Chirnside, Sept. 30. *Clyde*—Thornliebank, May 13. Queen's Park, Sept. 12, a few. Elvanfoot, Sept. 27, two, last seen.

Earliest, May 5, Broughton and Aberdeen. In last year's "Report" the Clyde records, April 12 and April 13 should be May in both cases.

MUSCICAPA ATRICAPILLA (Pied Flycatcher).

Dee—Aberdeen, May 24, two. *Clyde*—Ardpeaton, Loch Long, Aug. 24, a ♂.

HIRUNDO RUSTICA (Swallow).

Shetland—North Unst, May 24, five. Scousburgh, Oct. 27, one. *Orkney*—Sule Skerry, April 28, killed at lantern. *Sutherland*—Cape Wrath, May 6, three; May 13, one. *Dee*—Rattray Head, April 27, two. Peterhead, Sept. 24, in flocks. *Tay*—Pitlochry, April 19, a ♂. Auchinblae, April 20, arrived. Newport, April 21. *Forth*—Isle of May, April 23. Callander and Dalmeny, April 19, one; April 20, several. Tranent, April 20. Bo'ness, Oct. 5, large flock.

Dalmeny, Oct. 28, last seen. *Tweed*—Chirnside, April 20, Oct. 4. Halmyre, April 25, pair. Broughton, April 27. Rodono, April 28, one; May 7, several. *Outer Hebrides*—Barra, April 20, one. Island Glass, April 24, two. Monach, May 10, five, all day. *Argyll and Isles*—Tiree, May 7, several. Skerryvore, April 21, two flying about; May 31, one; June 9, two; June 12, one; July 19, one. Dhuheartach, April 21, two; May 20, two, one died from exhaustion; Sept. 18, one. *Clyde*—Thornliebank, April 17, pair. Carmichael, Sept. 27, last seen. Elvanfoot, Sept. 23, many passing, going S. Pollokshaws, Oct 20, one.

Earliest, April 17, Thornliebank; latest, Oct. 28, Dalmeny.

Chelidon urbica (Martin).

Orkney—North Ronaldshay, April 20, four. *Dee*—Peterhead, Sept. 24, flocking. *Tay*—Auchinblae, May 3, first. Blair Atholl, May 5. *Forth*—Callander, April 27, two. Musselburgh, May 4. *Tweed*—Broughton, April 18, a pair. Chirnside, April 28, plenty; Sept. 4, last seen. Halmyre, May 4, several. Rodono, May 5, several. Cramilt, Oct. 4, a pair with young left. *Outer Hebrides*—Flannan Isles, April 10, killed by Hawk (leg and wing sent). *Clyde*—Langside, April 4. Carmichael, Sept. 19, last seen.

Earliest, April 4, Langside; latest, Oct. 4, Cramilt.

Cotile riparia (Sand Martin).

Moray—Struy, May 17. *Dee*—Aberdeen, May 9, four; Sept. 15, last. *Tay*—Newport, May 1. *Forth*—Duddingston and Tyne, April 16. Forth, below Callander, April 20, two. *Tweed*—Chirnside, April 20, Sept. 10. Rodono, April 30, six or more. Cramilt, Sept. 30, last. *Clyde*—Cambuslang, April 19. Carmichael, May 1.

Earliest, April 16, Duddingston and Tyne; latest Sept. 30, Cramilt.

Carduelis elegans (Goldfinch).

Forth—May 19, one seen in Clackmannanshire ("Annals," 1900, p. 183).

Ligurinus chloris (Greenfinch).

Dee—Rattray Head, April 2, with Chaffinches on Tower, one exhausted and dying. *Outer Hebrides*—Barra, April, 3rd week, fairly numerous.

Passer montanus (Tree Sparrow).

Shetland—Dunrossness, Sept. 18, five at Scatness ("Annals," 1901, p. 8). *Forth*—Kingsknowe, Feb. 14 or 15, one obtained ("Annals," 1900, p. 183). *Tweed*—Halmyre, one appeared early in November, and is still here (March).

Fringilla cœlebs (Chaffinch).

Shetland—Dunrossness, Oct. 6, a ♂, first; Oct. 7, one. *Dee*—Rattray Head, April 2, at lantern all night with Greenfinches, several much exhausted. *Outer Hebrides*—Barra, Feb., end of, last seen, not numerous this year.

Fringilla montifringilla (Brambling).

Tay—Newport, April 5, numerous for a few days, not seen later. *Forth*—Morton, April 9, two. Isle of May, Dec. 15, one picked up (leg and wing sent). *Tweed*—Broughton, April 8, a ♀. Chirnside, Oct. 13, early arrival. *Clyde*—Carmichael, April 17, still here.

Linota cannabina (Linnet).

Shetland—Dunrossness, several small parties in Sept. ("Annals," 1901, p. 8). *Outer Hebrides*—Monach, Feb. 19, at lantern with Larks, Thrushes, Goldcrests, etc. *Argyll and Isles*—Dhuheartach, April 17, four.

Linota linaria (Mealy Redpoll).

Outer Hebrides—Barra, Oct. 13, one seen in garden at Eoligary. *Clyde*—Carmichael, Dec. 7, a pair shot.

(*To be continued.*)

ZOOLOGICAL NOTES FROM SOLWAY.

Robert Service, M.B.O.U.

Hedgehog (*Erinaceus europæus*).—Up till last autumn, my latest date when the Hedgehog was noted abroad is the evening of 22nd November 1898. On that occasion the animal was seen running quickly across a road in the moonlight, when snow was lying quite an inch in depth. To be sure of the beast's identity, I ran after it and caught it on the other side of the hedge. This last autumn I noted Hedgehogs out on their rambles on the evenings of 8th and 20th November, and again on 8th December. With the advent of the Winter Solstice, we should expect all the Hedgehogs were sleeping soundly. But on 3rd January 1901, and so late as 10 o'clock of the evening, I found a Hedgehog in perfect activity rambling along one of the pathways in the nursery fields that adjoin my house. It was a very mild night, the thermometer at the time standing at 46°; but making due allowance for this, surely the last-cited date must be altogether exceptional?

Jay (*Garrulus glandarius*).—Jays have been seen since the end of October in Annandale in several small parties. Mr. Pasley Dirom of Mount Annan informs me that one pair of Jays has bred on an outlying portion of his property for the last eight years. The young are observed flying about till the autumn, when all disappear. With the exception of the colony of Jays introduced by Sir Herbert Maxwell, M.P., at Monreith, I am unaware that the species has bred anywhere else in Dumfriesshire or Galloway during at least the last generation.

Spotted Crake (*Porzana maruetta*).—This bird was again observed last autumn, one having been shot at a locality in Troqueer, on 24th September 1900. Three days later another was killed against the telegraph wires on the Castle Douglas Railway, near Buittle.

Storm Petrel (*Procellaria pelagica*).—On 1st October 1900, an individual was observed flying about on Hightae Moss, near Lochmaben, and was shot. I examined it while in the bird-stuffer's shop in Dumfries. It may seem strange to state that this is the first Common Storm Petrel, of local origin, that I have handled. While the Fork-tailed species is in some seasons not uncommon, the other would appear to be of considerable rarity in this area. Certainly all those reported as "Storm Petrels" have invariably, in my experience, turned out to be Fork-tailed Petrels.

Wild Geese.—Amongst the wild-fowl of the past winter, geese have again been quite a conspicuous feature. More especially has this been the case in and near the estuary of the Nith, where in former years, always excepting the abundant Barnacles, they were never in anything but comparatively scanty numbers. Gray Lags have been in large flocks. On some occasions it was estimated that fully a thousand birds were flying, or sitting, together. I handled many of the gray geese got by the gunners, and these were all Gray Lags. It is hard to give any explanation of this curious change in relative numbers of species, for in quite recent years all the geese were Bean Geese, and a Gray Lag was but seldom got. Now this winter, to use a sporting phrase, the Grey Lag was "first, the rest nowhere."

Honey Buzzard (*Pernis apivorus*).—On the morning of the 17th January 1901, my friend Mr. Jardine, the tenant of Waterside farm, within a short distance from here, was out in one of his fields looking to his sheep. It was only in the gray of the morning, when his collie dog "set" at something sitting by one of the sheep-troughs. Then the dog made a dash at the object, which got up and flew some forty yards before alighting again. Mr. Jardine followed, and keeping the dog off, he was able to secure the bird without any difficulty, except

that he got his hand and cheek pretty severely scratched. The "hawk" was set at large in the barn; and none of those about the place knowing what it was, a message was sent to me. To my great surprise, I found it to be a particularly fine Honey Buzzard in the most splendid condition. It was strangely tame, and allowed one to handle it with perfect impunity. I stroked it all over, felt its thighs and breast, to ascertain whether it had been wounded, but could not find anything wrong. It was as plump as possible. There were no signs whatever of escape from captivity: only its very "pet" demeanour seemed to suggest that it had. But its whole aspect changed to a fierce and fighting attitude whenever any of the collies came near, when it would scream and try to strike them. It appeared to thrive, although I am afraid the diet it was supplied with (mutton cut from a braxy sheep) did not conduce to longevity. It died at the end of three weeks, and the sequel is to me personally very sad. Although, in anticipation of its fate, I had left word suited to the occasion: the poor bird's body was after some days buried in the midden, and although sought for, could not be got when I wished to resurrect it! The Honey Buzzard is certainly a strange visitant to turn up at midwinter. It is of very great rarity in Solway, and although Robert Gray says "specimens have been shot in Dumfriesshire on several occasions" ("Birds of the West of Scotland," p. 49), I have been able to authenticate only one such. That was a Honey Buzzard shot at Drumlanrig in the first week of June 1833. It has been stated that the fine specimen in a case in the Thornhill Museum is a local bird, but that is not so. That Honey Buzzard was taken to the Thornhill Museum by myself, and was shot long ago in Aberdeenshire.

Short Sunfish (*Orthagoriscus mola*).—This was found entangled, on 22nd September 1900, on the stake-nets at Port Luig, on the Stewartry coast. It was only a small specimen, its measurements being 15 inches long, 12 inches deep, and 3 inches wide across the eyes. Weight, 7 lbs. It was forwarded to the Carlisle Museum.

Blue Shark (*Prionace glauca*).—One measuring 10 feet 4 inches in length was captured in the Innerwell nets in Wigtown Bay on 17th August 1900. Its weight was given as $2\frac{1}{2}$ cwt.

Death's-Head Moth.—Continuing my notes ("Annals," October 1900, p. 249) on *Acherontia atropos*, I have to record imagos caught—one by myself, in Maxwelltown, on 25th September; one sent me from New Galloway on 4th October; one caught on the eaves of a bee-hive at Kirkpatrick Juxta on 6th October. A larva was found at Dalbeattie on 24th September.

NOTES ON BRITISH SALMONIDÆ. PART II.

By J. A. HARVIE-BROWN, F.R.S.E., F.Z.S.

(*Continued from p.* 24.)

REMARKS UPON RUNS OF FISH IN OTHER RIVERS.

IN Part I. of these notes I attempted to give an approximate account of the two rivers of Ailort and Morar, subject to further experience and observation. I now wish to make a few remarks upon certain other rivers which I know—I ought rather to say, have more or less knowledge of.

Now, it is the case that the large, and "so-called early," salmon of Loch Tay, which are caught in the very early opening of the season on that loch, are all, or nearly all, caught by trolling baits, and are rarely or never known to rise to fly. I look upon these large fish as old fish and quite as the antithesis of the large "true spring fish" which frequent the Garry and Oich, and which latter run up to an average size of 16 lbs. (*fide* A. Grimble, and others).[1] I look upon them also as the parallels of those old fish already spoken of under Part I., and as a *late run of the season*, and an early run only as regards the calendar year. In this opinion I am borne out by the experience of some of the most experienced and oldest anglers on the Tay, amongst whom I may mention the well-known firm of Anderson and Sons, Dunkeld; and in this experience I speak of both father and sons. They tell me that they have *always* looked upon these Loch Tay big fish as the latest run of the passing, or nearly past, season.

They come up fresh from the sea, resting little on the way, or not at all, until they reach Loch Tay. Loch Tay, in fact, is their great *Resting Pool* before ascending the rivers which flow into it. But, when we find a river where there are no great lake-reservoirs,—such as Tweed, Dee, Don, Deveron, and others—the late runs of heavy salmon are not in so much of a hurry to push on, nor do they attempt to populate the higher reaches, but leave these to the younger real "springers," which push on in early runs as if nothing

[1] "Salmon Rivers of Scotland."

could oppose them. In fact, the sea or the tidal portions of the river itself forms the *only resting pool* of these oldest and most worthless fish. They spawn not far above tide-mark, if not even in brackish water itself, and they benefit only the very lowest reaches of such rivers. Their flesh is inferior, and fetches a smaller price in the market. I do not refer in the above remarks to the numerous bull-trout (*Salmo eriox*) which run far up the Tweed, and Tweed's tributaries, but to the so-called "Grey-School" which keeps the bad company of these bull-trout—both inferior classes of fish. Is there any need for me to instance other rivers of similar character? Let me take one more, the Spey. In Spey, the early "springers" are small and active, rising freely to fly, and ascending rapidly as far as their first resting pools. Such may be caught far up the river: as far, indeed, as Shirramore in far Lochaber. But the *true late* "running fish" (*autumn* fish being synonymous in this case) going up to 30 lbs. or greater weights, though they rise freely on the lowest reaches of the river soon after they come up, quickly cease rising, and become sluggish. They are often seen here, as elsewhere, throwing themselves high out of water, and, as is well known to anglers, at such times they will not look at a fly. The same state of things is to be found on many other rivers known to me; and not an angler of experience but who could instance many more.

Before summing up what I have said above, I wish to make one or two side remarks which can scarcely be omitted at this point of our inquiry. I have referred to the *large true spring fish* of the Garry and the Oich (*auct.* Grimble). (Some one may think it worth while to argue that there is a parallel between the large fish of Loch Tay and the 16 lb. fish of the two rivers named, but I think I can show that there really is none.) The large (16 lb.) spring fish of Garry, etc., run right through Loch Ness, and do not rest in that sheet of water; and, immediately upon reaching the rivers, their habit of rising freely to fly, judging from a wide-spread analogy in other rivers, and a wide experience of anglers, is distinctly indicative of their true status as "springers." I believe their origin to have been from ova hatched in the newly opened up upper waters of these

rivers; and, let me add, perhaps the Morrison river also. But the entire habits of the large Tay salmon caught in January, February, and March in Loch Tay seem to me to be utterly different, and quite at variance with those of the rivers which flow into Loch Ness. Mr. Grimble refers to the action of the then Commissioners with regard to the rivers of Loch Ness and its estuary: he regrets that many other rivers of Scotland are not as liberally considered. But I am departing too far from my own fields of observation, and will here add only one more remark, and that is: it certainly seems to me, that if the late laird of these rivers —the late Mr. Ellice[1]—did catch the ear of the Commissioners of the time, and thereby "feathered his own nest" well, and granted that he did so, still, he at the same time — wittingly or unwittingly — did more. He did the best thing that has ever been done for the whole healthy improvement of the entire system of the Ness basin, as regards its salmon increase, by sea and shore and river.

And now, to sum up for the present as to these objects of our investigation: possibly it may be considered premature to attempt to arrive at conclusions such as the following, but I give them, as at least the time seems to have come when they may be discussed with some expectation of an outcome in some direction, whether in the one I try to point out, or in another. I put it, shortly, thus: If I find a river which has no great reservoirs at its sources, and if it is a river which offers sufficient inducements to fish to ascend; and if, notwithstanding these inducements, it is a *late* river, or a river which only stocks up in the late season, *then* I would be inclined to pronounce that it *ought to be* an earlier river, and would be so if it were properly treated. I would unhesitatingly pronounce that it is over-fished by bag-nets at the coast in spring, and had an insufficient estuary free of nets; that it was probably over-fished by other nets in the river itself; and that cruives and obstructions aided in its destruction. Also that illegal "snatching" of fish by poachers—the watchers not withstanding them, but only looking on in helplessness!—that poaching at the sources, and the

[1] I cannot help thinking that Mr. Ellice must have read, *and studied*, Murdo Mackenzie's pamphlet of 1860.

netting by poachers of "baggits" *before* they have spawned; that the imperfect *watching—without action*—only at the spawning time, and not before it; and neglect of the upper spawning grounds when the fresh run *spring fish first reach* their homes,—an utter disregard of the natural history of the fish, even so far as that is known: and finally, a total mismanagement of by far the greatest number of our salmon and sea-trout rivers; these are the destroying agents.

Mr. Horace Hutchinson has a very suggestive paper in the "Fortnightly Review" of August 1900. In it he says, amongst other remarks, "There are some who maintain that salmon are to be seen spawning at any time throughout the year—because salmon are to be seen on the spawning beds, as many river-watchers will testify, at any time of the year." I do not altogether admit the sequiter; but it is not my present purpose to argue that point, but to pass on to his following remarks. He goes on to say (making some interesting remarks on natural selection): "Arranging" (*i.e.* Nature arranging) "for a bigger autumnal run than used to be the case some years ago, *by reason of the decimation caused by the netting in the spring run.*" Now comes my point (the italics are mine).

As a remedial measure, Mr. Hutchinson then proposes the following: "Give the fish the chance of going up as often as they make the attempt, by closing the net-fishing in the late summer months when the results are least profitable." Now, in almost all Mr. Hutchinson says, I agree, but I would be inclined to go even a little further, and advise as follows: Give the fish as many chances as possible to run up during the *true* early runs of the species—*i.e.* the early "springers" (not necessarily on all rivers synchronous with the early spring of the calendar, as I have already attempted to show). Give the best young fish the best chances, by curtailing the netting at the river estuaries: at least—at the very least—do this upon such rivers as are fed by springs, and have no great reservoirs at their sources.—I mean on such rivers as the Dee in Aberdeenshire, the Deveron, the Tweed; and perhaps the Awe ought to be included—or rather the Orchy.

Now, it seems extremely probable, notwithstanding what

has been said to the contrary, that there are some salmon breeding over a very extended portion of the year. And we know that in many rivers and on many occasions "kelts" are found descending a river at many times in the year when fresh fish are running up. On the river Deveron, in April 1897, I was assisting in landing by hand a fish hooked by my cousin on a phantom minnow, when, to my astonishment, fresh fully developed golden eggs flowed from her, but it was evident that she had just almost completed the operation, because upon gentle pressure no more ova escaped, and the fish presented the appearance inseparable with fully spawned females. Our laird—an experienced angler—told us he had met with the same thing before, but was not prepared to try and account for it. My only object in speaking of it in this place, is to instance the fact that *all* fish (by which I mean of course here all salmon) do not spawn during the winter months.

How much the theory of Mr. Hutchinson as regards a natural provision or balance being made up by fish spawning at various times of the year may be correct, I cannot say; but our experience of the baggit on the Deveron was certainly not one met with every day. Elsewhere, I think I have related how our Sutherland fishing party found brown trout full of highly developed ova in the Gorm Lochs at the back of Benmore of Assynt, and this as late as June. As snow still lay, which was draining into these lochs, I was inclined to put down this phenomenon to natural results of the hatching temperature of the water. Indeed I think so phenomenal an occurrence as regards brown trout as I have just related could hardly have taken place were such phenomenal temperatures not present.

I will now give another instance of a salmon holding fully developed ova at what must—under our present knowledge—be considered an abnormal time. On the river Gruinard, on 19th May 1883, I killed a fish upon the Garden Pool—which pool is just *one* above the Sea Pool, and close under the garden of Gruinard House. It weighed 10½ lbs., and on the 23rd May my friend Mr. H. Alston killed another, 11 lbs., in almost exactly the same place. When these fish were viewed—first the one, and then the

other—they were unanimously pronounced to be male fish, on account of the huge "beak" on the lower jaw which each exhibited. The first was killed in the presence of the late Mr. David Murray, lessee of the Dundonnel Deer Forest and grasings (and an old and experienced angler as well as a very shrewd observer). He, quite as a matter of course, pronounced the first a male fish. Well; we took it home and cut it up to be prepared as a "kipper," *when*, to our astonishment, we found it full of highly developed ova almost ready for extrusion. This fish was perfectly fresh run from the sea, and took the fly with a most determined rush. On the 23rd, exactly the same thing again occurred to Mr. Alston, likewise in Mr. Murray's presence, and in either mine or that of the third member of our party,—Mr. Young of Glendoune,—and it also turned out to be a female fish full of large orange fully developed ova. Like the other, this fish was perfectly fresh out of the sea. When the fact—of the ova being found—was communicated to Murray (he lived less than a mile from our quarters), he recollected, once, a similar experience during the nineteen years' lease he had of Dundonnel. It took place in the same pool of the river. These fishes would, most undoubtedly, have spawned within a very few days, we consider, of the time they entered the mouth of the river. Would they then have retired, as soon as possible after spawning, to the tidal water or the sea? I certainly believe they would. The tidal water at the mouth of the Gruinard is of very limited scope, as the river runs almost directly into salt water. How, I want to ask, are these huge "beaks" found upon two female fishes to be accounted for, except as the development of *great age* in the individuals? On the same river Young and I found kelted sea-trout descending the water at the same time that fresh run salmon were ascending; and we also met with a "fearful kelted salmon" coming down even later, viz., in June. I had also landed a huge ugly kelt of 17 lbs. once on the Deer Pool of the river Inver as late in the season as the 25th of July. Of course it was in the most disgusting stage of gill-discoloration and raggedness. Had that river been my own property, I would as soon have put that fish back as I would have put back a pike. (Perhaps (?) some one

might, with such a recommendation as that, put me on as a river-watcher and give me a free hand!) I have dwelt at some length upon these instances, because I think the bearing upon other facts ought to be realised, whether I have alluded to them already, or whether I may allude to them again later on.

Returning once more with special reference to sea-trout, we find considerable significance in such paragraphs as the following which I cut out of a local (Aberdeen) paper. The writer says simply: "This fine edible fish (the sea-trout) is steadily on the decrease all along the seaboard of the country. Even in our estuaries, anglers lament the absence of adolescent *Salmo trutta* of 2 lbs., 3 lbs., and even 4 lbs., which used to adorn their baskets in days gone by." Then, as usual, shying the real cause, or not realising it, the writer goes on to say: "From *whatever causes* (!) it is a patent fact that salmon trout have been steadily on the decline during the past thirty years."

Observe: that the following combination of circumstances—a prolonged *chain of destruction*—cannot fail to bring about a worse and more lugubrious wail from *kelt-anglers* and more legitimate fishermen in the near future unless *something be done.* Thus, we have the juvenile "finnocks" killed literally by the thousand by tidal anglers in the early spring. No wonder they complain about the scarcity of adolescent sea-trout of from 2 to 3, or even 4 lbs., such as used to "grace their baskets." We have these 2, 3, or 4 lb. trout being killed at the same time by the stake and bag-nets on the coast: at least nets of fair mesh, as allowed by present laws, take those adolescent sea-trout of the greater weights. Then again, we find that the "baggits," at or near the sources of many of the best rivers, have practically no protection from bands of professional poachers who harry the water unchecked, who "snatch" fish under the very eyes of the *watchers*—often admirably and satirically so called! And yet again, as soon as fresh run fish reach their spawning grounds, eagle eyes *watch* for their arrival, and soon *account* for many. Thus the candle burns at both ends. What can be expected? Besides, not content with this *sliding down-*

grade, our law permits a preservation of big, old, late-running —and though big and old and late, *less valuable*— fish, acting as river-vermin, to the depletion still further of its young fry and younger and healthier fish.[1] This is often done in the sole interests of the time-being netsmen. When *they* make a fortune, it will be time enough for them to pose as "Upper Proprietors," and even purchase Riparian Properties!

As I am on the subject of poaching and unnatural ways of killing salmon and sea-trout; and as I am in some measure only adding testimony to Mr. Grimble's work, I may be allowed to refer to the poaching of sea-trout by "schringing" from yachts, and by yachts' crews. To Mr. Grimble's remarks, speaking of Glen Dhu in Sutherland (p. 16 of vol. iii.), I can add the testimony that, many years before he made his observation, I saw a fine large yacht slowly steam down past Kylesku, flaunting her "schringe-nets" openly, hung up to dry in the shrouds. She came from Glen Dhu. Comment is, or ought to be, unnecessary!

The moral appears to me to be: Yachts ought to be made by law to carry their identity—name painted fore and aft, and club-flag flying when within a specified distance of the shores, or at anchor. Private owners might do this without the assistance of the law, and make it a condition when letting their vessels to others, that they preserve the identity of their yachts, if only for the purpose of preserving their own (*i.e.* the owners') good names. If some such plan were followed, some of these poaching yachts[2] could not easily prosecute this illegal fishing without considerably more risk to themselves than at present, or than might be pleasant for them.

Stones and iron hooks, no doubt, may be good and effective preventatives (?); but that which private individuals do for their own protection, ought to be carried out more systematically and thoroughly by our legislators who *make laws*. And when laws are put upon the roll, the ways and

[1] Of this we may have more to say again. In Tweed a vast mortality amongst salmon took place after spawning in early January 1901.

[2] By some recent statistics (I cannot recall exactly) some 5000 yachts frequent our West Coast in summer—good, bad, and indifferent.

means of enforcing them should occupy more of their attention than these have hitherto done.

Mr. Duncan Dorroch, more than twenty years ago, reported to the then Commissioners, *at their request*, as regards his own river—the Torridon—upon similar subjects, and Mr. Grimble speaks in high terms of the sensible nature of all his remarks ; but since then nothing has been done. Granting there are difficulties to overcome—mostly, *we fear*, commercial and political (?)—surely some step might have been made in the right direction, and the matter not left so completely stranded as it undoubtedly has been.

As regards the fixing of the limits of the various estuaries, alas, there still appears to be the same listless, short-sighted policy, and *letting drift* the old, *old* reports of the Commissioners of the Act of 1862. Mr. Grimble wisely advises that this should promptly be revised (*v.* pp. 26 and 27). He also instances the Beauly as a river participating in some measure with the Ness in the advantages of a far-out limit. Interested parties have since applied to have this estuary shifted seven miles farther *up*—a very decidedly retrograde proposal. And now, the poor seals get the heavy end of the reproach, whereas in all common sense surely there might be enough fish for both the seal and the salmon-fisher. Where there are no salmon there are less likely to be seals—at least on the East Coast estuaries. We hope we will never see the day when any such retrograde legislation will be passed ; as if we do, then the later state of our Salmon Commissioners will prove to be worse than the earlier ones, who fixed ("for ever") these *absurd* limits of many of our rivers, to apparently suit the palates of the epicures and the pockets of the netsmen.

Now, it is over forty years since a far-seeing and most able essay was written by Murdo Mackenzie, the old laird of Dundonnel—"A View of the Salmon Fishery of Scotland" (Blackwood & Sons, Edinburgh, 1860).

Since that able essay appeared, instead of any improvement having been made by our salmon legislators, everything has been steadily, and at some localities rapidly, going from bad to ten times worse. Strange that one of these rapidly declining river-fisheries should be *that* from

which the laird of Dundonnel took most of his inspiration. This surely cannot be held to reflect upon him! It was here that the estuary lines were fixed by the 1862 Commissioners, —mostly *strangers to the locality*,—which, were it not sad, would be, yea, are absolutely laughable on account of their self-condemnatory *silliness*. One end of the line was set upon a rock, which was isolated from the shore or joined to the shore only at high and low spring tides! As if that were not rough enough upon Murdo Mackenzie's written account, dating only two years earlier, the coast of the whole bay of Gruinard has been staked and bag-netted throughout its entire circumference; and, in 1884, I was one of a party of anglers who pointed out to a later Salmon Commissioner a net-fishing illegality within even that *silly* limit. His duty was, as we were told, *only to report!* We did not return to fish this river after two disastrously bad seasons, and I am not aware whether this illegal net was ever stopped. Judging, however, from other experiences, I fancy it was not *likely* to be! Since then—*i.e.* since 1884—the river has gone from bad to worse; indeed, since 1860, when Mackenzie wrote, this has been going on.

"Three Ross-shire Midges" wrote some account of the state of things on this river in the volume of "The Field" of that year (1884),—if I remember it was in October and November of the same year, 1884,—which letter or article had the approbation of the three lessees of the river-fishings, both under the Dundonnel rights, and the single rod under the rights of the late Mrs. Catton, and indeed was carefully prepared under their supervision, and was read over to Mr. A. Young, then Inspector of Salmon Fisheries for Scotland. This article contained a revelation as regards the very lenient treatment of the illegal working of the nets in Gruinard Bay. Verily may the passages in the preface to Mackenzie's tract be once more re-perused, especially by those who now are engaged upon the New Commission on our Salmon Fisheries; and I hope it is not too much to ask that the article referred to in "The Field" be read also.

Without quoting further, or saying any more on this disagreeable series of facts, I will only now refer to one

more recent article, which may not so easily meet the Argus (?) eyes of those appointed to the Commission—I say I need not refer to this further than by name. It has for title, "A Declining Industry," and appears in the "Yorkshire Herald" of 7th September 1900—no longer ago. And I will only add that this article urges upon our *Fishery Boards* and Conservators (not to say the *New Royal Commission* on our Salmon Fisheries) a prompt attention and a prompt remedy, after these many years of what would almost appear a wilful neglect of all common-sense information and endeavour by others.

A CONTRIBUTION TO THE ENTOMOLOGY OF ABERDEEN.[1]

By J. Mearns.

The following list is the result of many years' collecting within an average radius of ten miles of Aberdeen. All the species named have been obtained by myself.

As to the identification of the specimens, that may be taken with every confidence, when I state that the Coleoptera have been examined by the Rev. Canon Fowler, M.A., F.L.S.; most of the Hymenoptera-Aculeata by Mr. E. Saunders, F.L.S.; the Odonata by Mr. R. M'Lachlan, F.R.S.; most of the Diptera by the Rev. E. M. Broomfield, M.A., F.E.S., nearly all of which have since been examined by Mr. Percy Grimshaw, F.E.S., who also determined some others of them. To all these gentlemen my most sincere thanks are due; for without the kindly help rendered by them, my work could not have been presented with any confidence, as it now is.

DIPTERA.[2]

Pulicidæ.

Pulex irritans, *L.*—On man.

P. sciurorum, *Bouché.*—On squirrel.

P. canis, *Dugès.*—On dog and fox.

[1] Mr. William Evans has kindly edited this paper at our request.—Eds.

[2] Nomenclature of Verrall's "List of British Diptera."

MYCETOPHILIDÆ.

Sciophila fasciata, *Zett.*—Hazlehead, May.

BIBIONIDÆ.

Dilophus febrilis, *L.*—Hazlehead and Banchory, June and July.
Bibio pomonæ, *F.*—Aberdeen Links, July.
B. nigriventris, *Hal.*—Hazlehead, July.
B. Johannis, *L.*—Hazlehead, July.

SIMULIDÆ.

Simulium reptans, *L.*—Banchory, July.

CHIRONOMIDÆ.

Chironomus plumosus, *L.*—Nigg, June.

PTYCHOPTERIDÆ.

Ptychoptera paludosa, *Mg.*—Banchory, etc., July.
P. albimana, *F.*—Aberdeen Links, etc., June.

LIMNOBIDÆ.

Symplecta punctipennis, *Mg.*—Banchory, July.

TIPULIDÆ.

Phalacrocera replicata, *L.*—White Stripes, near Aberdeen.
Dolichopeza sylvicola, *Curt.*—Invercannie, July 1898.
Pachyrrhina maculosa, *Mg.*—Aberdeen, etc., August.
Tipula ochracea, *Mg.*—Near Aberdeen, August.
T. Dianæ, *Mg.*—Whitestripes, July.

RHYPHIDÆ.

Rhyphus fenestralis, *Scop.*—Invercannie, July.

STRATIOMYIDÆ.

Sargus infuscatus, *Mg.*—Rubislaw Den, September.
Chloromyia formosa, *Scop.*—Mouth of Don and Aberdeen Links, July.
Microchrysa polita, *L.*—Hazlehead, July.

Tabanidæ.

Hæmatopota pluvialis, *L.*—Near Aberdeen.

H. crassicornis, *Whlbg.*—Maryculter, near Aberdeen.

Therioplectes solstitialis, *Mg.* ?—Invercannie, near Banchory, July.

Atylotus fulvus, *Mg.*—Invercannie, 19th July 1898.

Tabanus cordiger, *IV.*—Invercannie, 19th July 1898. An addition to the Scottish list.

Chrysops cæcutiens, *L.*—Whitestripes and Scotston Moor, June.

C. relictus, *Mg.*—Loch of Skene and Maryculter, June.

Leptidæ.

Leptis scolopacea, *L.*—Aberdeen Links, June and July.

L. tringaria, *L.*—Aberdeen Links, June and July.

L. lineola, *F.*—Hazlehead, July.

Chrysopilus auratus, *F.*—Hazlehead, July.

Symphoromyia crassicornis, *Pz.*—Hazlehead, July.

Asilidæ.

Dioctria rufipes, *Deg.*—Banchory and Aberdeen Links, July.

Laphria flava, *L.*—Invercannie, September 1889, ♂ and ♀. These specimens are now in the British Museum.

Epitriptus cingulatus, *F.*—Murcar Links, June and July.

Therevidæ.

Thereva nobilitata, *F.*—Aberdeen Links, June and July.

T. annulata, *F.*—Murcar Links, June.

Empidæ.

Hybos grossipes, *L.*—Hazlehead, July.

Rhamphomyia nigripes, *F.*—Hazlehead, July.

Empis tessellata, *F.*—Aberdeen Links, June and July.

E. stercorea, *L.*—Hazlehead, July.

E. trigramma, *Mg.*—Hazlehead, July.

Hilara matrona, *Hal.*—Hazlehead, July.

Ocydromia glabricula, *Fln.*—Near Banchory, July.

Clinocera fontinalis, *Hal.*—Aberdeen Links, July.

Dolichopodidæ.

Dolichopus atripes, *Mg.*—Nigg, June.

D. atratus, *Mg.*—Banchory, July.

D. plumipes, *Scop.*—Aberdeen Links.

Syrphidæ.

Paragus tibialis, *Fln.*—Invercannie, July.

Pipiza noctiluca, *L.*—Near Banchory, July.

Chrysogaster metallina, *F.*—Aberdeen Links, July.

C. hirtella, *Lw.* (=*Macquarti*).—Invercannie, July.

Chilosia sparsa, *Lw.*—Banchory, etc., July.

C. chloris, *Mg.*—Near Banchory, July.

C. flavimana, *Mg.*—Banchory, July.

C. œstracea, *L.*—Hazlehead, August.

Leucozona lucorum, *L.*—Hazlehead, August.

Melanostoma mellinum, *L.*—Scotston Moor, May.

Pyrophæna ocymi, *F.*—Invercannie in July, and Murcar Links and Muchalls in August.

Platychirus manicatus, *Mg.*—Common on Dee in July.

P. albimanus, *F.*—Common on Dee in June.

P. peltatus, *Mg.*—Banchory, July.

P. scutatus, *Mg.*—Banchory, July.

P. scambus, *Stæg.*—Countesswells, near Aberdeen, July.

P. clypeatus, *Mg.*—Banchory, July.

Didea intermedia, *Lw.*—Invercannie, July.

Syrphus lasiophthalmus, *Ztt.*—Invercannie, July.

S. punctulatus, *Ver.*—Banchory, July.

S. compositarum, *Ver.*—Near Banchory, July.

S. cinctus, *Fln.*—Invercannie, July.

S. cinctellus, *Zett.*—Near Banchory, July.

S. balteatus, *Deg.*—Near Aberdeen, June.

S. luniger, *Mg.*—Invercannie, July.

S. corollæ, *F.*—Invercannie, July.

S. ribesii, *L.*—Scotston Moor, August.

S. grossulariæ, *Mg.*—Banchory, Invercannie, etc., in June, July, and August.

S. topiarius, *Mg.*—One specimen of this rare species taken at Invercannie, July 1899.

S. annulipes, *Ztt.*—Invercannie, July.

S. tricinctus, *Fln.*—Invercannie, July.

S. lunulatus, *Mg.*—Invercannie, July.

S. albostriatus, *Fln.*—Invercannie, July.

S. laternarius, *Müll.*—Loch of Skene, July.

S. glaucius, *L.*—Loch of Skene, July.

S. venustus, *Mg.*—Bishop Loch, July.

Catabomba pyrastri, *L.*—Near Aberdeen, June.

Sphærophoria dispar, *Zw.*—Near Aberdeen, June.

S. picta, *Mg.*—Banchory, July.

S. menthastri, *L.*—Banchory, July.

Baccha elongata, *F.*—Invercannie, July.

Ascia podagrica, *F.*—Near Aberdeen, August.

A. floralis, *Mg.*—Invercannie, July.

Rhingia rostrata, *L.*—Hazlehead and Nigg, June and July.

Volucella bombylans, *L.*—Near Banchory, June and July

V. pellucens, *L.*—Banchory and Culter, July and August.

Sericomyia borealis, *Fln.*—Banchory and Culter, July.

S. lappona, *L.*—Scotston Moor, etc., June to August.

Arctophila mussitans, *F.*—Countesswells and Hazlehead, July and August.

Eristalis sepulchralis, *L.*—Aberdeen Links, from June to August.

E. tenax, *L.*—Aberdeen Links, from June to August.

E. intricarius, *L.*—Aberdeen Links, etc., June and July.

E. arbustorum, *L.*—Aberdeen Links, etc., June and July.

E. rupium, *F.*—Banchory and Loch of Skene, July.

E. pertinax, *Scop.*—Loch of Skene, July.

E. horticola, *Deg.*—Loch of Skene, July.

Helophilus trivittatus, *F.*—Aberdeen Links, June and July.

H. hybridus, *Zw.*—Aberdeen Links, June and July.

H. pendulus, *L.*—Aberdeen Links, June and July.

H. lineatus, *F.*—Bishop Loch, July.

H. lunulatus, *Mg.*—Bishop Loch, July.

Merodon equestris, *F.*—Hazlehead, June.

Xylota segnis, *L.*—Banchory, July.
X. florum, *F.*—Neatherley, Kincardineshire, July 1898.
X. sylvarum, *L.*—Banchory, July.
Syritta pipiens, *L.*—Near Aberdeen, June to July.
Chrysotoxum arcuatum, *L.*—Banchory, July.

Conopidæ.

Conops quadrifasciatus, *Deg.*—Banchory, September.
C. ceriiformis, *Mg.*—Invercannie, one.
Sicus ferrugineus, *L.*—Banchory, July.

Œstridæ.

Cephenomyia auribarbis, *Mg.*—Larvæ on head of Red Deer.

Tachinidæ.

Echinomyia grossa, *L.*—Hazlehead and Invercannie, etc., July.
Micropalpus vulpinus, *Fln.*—Countesswells, August.
Nemoræa radicum, *F.*—Rubislaw Den, August.
Exorista cheloniæ, *Rond.*—Rubislaw Den, August.
Siphona geniculata, *Deg.*—Scotston Moor, September.

Sarcophagidæ.

Sarcophaga carnaria, *L.*—Everywhere from May to September.
Cynomyia mortuorum, *L.*—Mouth of Don and Dee, June to August.

Muscidæ.

Lucillia cornicina, *F.*—Aberdeen Links, June.
L. Cæsar, *L.*—Aberdeen Links, June.
L. sericata, *Mg.*—Aberdeen Links, June.
Calliphora grœnlandica, *Ztt.*—Aberdeen Links, July.
C. erythrocephala, *Mg.*—Aberdeen Links, July.
C. vomitoria, *L.*—Aberdeen Links, July.
C. sepulchralis, *Mg.*—Aberdeen Links, July.
Pollenia vespillo, *F.*—Rubislaw Den, August.
P. rudis, *F.*—Rubislaw Den, August.
Musca domestica, *L.*—Everywhere.

Pyrellia lasiophthalma, *Mcq.*—Aberdeen Links, June.
Mesembrina meridiana, *L.*—Hazlehead, August.
Graphomyia maculata, *Scop.*—Countesswells, September.
Morellia hortorum, *Fln.*—Countesswells, August.

Anthomyidæ.

Polietes lardaria, *F.*—Near Aberdeen.
Hyetodesia semicinerea, *IV.*—Aberdeen Links, July.
H. erratica, *Fln.*—Braes of Don, June.
H. basalis, *Ztt.*—Braes of Don, June.
Mydæa pagana, *F.*—Aberdeen Links, June and July.
M. impuncta, *Fln.*—Aberdeen Links, June and July.
Spilogaster communis, *Dse.*—Rubislaw Den, July.
S. depuncta, *Fln.*—Old Aberdeen Links, June.
S. nigrinervis, *Ztt.*—Old Aberdeen Links, June.
Limnophora compuncta, *IV.*—Loch of Skene, July.
Hydrotæa palæstrica, *Mg.*—Rubislaw Den, August.
Drymeia hamata, *Fln.*—Loch of Skene, August.
Hydrophoria conica, *IV.*—Aberdeen Links, August.
Hylemyia strigosa, *F.*—Scotston Moor, June.
Homalomyia canicularis, *L.*—In houses, from January.

Cordyluridæ.

Norellia spinimana, *Fln.*—Scotston Moor, August.
Hydromyza Falleni, *Schin.*—Scotston Moor, July.
Scatophaga lutaria, *F.*—Near Aberdeen, August.
S. stercoraria, *L.*—Common everywhere.
S. squalida, *Mg.*—Old Aberdeen Links, July.
S. villipes, *Ztt.*—Old Aberdeen Links, July.

Helomyzidæ.

Helomyza lævifrons, *Lw.*

Sciomyzidæ.

Dryomyza anilis, *Fln.*—Near Aberdeen.
D. flaveola, *F.*—Hazlehead and Rubislaw Den, August.
Tetanocera elata, *F.*—Hazlehead and Rubislaw Den, August.

T. ferruginea, *Fln.*—Hazlehead and Rubislaw Den, July.
T. robusta, *Lw.*—Braes of Don, July.
T. reticulata, *L.*—Hazlehead, August.

PSILIDÆ.

Psila fimetaria, *L.*—Hazlehead, July.

ORTALIDÆ.

Pteropæctria frondescentiæ, *L.*—Invercannie, July.

TRYPETIDÆ.

Trypeta onotrophes, *Lw.*—Invercannie, July.
Urophora solstitialis, *L.*—Near Banchory, July.
Tephritis miliaria, *Schrk.*—Near Banchory, July.

LONCHÆIDÆ.

Lonchæa vaginalis, *Fln.*—Banchory, July.
Palloptera umbellatarum, *F.*—Banchory, July.
P. arcuata, *Fln.*—Invercannie, July.

SAPROMYZIDÆ.

Sapromyza præusta, *Fln.*—Banchory, July.
S. rorida, *Fln.*—Invercannie, July.
Lauxania ænea, *Fln.*—Banchory, July.

OPOMYZIDÆ.

Balioptera combinata, *L.*—Banchory, July.
Opomyza germinationis, *L.*—Hazlehead, August.

SEPSIDÆ.

Nemopoda cylindrica, *F.*—Near Aberdeen, June to August.
Cheligaster putris, *L.*—Scotston Moor, July.

CHLOROPIDÆ.

Meromyza pratorum, *Mg.*

(*To be continued.*)

RECORDS OF SCOTTISH PLANTS FOR 1900, ADDITIONAL TO WATSON'S "TOPOGRAPHICAL BOTANY," 2nd Ed. (1883).

By Arthur Bennett, F.L.S.

THESE records are now becoming much less in number, as might be expected. After Dr. Trail's "Topographical Botany of Scotland" is complete, a return may be made to the first idea of these records, *i.e.* Notes, etc., to accompany them.

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"; *sp.* denotes that a specimen was sent me, and ! denotes that I have seen a specimen labelled as from the county.

74. Wigtown.

Rubus argenteus, *P. J. Mueller*. *Druce* in "Ann. S. N. H.," 1900, p. 252.

84. Linlithgow.

(All *A. Somerville* and *J. Renwick*, *sp.*)

Fumaria Vaillanti.
Polygala serpyllacea.
†Pyrus Aria.
„ Aucuparia, making the Scotch counties complete for this species.
Taraxacum palustre.
Carex pilulifera.

92. South Aberdeen.

(*Druce*, in "Ann. S. N. H.," 1901, p. 35.)

Caltha radicans, Forst.
Ranunculus Steveni, Andrz.

99. Dumbarton.

Rubus Rogersii, Linton
„ nitidus
Epilobium obscurum
Circæa alpina
Hieracium auratum, Fr.
} All *fide Rev. E. S. Marshall.*

Pyrola minor, *A. Somerville*, *sp.*
„ secunda, *L. Watt*, *sp.*, on red sandstone rocks at 350 ft.

100. Clyde Isles.

Rubus Rogersii, Linton
,, damnoniensis, Bab.
Rosa involuta, *sp.*
Callitriche autumnalis, *sp.*
Arctium intermedium, Lange, *sp.*
Glyceria plicata, *sp.*
} All *Rev. E. S. Marshall.*
Sparganium ramosum, *F. C. Crawford*, 1898.

101. Cantire.

Thalictrum alpinum, *G. C. Adeney*, *ex* C. E. Salmon!
Arabis Thaliana, *J. M'Rae*, *ex* A. Somerville.

106. East Ross.

Silene acaulis
Trifolium medium
Hieracium globosum
,, Backhousei, F. J. Hanb.
} *Rev. E. S. Marshall.*

107. East Sutherland.

(All *Rev. E. S. Marshall, sps.*)

Thalictrum alpinum.
Dryas octopetala.
Saxifraga oppositifolia.
Cornus suecica (P. Auth.).
Arctostaphylos alpina.
Polygonum viviparum.
Salix Myrsinites.
Orchis incarnata.

108. West Sutherland.

(All *Rev. E. S. Marshall*, with *sps.*, except where stated.)

Fumaria Boræi.
Cerastium semidecandrum.
Spergularia marginata (*var.* or *sub-sp.*).
Hieracium argenteum.
Pyrola rotundifolia.
Salsola Kali.
Betula alpestris, Fr. (new to Scotland).
Juniperus intermedia.
Zostera marina, *var.* angustifolia.
Habenaria conopsea × viridis, *ms.*
,, albida × conopsea, *ms.*
Carex curta.
,, Hornschuchiana × flava, lepidocarpa.
,, Hornschuchiana × Œderi.
†Avena fatua and strigosa, *ms.*

109. Caithness.

(All *Rev. E. S. Marshall*, with *sps.*)

Barbarea arcuata.
Erophila præcox.
Viola silvestris, Reich. (= Viola Reichenbachiana). This is common in Scandinavia, while R. Riviniana, Reich., is rare.
Hieracium euprepes, F. J. Hanb.
Symphytum tuberosum, "from a native station."
Carex Goodenovii × aquatilis.
,, Hornschuchiana × flava, lepidocarpa.

110. Outer Hebrides.

Radiola millegrana, *W. J. Gibson, sp., ex* A. Somerville.

111. Orkney.

(All *Rev. E. S. Marshall*, with *sps.*, with three exceptions.)

Fumaria pallidiflora.
Cochlearia grœnlandica, L.
Spergularia marginata, *var.* or *sub-sp., ms.*
Hieracium Orarium, Lindeb., *ms.*
Sparganium simplex. In brackets in "T. B.," *ms.*
C. Hornschuchiana × Œderi.
Glyceria plicata.

112. Shetland.

Erodium cicutarium, Centaurea Cyanus, confirmed } *W. H. Beeby.*

ADDITIONAL RECORDS TO TOPOGRAPHICAL BOTANY OF SCOTLAND.

By Robert Smith, B.Sc.

[In the course of the past summer Mr. Smith sent me these records as a help towards the work in which I have been engaged for some time, and with permission to use them as I thought best. As showing that amidst the heavy labour of the task undertaken by him of working out the plant associations of Scotland he sought to help other workers, as well as in their value as records of new localities, they deserve publication.—J. W. H. Trail.]

Stellaria nemorum, *L.*—(85) Fife, in Birkhill Woods, Balmerino, 1898.

Arenaria peploides, *L.*—(89) East Perth. Abundant on old harbour works at Kingoodie, 1896.

Geranium phæum, *L.*—Well established in (89) East Perth, in Den of Rait, 1898; (90) Forfar, in Ballumbie Den, 1898, and at Tealing, 1894.

Vicia gemella, *Crantz.*—(90) Forfar, at Arbroath Cliffs, 1896.

Galium Mollugo, *L.*—(90) Forfar, near Baldragon, 1899, and near Monifieth, 1894.

Petasites fragrans, *Presl.*†—(90) Forfar, in Den of Mains, 1888.

P. albus, *Gærtn.*†—(90) Forfar, in Duntrune Den, 1894.

Doronicum Pardalianches, *L.*†—(85) Fife, in St. Fort Woods, near Newport, 1892; (90) Forfar, Duntrune Den, 1890.

D. plantagineum, *L.*†—(90) Forfar, in Duntrune Den, 1890.

Erica Tetralix, *L.*—(78) Peebles, on Pentlands, near West Linton, 1897, and on Cloich Hills.

Anchusa sempervirens, *L.*†—(90) Forfar, in Duntrune Den, 1890.

Linaria Cymbalaria, *L.*†—(90) Forfar, casual around Dundee.

Utricularia intermedia, *Hayne.*—(85) Fife, in Forgan Bog, near Newport, 1892.

Pinguicula vulgaris, *L.*—(78) Peebles, on the Pentlands, near West Linton, 1897.

Goodyera repens, *R. Br.*—(85) Fife, in St. Fort Woods, near Newport, 1893.

Epipactis latifolia, *All.*—(85) Fife, in Pitreavie plantation, near Dunfermline, 1896; Kinross, in plantation beside Loch Leven, 1897.

Luzula maxima, *DC.*—(78) Peebles, on Cloich Hills, 1899.

Eriophorum vaginatum, *L.*—(78) Peebles, on Cloich Hills, 1899.

Schœnus nigricans, *L.*—(85) Fife, in Forgan Bog, near Newport, 1889.

Carex echinata, *Murray.*—(78) Peebles, on Pentlands, near West Linton, 1897.

C. lævigata, *Sm.*—(78) Peebles, on Pentlands, near West Linton, 1897.

Molinia varia, *Schranck.*—(78) Peebles, abundant on Moorfoot, Cloich, and Pentland ridges.

NOTES ON THE FLORA OF FORFARSHIRE.

By G. Claridge Druce, M.A., F.L.S.

Thalictrum dunense, *Dumort.*—Lunan Bay.

Ranunculus heterophyllus, *Weber, ex* Wigg.—Rescobie.

R. Lingua, *L.*—A form with rather more hairy leaves than usual occurred at Rescobie.

Cardamine pratensis, *L.*—The true plant with sessile leaflets grew with *C. palustris*, Petermann, in a marsh at Rescobie.

Viola tricolor, *L.*, *V. saxatilis* (Schmidt), var. *Sagoti* (Jord.).—Near Forfar.

Cerastium tetrandrum, *Curt.*—On the coast near Lunan Bay.

Spergula sativa, *Boenn.*—Forfar.

Arenaria serpyllifolia, *L.*, var. *scabra*, Fenzl.—Burnside.

Erodium cicutarium, *L'Hér.*, var. *micranthum*, Beck.—Lunan Bay.

Vicia Cracca, *L.*—With curious steel-blue coloured flowers at Lunan Bay.

Rubus Selmeri, *Lindeb.*—Near Forfar.

Potentilla palustris, *Scop.*, var. *villosa*, S. F. Gray ("Nat. Arr.," ii. 581).—In a marsh at Rescobie.

Alchemilla vulgaris, *L.*, var. *alpestris* (Schmidt).—At Rescobie, with the var. *pratensis* (Schmidt).

Cratægus Oxyacantha, *L.* (*C. monogyna*, Jacq.).—With barren fruits, near Forfar. Herr Freyn queries it as a hybrid with *C. oxyacanthoides;* but I saw no specimens of the latter plant at Forfar.

Callitriche intermedia, *Hoffm.* (= *C. hamulata*, Kuetz.).—Rescobie.

Pimpinella Saxifraga, *L.*, var. *major*, Koch.—By the shores of Lunan Bay.

Galium elongatum, *Presl.*—Rescobie Marsh.

Myrrhis Odorata, *Scop.*—Near Restennet.

*Artemisia Stelleriana, *Bess.*—This native of Kamtschatka, which has become quite naturalised on the sandy coast of Scania in Southern Sweden, in Oeland, and along the eastern freeboard of the United States for some distance, also appeared in quantity on the coast of Co. Dublin. In the latter place strong evidence was given to show that it had escaped, or been accidentally conveyed to the coast from Lord Ardilaun's garden, where it had been used as a bedding plant. The curious point in all the cases where it has been found is that

the plant did not grow in the nearest vegetative zone to the sea, where we might expect to see it if it had been cast up by the waves, but in the higher zone, among *Psamma* and *Eryngium*, which are only occasionally within the reach of surf. In the case of the Irish plants, the only portion where refuse was taken from Lord Ardilaun's garden was separated by a creek a quarter of a mile wide from the locality where the wild plant occurred, well above ordinary water-mark. More recently I gathered it in the *Psamma* zone on the coast of Cornwall, between Penzance and Marazion; but this part of the coast is notoriously the home of many foreign plants; though, so far as I know, none of them could be referred to Kamtschatkan or even to Scandinavian origin. Professor Areschoug, in an interesting and weighty paper, gave reasons for assuming the plant to be a relic of an Altaian flora which had been gradually driven out by a more recent invasion of species of an Atlantic type; and he considered it to be a native of Scania. This year, while botanising with the Rev. H. J. Riddelsdell and Mr. Knox, I found a solitary specimen on the sand dunes of Lunan Bay, Forfarshire, where it was associated with *Psamma* and *Elymus*. I have made extensive inquiries, and find that, while it is not sold by nurserymen in that district of Scotland, it is actually grown in the garden of Glammis Castle in Forfarshire, from which I have specimens; but these specimens are not identical with the form I gathered at Lunan Bay; nor do I think it at all likely that the garden was the source which supplied it. It must be remembered that the latitude of Lunan Bay and of Scania is very similar, and that it is more probable that we owe its occurrence to some bird, unless, indeed, Professor Areschoug is correct in his hypothesis. Certainly the discovery of the *Artemisia* in other localities on the northern and eastern coasts of Scotland would do much to support his idea.

Carduus nutans, *L.*—Near Forfar.

*Gentiana uliginosa, *Willd.* (*G. axillaris*, Schmidt, var. *annua*).—Foliis basilaribus spathulatis. Near Forfar.

Utricularia major, *Schmidt* (= *U. neglecta*, Lehm.).—In a marsh near Forfar.

Symphytum tuberosum, *L.*—Near Lunan Bay.

Pneumaria maritima, Hill (*Mertensia*).—Sparingly on the shingle between Lunan Bay and Redhead, pointed out to me by my friend Mr. John Knox.

Euphrasia scotica, *Wetts.*—Glen Dole, 1882.

E. brevipila, *Burn.* and *Gremli.*—Clova, 1882.

E. gracilis, *Fries.*—Clova, 1882.

Polygonum aviculare, *L.*, var. *monspeliense* (Thiebaud, in "Pers. Syn." i. 439; as a species, Beck, "Fl. Nieder-Oester," i. 322; var. *vegetum*, Ledeb., "Fl. Ross.," iii. 532).—A luxuriant form, which I should have referred to var. *arenastrum*, is named as above by Herr Freyn. It occurred on bare ground near Forfar.

Chenopodium opulifolium, *Schrad.*—In the enclosure where street refuse is deposited, Forfar.

*Atriplex laciniata, *L.*—On the sands of Lunan Bay.

Salix pentandra, *L.*—A form with small leaves grew with the type at Rescobie.

*S. Smithiana, *Willd.*—Near Lunan Bay.

Quercus Robur, *L.* (*Q. pedunculata*, Ehrh.).—Near Burnside, Forfar.

Q. fœmina, *Miller* ("Gard. Dict.," 8th ed., 1768) (= *Q. sessiliflora*, Salisb.).—Near Rescobie, etc.

Betula alba, *L.* (*B. verrucosa*, Ehrh.).—Rescobie.

B. pubescens, *Ehrh.*—Near Burnside, Forfar.

Sparganium erectum, *L.*, var. *microcarpum* (Neum.).—Rescobie.

Orchis incarnata, *L.*, var. *lanceata* (Reichb.).—In a marsh at Rescobie. Agrees excellently with Reichenbach's plant.

Allium oleraceum, *L.*—On the cliffs near Lunan Bay.

A. carinatum, *L.*, var. *bulbiferum.*—On a cliff overhanging Lunan Bay, *teste* Freyn. This requires verification.

Carex vulpina, *L.*—Lunan Bay.

Carex aquatilis, *Wahl.*, var. *epigeios*, Fries.—Clova tableland.

C. lepidocarpa, *Tausch.*—Rescobie, *teste* Pfarrer Kükenthal.

C. Œderi, *Retz* (*C. flava*, var. *cyperoides*, Marss.).—Border of Rescobie Loch.

C. paniculata, *L.*, var. *simplicior*, Anders.—Rescobie.

Phleum pratense, *L.*, var. *nodosum* (L.).—Near Forfar.

Kœleria cristata, *Pers.*, forma *humilis.*—On the cliffs of Lunan Bay with *Astragalus danicus*, *Vicia sylvatica*, *Trifolium striatum*, *Cerastium tetrandrum*, etc.

*Panicularia plicata, *Druce* (*Glyceria plicata*, Fries).—In Forfar Marsh.

P. maritima, *Kuntze* (*Glyceria maritima*, Mert. and Koch).—A small slender form on the coast near Lunan Bay.

Festuca rubra, *L.*—Forfar, Arbroath, etc.
sub.-var. *juncea*, Hack.—Shores of Lunan Bay.

F. arundinacea, *Schreb.*, var. *strictior*, Hack., "between var. *strictior* and var. *pauciflora*" (*teste* Hackel).—Sandy coast near Lunan Bay.

Arrhenatherum precatorium, *Beauv.*—Near Forfar.

Phragmites communis, *Trin.*, var. *nigricans*, Gren. and Godr.—Rescobie.

Agropyron junceum, *Beauv.*—On the sands of Lunan Bay, with *Elymus europæus.*

NOTES ON WEST ROSS PLANTS.

By Arthur Bennett, F.L.S.

In the "Transactions of the Botanical Society of Edinburgh," November 1894, Mr. G. C. Druce gave a paper—'Contributions towards a Flora of West Ross,' pp. 112-171 The following notes make a few additions, or put queries, to that paper:—

Drosera intermedia, *Hayne.*—This may stand on the authority of Mr. A. Evans, 1890.

Geranium lucidum, *L.*—Mr. P. Ewing, 1891.

Hypericum perforatum, *L.*—Mr. P. Ewing, 1891.

Myriophyllum spicatum, *L.*—Mr. P. Ewing! 1891.

Callitriche autumnalis, *L.*—"Druce *ex* Newbould." This record was given me before June 1886. As Mr. Druce does not mention this species in his list, I suppose it was a mistake.

Epilobium alsinefolium, *Vill.*—In a watercourse about 2000 ft. up on Slioch, D. Russell. Mr. Russell sent me a series of West Ross plants, and among them there were several interesting species. I have a note, "G. C. Druce 7/87"; but I suppose again some mistake, as Mr. Druce does not give it.

Ligusticum scoticum, *L.*—Gairloch, 31/7/96, D. Russell!

Galium uliginosum, *L.*—Ross W. (Druce), "Top. Bot.," ed. 2. Not noticed by Mr. Druce.

Gentiana baltica, *Murb.*—Letterewe, July 1894, D. Russell!

†Atropa Belladonna, *L.*—Gairloch, 31/7/96, D. Russell! Growing among rocks by the sea-shore.

Trientalis europæa, *L.*—"Ru Noa. I found it here in August 1896, and again in June 1897, in full flower and plentiful." D. Russell!

†Plantago media, *L.*—Near Talladale Pier, D. Russell!

Betula nana, *L.*—Professor Barker, specimen.

Salix pentandra, *L.*—"Druce *ex* Newbould." A mistake, I suppose, as Mr. Druce does not name it.

Juniperus communis, *L.*—"Druce *ex* Newbould."

Malaxis paludosa, *Sw.*—Near Gairloch, 31/7/96, D. Russell!

Habenaria albida, *R. Br.*—Plentiful about Kinlochewe, June 1897, D. Russell!

Sparganium affine, *Sch.*—Pool at Gairloch, August 1896, D. Russell!

Carex lævigata, *Sm.*—Wet ground by Loch Maree, July 1895, D. Russell!

Deschampsia cæspitosa, *Beauv.*, *var* brevifolia, *Parnell.*—Slioch, July 1894, D. Russell!

Asplenium marinum, *L.*—"I saw a number of plants by the shore at Gairloch," D. Russell!

A. Adiantum-nigrum, *L. var.* obtusum, *Kitaib.* and *Milde.*—Gairloch, D. Russell!

Polypodium Dryopteris, *L.*—Craig Tollie, July 1895, D. Russell!

Lycopodium inundatum, *L.*—Meall Riabach, June 1897, D. Russell!

Confirmation is required of some species in Mr. Davidson's List ("Scot. Nat.," 1873-74, pp. 74-78), and also in Mr. Dixon's "Gairloch," 1886; some of them, as pointed out by Mr. Druce, being quite improbable.

MOSSES FROM TARBERT IN HARRIS.

By Dr. James Stirton, F.L.S., etc.

[In this communication, as in the others, the standard unit of measurement, unless where otherwise indicated, is the micro-millimetre, represented by μ, which, however, is suppressed.]

After an interval of fourteen years I paid, in August of last year, another visit to Tarbert in Harris. My main purpose was an investigation of the Moss Flora, and more especially of species of the genera *Campylopus* and *Grimmia*, which

luxuriate in such a moist, equable climate. I renewed acquaintance with several species such as *Campylopus Shawii*, which grows in rank profusion; *C. symplectus*, described in the "Annals of Scottish Natural History," for April 1897, of which there was also a fair supply throughout the district. I met with, besides, another *Campylopus*, a few stems of which had previously been detected—a moss which has exercised me very considerably. It bears a close affinity to *C. symplectus*,—to such an extent, indeed, that casually the one might easily be mistaken for the other. The first indication implying a difference is the peculiarly soft, almost velvety feel communicated on pulling up a tuft, whereas a tuft of *C. symplectus* is rougher and harder. A second peculiarity, detected easily by means of an ordinary field-lens, or even by the naked eye, is the rounded, bulging, and usually whitish appearance of the bases of the leaves, generally, however, covered by a beautiful violet or purple tomentum.

In order to show more closely the differences between the two mosses, I shall supplement a little the previous description of *C. symplectus.*

The cells of the anterior row, as shown in a cross-section of the nerve, are enlarged from above downwards, from 6 to 17 in diameter; those of the row next to this vary from 5 to 10, and become ultimately pellucid; those of the third row are scarcely perceptible in the upper third of the leaf, but show downwards as an irregular row of minute blackish points which enlarge ultimately from 3 to 5; lastly, the bulging pellucid cells on the posterior surface of the nerve vary from 5 to 9 lengthwise, and increase also in size downwards, but in the lowest third are nearly obliterated or only show here and there towards the margin of the nerve. The thickness of the nerve is nearly uniform throughout the entire length of leaf, viz. about 40.

The following is the diagnosis of the new moss:—

Campylopus purpurascens.—Densely tufted, from 1 to 2 inches in height, of a light-green colour above, generally pale in the middle and dark brown below; stems sparsely dichotomously branched; leaves spreading somewhat when moistened, straight, lanceolate, short, blunt as well as denti-

culate at apex and toothed a little down the margin, almost always a little curved towards the apex, which is rendered thereby somewhat cucullate, pellucidly and bluntly toothed or serrated, rather regularly, on the back in the upper half, very concave, almost tubular above, with small, feebly developed auricles at the base, composed, at first, of hexagonal colourless cells which become, next the nerve, tinted of a wine colour, rarely entirely so tinted; central basal cells of the narrow pagina oblong, rather small, 20 to 30 by 7 to 10; outwardly the basal cells much narrower, but not so narrow at the margin as those of allied species; upwards, the cells much smaller and quadrate, 10 to 17 by 5 to 7; nerve very broad, occupying, near the base, three-fourths or more of the entire breadth of leaf, thickness near the apex about 40, becoming thicker downwards, until near the base the thickness is nearly doubled or about 70, composed of four rows of cells, those of the anterior row pellucid, measuring from 7 to 24 across, occasionally as much as 30, increasing in size downwards; second row also of pellucid cells, from 5 to 13; third row, from 3 to 7, irregular; fourth or posterior row of large, pellucid, protruding or bulging, detached cells, from 6 to 13, which continue to enlarge almost to the base (a condition almost unique), where they are fully developed and not collapsed, at least in a recent state; groups of small stereïd cells in abundance in the space between the second and third rows of cells, often as many as 7 or even 8 in a group.

In *C. fuscoluteus*, an allied species, the stereïd cells are found surrounding those of the second row in the great majority of instances. The tomentum covering the base of leaf in *C. purpurascens* is of a beautiful violet colour which merges ultimately to purple. Another form of this tomentum is seen in other examples, covering the plant generally, also at first violet which deepens to purple, and often ultimately assumes a sordid appearance. This tomentum imparts a beautiful aspect to the moss when freshly gathered. There are no septa in the fibres of this tomentum. This is the only instance where I have seen such a colour.

In wettish places at several stations near Tarbert.

The form covered, in part, with the dense, violet-coloured tomentum may be distinguished by the name, var. *ornatus*.

The section of the nerve near the base presents much the appearance of that of *C. Hunti*, described in the "Annals" for April 1899, although the cell-formation near the base is not so open behind as in the latter, while the nerve is much broader relatively, and the areolation of the pagina near the base much smaller, etc. I have not detected in *C. Hunti* any of the blunt serratures on the back of the leaf—serratures which must surely be distinct from the posterior bulging cells.

Campylopus atrovirens grows in great luxuriance and often attains a great size in this district. Two forms are so peculiar that I am tempted to give distinction to them.

The first, which may be called var. *incurvatus*, is densely tufted, deep green above, brownish black or even almost black below; apical leaves and others lower down have cucullate, blunt apices, and only a few leaves with short hair-points intermingled down the stem. The structure of the nerve, in this variety, does not differ from that of the normal form.

The second, to which the name var. *flexilis* has already been given, has quite a different habit from the typical form. The tufts are very close and dense, large, and often from 4 to 6 inches long; stems closely compacted, yet readily delapsing, slender and flexile; the leaves are rather closely set, each having a short, stiff, denticulate point, which is permanent or at least does not easily become detached as in the normal form. The constitution of the nerve is not different from that of the typical form. This moss has several of the peculiarities of *C. brevipilus*.

Grimmia sublurida, described several years ago in the *Scottish Naturalist*, was found in great plenty. It presents various aspects, from a lurid green to a somewhat yellowish green, but all in dense compact tufts, about one inch or less in height, and quite unlike any form of *Gr. heterosticha*, to which Dr. Braithwaite refers it, and characterises it as merely a "dwarf starved form"—a very unlikely condition in such a moist climate.

Another *Grimmia*, closely allied to *Gr. sublurida*, if indeed they can be separated, is tolerably common. Its tufts are as dense, but they have a softer feel, and the stems

are not wiry as in the other. The sinuous areolation occupies only the lowest fourth of the leaf, the rest of the cells being roundly quadrate, small, measuring from 6 to 9 across; the apex of the leaf is very shortly hair-tipped, while there is a fair proportion of leaves which are muticous and bluntish. This moss may meanwhile be named *Grimmia calvescens.*

There is a second moss under the same division of the Grimmiæ which has much greater pretensions to specific distinction.

Grimmia fuscoviridis.—In extensive compactish tufts several inches in diameter and from 1 to 3 inches in height. Shortly deep green above, darkly fuscous to nearly black below; stems long, simple or sparsely divided, flexile, readily delapsing; leaves rather densely disposed even to the base, when dry nearly erect and appressed, slightly spreading but straight when moistened, rather broadly and shortly lanceolate, somewhat acuminate, muticous and bluntish at the apex, quite entire, scarcely carinate, margins narrowly recurved in lower half, but almost entirely so on one side only, plane above; nerve broad, about one-fourth to one-third the breadth of the leaf near the base, only bulging a little behind, composed of 3 strata of cells below, generally of 4 strata in the upper third, the anterior row having the largest cells, often pellucid, and then about 9 broad, pale, then quickly turning a deep fuscous red throughout (as well as the pagina), not reaching the apex, which is concave as well as the leaf itself for a short distance downwards; cells of the pagina smooth, bistratose throughout, except in the lower third of leaf or thereby, where they are unistratose, although the margin remains bistratose and thickened, nearly roundly quadrate above and small, strongly and narrowly sinuose in lower third, a few, in single file, on the basal margin, nearly smooth and rectangular. The nerve becomes thicker in an upward direction as well as the pagina, the latter, near the apex, often 25 thick, while below, where the cells are unistratose, only 14.

This moss is peculiar in several respects; in the strong tendency to assume the fuscous-red colour—a colour exactly resembling that of the *Andrææ*—only a small section at

the apex being green, the thickening of the leaf in an upward direction, the breadth of the nerve, the size and habit of the plant, etc.

It is allied to *Gr. obtusa*, which, however, has the pagina unistratose throughout as well as the margin, and the nerve near the base is only about one-ninth the breadth of the leaf. It has also rather close relationships to *Gr. elliptica*, but as the differences are obvious they need not be enumerated.

In the clefts of rocks and on the ground near Tarbert.

I have lately ascertained that in the moss described as *Campylopus brevipilus*, var. *attenuatus*, in the "Annals" for April 1897 there is a group of cells which I have elsewhere named the central basal group, composed, in this instance, of long, undulating cells with osculating pores, occasionally seen connected by very slender tubes, and that the anterior of the three rows of cells, seen in a cross-section of the nerve, is nearly entirely suppressed. Accordingly, this moss should have specific distinction, more especially as it is closely allied to *C.* (*Trachypogon*) *aurescens*.

In my botanical rambles I now seldom direct much attention to flowering plants. Still, I cannot refrain from picking up any specimen presenting appearances unfamiliar to me. I cannot recall any such, nor indeed any that arrested my attention except *Scutellaria minor*. The extraordinary size and peculiar appearance of *Potentilla anserina* give an almost distinctive feature to the roadside botany of this queer division of the British Islands, a part of which, viz. South Harris, is destitute of *Bracken*, and, as is alleged, has neither moles nor frogs nor, presumably, toads.

Since writing the above I have discovered, in the collections from Tarbert, a tuft of *Grimmia microcarpa* (Bridel); the first, to my knowledge, I have ever picked up, and probably the second ever secured in Great Britain. This is a very characteristic moss when viewed under the microscope, but, as I now know, very apt to be mistaken for others of this section of the Grimmiæ.

Grimmia halophila (Strn.), described in a recent number of the "Annals," has also turned up in Tarbert; and, on the other hand, *Campylopus pelidnus* (Strn.), originally

from the island of Benbecula, has been found in collections from Unst in Shetland and from the Mainland of Orkney.

Although I have examined from 40 to 50 samples of *Campylopus Shawii* from various localities, but more especially from Tarbert, as well as samples of *C. setifolius* from five places in Ireland, I have not discovered any osculating pores in any of the leaf-cells. On a specimen of the latter from the Gap of Dunloe in Ireland, picked up in 1864 by the late Mr. G. E. Hunt, I find abundance of these pores on the long characteristic cells, and still seen connected in two or three instances by slender tubes. These cells are the longest of any in the leaf, and, in this specimen, measure from 60 to 90 by 9 to 13, and are undulatingly fusiform or oblong fusiform. In all the specimens of the various Campylopi examined these porous cells have only been found in rather well-defined, elongated groups, situated close to the nerve and a little up from the base. Mr. Hunt's specimen is rather laxly tufted, 4 inches long, but affords evidence that the stems must have been considerably longer. As the original specimens (of which I still retain a few stems) on which Wilson founded the species do not show any such cells or pores, I propose to name this moss *Campylopus porophorus*.

I am persuaded that I possess from Tarbert specimens which can scarcely be otherwise reckoned than as forms of *C. setifolius*—a moss, as I now know, very closely allied to *C. Shawii*. I shall have more to say under this head on another occasion.

ZOOLOGICAL NOTES.

Barred Warbler, Pied Wagtail, Mealy Redpoll, and Snowy Owl in Barra.—On the 29th of October last I shot a Barred Warbler (*Sylvia nisoria*) in my garden at Eoligary, and Mr. John Paterson and Mr. Wm. Eagle Clarke, who have examined the specimen, pronounce it to be a young example. Mr. Eagle Clarke tells me that it is the third known Scottish example, and that all of them, singular to say, have been obtained in the western isles. I have presented the specimen to the Edinburgh Museum, to be incorporated with the fine collection of Scottish birds in that national institution.

I saw the Pied Wagtail (*Motacilla lugubris*) in Barra for the first time on the 15th of November. It was a single bird only, and I have not seen it since.

A Mealy Redpoll (*Linota linaria*) was obtained in the garden here on the 13th of October. I have seen this species in Barra before, but it is a rare visitor to the island.

A Snowy Owl (*Nyctea scandiaca*) was seen on the 5th of December. It was sitting in a potato field, and appeared to have newly arrived. This bird was seen again on the 8th, but not since. —Wm. L. MacGillivray, Barra.

Tree Sparrow in Peeblesshire.—A Tree Sparrow (*Passer montanus*) has frequented the stackyard at Halmyre Farm, West Linton, during the winter. It was first noticed in November with a party of House Sparrows, and has been repeatedly in evidence since that date. This is the first record I know of the occurrence of the species in Peeblesshire.—T. G. Laidlaw, Edinburgh.

Mealy Redpoll in Upper Clyde.—On the 11th December last a pair of birds were received by me for identification. On examination I found them to be "Mealy Redpolls" (*Linota linaria*). They were shot near here on the 7th from among a number of birds while feeding on a birch tree. So far as my experience goes this is the first time the species has been observed here.—J. D. W. Gibson, Carmichael.

Damages to Pine Forests by Crossbills.—In the "Trans. Royal Scottish Arboricultural Soc." vol. xvi. p. 319, Mr. J. R. Meiklejohn asks foresters to co-operate in the destruction of these birds, and use their influence with the Government to repeal the protection they enjoy. I sympathise in some senses with the appeal. But such matters cannot be taken up and treated in such an off-hand way, or by rushing from one extreme to another. It was unnecessary to protect Crossbills, because they are not amongst our rare birds; but it would be wrong to encourage such wholesale destruction as suggested by Mr. Meiklejohn. Because, although all he may say is true as far as he sees, still he, as a forester, may perhaps realise that that which in Darwinism is known as "Nature-pruning," and in other directions as "Natural Recompense" or "Balance," ought to receive some share of attention. He says Crossbills do not get enough seeds to satisfy themselves, at the same time "depriving the forest of hundreds of seeds"! I will only ask the question—"For every ripe seed the birds get, how many do they scatter?" And if all the hundreds of seeds fell and then came to maturity, wherein would there be a saving to forestry. Fire might perhaps be the easiest way to clear off such a vast surplusage, as in the forests of the far West. I think Mr. Meiklejohn ought to look more kindly than he does on the Crossbills, as assistants in planting in a natural way, and not preach vengeance, or "muzzle the ox that treads the

corn," and surely "the labourer is worthy of his hire." The first error was protecting them when they did not require protection; and the second error—and greater than the first—would be to exterminate them. These birds are Nature's sowers as well as reapers.—J. A. HARVIE-BROWN.

Crested Tit in "Tay."—In a popular work lately issued by Messrs. Virtue and Co., called "The Highland Tay, from Tyndrum to Dunkeld," occurs (p. 42) the passage:—"The Crested Tit, one of the most interesting survivors of the Bird-life of the Ancient Forests, has now abandoned this locality (*i.e.* behind Finlarig of Craigcailleach), and is now confined almost exclusively to the denser parts of the Great Pine Woods of Rothiemurchus and Loch Morlich, and even there it is but rarely seen or heard." I am aware of the record of the Crested Tit having appeared in the Pass of Killiecrankie—quite an old record—but I do not know of any other record for the Tay Valley. Though I do not question the possibility that the Crested Tit was more generally dispersed through the Ancient Caledonian Forests, yet I am not aware where the writer of the above volume can have obtained authority for his statement; and if any one can give me the reference to the original statement, I shall be obliged.—J. A. HARVIE-BROWN.

Greenland Falcon, Ivory Gull, and Waxwing in Scotland.—The late winter, possibly on account of the mildness of the weather, has not produced many ornithological rarities, though these seem almost as dependent on the direction of the wind at the time of migration, and other meteorological influences, as the mere severity of the season.

Skye has produced another Greenland Falcon (*Falco candicans*) which was obtained by Mr. A. Macaskill, gamekeeper at Glen Drynoch, about 23rd October 1900. From Broadford, in the same island, a fine adult Ivory Gull (*Pagophila eburnea*) was sent to Inverness by Mr. James Ross, of the Broadford Hotel, about 6th February of this year. On the 1st of February a Waxwing (*Ampelis garrulus*) was brought in to Mr. Macleay; it had been picked up on the Canal Bank, Inverness, by two boys, and was alive when they captured it. Woodcocks have been very scarce all through the north from all accounts; at one time there was a good deal of snow on the hills, but even Raasay, so well known as a haunt of these birds, has proved almost a blank this season, there being apparently no birds for the snow to drive in off the hills.—T. E. BUCKLEY, Inverness.

Scops Owl in Shetland.—In the "Annals" (1900, p. 184) I recorded the occurrence of Scops Owl (*Scops giu*) in Foula, where the bird arrived late in April last. Mr. Frank Traill, who kindly furnished me with the particulars, and sent me a wing for identification, informs me that a second specimen was obtained in the

western part of the main island about the same time. This bird was lost in the ill-fated "St. Rognvald," when on its way south to be mounted.—William Eagle Clarke.

Bewick's Swan on the Solway Firth.—Wild Swans have not been much in evidence on the Solway Firth (English side) during the winter 1900-1, only five having been seen in the neighbourhood of Silloth up to 5th February 1901. But a herd of thirty Bewick's Swans visited the Firth on the last day of the open season, and I am sorry to say that five of this number were shot by a punt-gunner. The greater number happily escaped scatheless. I do not think that swans of any kind should be shot in these islands. They are not wanted for the table, and it is a pity that they should be disturbed.—H. A. Macpherson, Pitlochry.

Nesting of Tufted Duck and Pochard in Wigtownshire.—The Tufted Duck (*Fuligula cristata*) and the Pochard (*F. ferina*) breed annually in considerable numbers in Mochrum parish. I have seen the young of both reared from eggs taken in defiance of the prohibition issued by the County Council. I have reason to suspect that the Golden-Eye (*Clangula glaucion*) will be identified as breeding there also. In the spring of 1899, an expert naturalist, Mr. M'Haffie Gordon, found two eggs of a duck in a hollow tree upon an island. There were Golden-Eyes on the lake at the time, and the eggs were left undisturbed in order that Mr. Gordon might identify the parents. Unluckily, when he returned a few days later, the eggs had been destroyed by rooks or crows. I believe there is no recorded instance of the Golden-Eye nesting in Britain, but I have seen adult birds on these lochs in the month of May, and specimens in the "Morillon" stage are here at nearly all seasons.—Herbert Maxwell.

Great Crested and Sclavonian Grebes in Wigtownshire.—In the "Annals" for January 1897 I recorded that the Great Crested Grebe (*Podicipes cristatus*), which I had first observed on the White Loch of Myrton in 1894, had found a mate and reared young in 1896. Since then this species has nested regularly on the loch; there were two nests there last year. I have now to record the advent of another grebe for the first time during my intimate acquaintance with this sanctuary loch. I take it to be the Sclavonian Grebe (*Podicipes cornutus*), of which a single specimen has been there for some days. To-day (14th January) I had a good gaze at him through the glass in bright sunshine, and compared him with a Great Crested Grebe there also. The winter plumage of the Sclavonian and the Eared Grebe (*P. auritus*) is so similar that I cannot pronounce with certainty, but undoubtedly a new species has to be added to the list of wildfowl frequenting this loch.

When I wrote the note referred to in 1897 there was a heavy crop of American weed (*Elodea canadensis*); hundreds of widgeon, a fleet of nine shovellers, and about a dozen scaup duck were busy on

the succulent diet. But this weed, after a couple of seasons luxuriance, shrinks to the bottom, where it forms a close green carpet for five or six seasons. Then it springs again into prodigious growth, and completely fills large breadths of water. At present it is in its carpet state, and not a single widgeon, scaup, or shoveller is to be seen, only the normal habitants—mallard, golden-eye, tufted duck, pochard, and teal. The coots, which appear in thousands to feed on the American weed, are now to be numbered only by scores.—HERBERT MAXWELL.

Obisium muscorum, *Leach*, **on Edinburgh Castle Rock.**—On 23rd January this year, when looking for shells on the Castle Rock, I found two false-scorpions of this species moving actively about in damp earth covering the rocks. Although the species is common in our neighbourhood, I think the locality is worth recording.—ROBERT GODFREY, Edinburgh.

Sphinx convolvuli at Berwick-on-Tweed.—A specimen of this fine moth was found in a house in the Greenses on 10th October 1900, having, it was supposed, been brought in upon some clothes which had been hung out to dry. It was chronicled in the local newspapers as a "Death's Head," and had received much rough handling before it was brought to me three days after its capture, though it then still retained enough vitality to "buzz" across the room and fly with much force against the window-pane, when liberated from the tiny box into which it had been cramped. On 22nd October 1898 a very much worn example was brought to me which had been picked up on the previous day near the side of the dock at Tweedmouth.—GEORGE BOLAM, Berwick-on-Tweed.

Scottish Chrysids.—The *Chrysididæ*—those brilliant hymenopterous insects known as Ruby-tails and Gilded-wasps—seem to be poorly represented in Scotland. So far, I have only detected the following three species, but no doubt some of the readers of the "Annals" can add to the number. The Rev. F. D. Morice, who has recently published a "Revised Synoptic Table of British Chrysids" ("Ent. Mo. Mag." 1900, pp. 129-131), has kindly examined some of my specimens of each form, and says they are correctly named.

Chrysis hirsuta, Gerst. (= *bicolor*, Sm.).—Two examples of this rare Chrysid were obtained from the cells of *Osmia inermis*, Zett. (= *parietina*, Sm., etc., *nec* Curt., *vide* Saunders's note in "Ent. Mo. Mag.," 1900, p. 51), found by me near Blair Atholl in September 1898. Under the name of *C. bicolor*, it was first described as British by F. Smith in his monograph of the family ("Ent. Ann.," 1862). His specimens were from a nest of the same bee brought from the neighbourhood of Loch Rannoch. As a British species it is as yet only known from Scotland.

Chrysis ruddii, Shuck.—I have this form from Aviemore, Inverness-shire (June 1893), Kinghorn, Fife (June 1897 and June

1900), Inverkeithing (June 1900, a good many), and Dunbar (July 1900). I am not aware that any one else has recorded it from Scotland.

Chrysis ignita, L.—This is our common Ruby-tail. I have specimens from Dunbar, Tyninghame, Aberlady, Longniddry, Morningside, Comiston, Mid-Calder, Peebles, Linlithgow, Kinghorn, North Queensferry, Inverkeithing, Perth, and Loch Tay, and have seen it in a number of other localities. Mr. P. Cameron has recorded it for Clydesdale ("Fauna and Flora of West of Scotland," 1876, p. xviii.); and the name occurs in Stewart's list of Edinburgh Insects (1809) and MacGillivray's "Natural History of Deeside" (1855). It is parasitic on Mason-wasps (*Odynerus*).

Mr. Cameron (*l.c.*) records "*Omalus cæruleus*" from Clydesdale. This was probably *O. cæruleus*, Smith (*nec* Dhb.) = *Ellampus æneus*, F., of Morice's table. According to Smith's 1851 List of Hymenoptera Aculeata in the British Museum, *Cleptes nitidula* (F.) has occurred in Scotland, but no particulars are given.—William Evans, Edinburgh.

Acalla ferrugana, *Fr.*, in spring.—Recently when referring to the "Ent. Monthly Mag." vol. x. (1873), I came on a passage at page 173 written by Mr. Barrett to the effect that *Acalla aspersana* is partially double-brooded, the first brood, which is scarce, appearing in June. As this interested me, "Stainton's Manual" was referred to; he gives "VIII.-X." without allusion to its appearance in spring. Meyrick is apparently rather sceptical and says: "There is said to be sometimes a partial early brood of imagos in June, perhaps from autumnal larvæ."

Now I think, in Scotland at any rate, the explanation is that we have but an autumnal brood, which hybernates. Any one who has visited Rannoch in April can hardly have failed to notice at least two things when passing through the leafless alleys of purple-twigged birches, namely *Brephos parthenias* with its tumbling flight, and a little Tortrix, *Acalla ferrugana*. These April examples are paler than the autumnal ones, the result, no doubt, of hybernation, although Mr. Barrett refers to the same distinction between the supposed June and autumnal broods. I have seen no allusion hitherto to this hybernation, although I can scarcely believe it to have been unnoticed.—K. J. Morton, Edinburgh.

Selenia bilunaria, *Esp.*: is it double-brooded in Scotland?—It seems to be pretty generally taken for granted that *Selenia bilunaria* is double-brooded throughout its range in Britain—at least Barrett in his recent review of the species speaks of no exception.

That this species is really regularly double-brooded throughout Scotland cannot be the case. During observations, extending over many years, in the Carluke district of Lanarkshire, I never happened to meet with a single specimen during the later summer months.

The insect ranged in that district from the level of the river (200 ft.) up to above the village (say over 600 ft.), and it usually appeared about the beginning of May, occurring throughout that month. I have one example, in fair condition, bearing the date of 7th June.—K. J. Morton, Edinburgh.

Note on Agriotypus armatus, *Curtis*.—This curious parasite of the larvæ of Trichoptera (caddis-worms) was recalled to my mind not long ago by an application for specimens made by Mr. Claud Morley of Ipswich. It is considered a rare insect; why, I do not know. A good many years ago I found it at Loch Ard in Perthshire ("Ent. Monthly Mag." vol. xxx. p. 62), and afterwards I used to meet with it not rarely near my old home at Carluke, not very many miles distant from the original habitat (for the insect was described by Curtis from specimens received from Henry Walker of New Lanark). And I think also it came before me last spring when I was hunting for *Perlidæ* on the Pentlands; but as Mr. Morley's wants were not then known to me, the examples were not taken.—K. J. Morton, Edinburgh.

Scottish Myriapoda.—Referring to my note in the "Annals" for 1900, p. 127, Mr. Pocock reports that among some further specimens of Myriapods submitted to him by me, he finds the following species, which I do not see mentioned in Gibson-Carmichael's list:—

Julus britannicus, Verhoeff.—One, among withered leaves in a wood near Port Seton, November 1900.

J. pilosus, Newp.—Swanston, Pathhead, Pettycur, Callander.

Blaniulus fuscus, Stein.—Mortonhall and Roslin, under bark on rotten trees, March 1900.

Lithobius calcaratus, C. Koch.—Bavelaw, Kirknewton, Callander.

L. crassipes, L. Koch.—Mortonhall and Pentland Hills.

Geophilus proximus, C. Koch.—Lothianburn and Aberdour.

G. carpophagus, Leach.—Callander. This is probably the *G. sodalis* of the list above referred to.

Schendyla nemorensis (C. Koch).—Mortonhall, March 1900.

In addition to the examples of *Craspedosoma rawlinsii* mentioned in my former note, I have taken single specimens at Braendam near Callander (April 1900), and at Cartland Craigs, Lanarkshire (October 1900).—William Evans, Edinburgh.

Trichoniscus roseus (*Koch*) **in Linlithgowshire.**—On 23rd March I discovered a small colony of this brightly coloured Woodlouse among some stones and cinders on a bank close to South Queensferry. It is an addition to Mr. T. Scott's list of the Land and Freshwater Crustacea of the district around Edinburgh.—William Evans, Edinburgh.

Clavella labracis, *Van Beneden*, **a Copepod new to Britain.**—The parasitic Copepod, which is now added to the British fauna, was

obtained on the gills of a Striped Wrasse (*Labrus mixtus*) captured in Ayr Bay on 30th January 1900. *Clavella labracis* is a small copepod parasitic on fish; full grown females with ovisacs scarcely reach a millimeter (or $\frac{1}{25}$ of an inch) in length, but though minute it carries moderately large ova shaped like small cylinders, the length of which is about one and a half times longer than the diameter. These ova are arranged end to end inside a very thin transparent sac. The ovisacs appear to be moderately elongated, but any specimens I have seen—and they are not uncommon on the gills of the Striped Wrasse—have had the ovisacs more or less incomplete; probably the enclosing membrane is very delicate and easily ruptured. A figure of the Copepod—a female—will be found in P. J. van Beneden's work "Les poissons des cotes de Belgique," *Mem. Acad. Roy. Belg.* vol. xxxviii. Pl. I. (1870). I have not yet seen any males. They are probably smaller than the females, and will therefore be easily missed.—T. Scott, Aberdeen.

BOTANICAL NOTES AND NEWS.

Notes on the Flora of Argyllshire.—*Rubus danicus*, Focke, near Dalmally; *Taraxacum palustre*, L., Ben Dothaidh; *Euphrasia foulaensis*, Towns., Ben Laoigh; *E. gracilis*, Fries., near Dalmally; *E. brevipila*, Burn. and Gremli., near Tyndrum, but in Argyll; *Mentha piperita*, Huds., near Dalmally; *Sparganium erectum*, L., var. *microcarpum* (Neuman), near Dalmally; *Carex Goodenowii*, Gay, var. *elatior*, Lange, forma *angustifolia* (Kükenthal), by the river near Dalmally.—G. Claridge Druce.

Notes on the Flora of Kincardineshire.—*Viola tricolor*, L., *V. saxatilis*, Schmidt, var. *Sagoti* (Jord.), **Rubus Rogersii*, Linton, *R. Selmeri*, Lindeb., *R. mucronatus*, Blox., *Alchemilla vulgaris*, L., var. *alpestris* (Schmidt), *Salix Smithiana*, Willd., and **Arrhenatherum precatorium*, Beauv., were all noticed near Banchory.—G. Claridge Druce.

Spergula arvensis, *L.*, in Scotland.—In January 1900, in this Journal, I stated the results of my search in the north-east of Scotland for the forms included under this name. During 1900 I have observed *sativa* in fields in every part of the district called Buchan, in Watson's v.c. 93, between the rivers Ythan and Deveron, usually plentiful, though seldom so abundant as near Aberdeen. In September and October I found *vulgaris* in the same district not rare in a few fields in the parishes of Lonmay, Rathen, and Strichen in the north-eastern part of Buchan, and in Fyvie and Auchterless in the south-western part, in localities a good many miles apart. It also occurred in a sandy field near the coast six or seven miles north of Aberdeen; it is evidently better established in the north-east of

Scotland than earlier observations appeared to indicate. As previously noted, it is markedly later than *sativa* in its development.—JAMES W. H. TRAIL.

Stellaria nemorum, *L.*, in Banffshire.—In the same number of this Journal, Mr. A. Bennett called attention to the distribution in Scotland of this plant, remarking that it "does not seem to be recorded farther north than 57°30′" in this country. It is a scarce and local plant in Scotland. I found it in small amount by the Fiddich near Craigellachie (just about 57°29′) in August 1899; and I also met with a few rather small plants on the right bank of the Deveron, a little way above Banff Bridge, in August 1900 at about 57°40′N., little above the high-tide mark.—JAMES W. H. TRAIL.

Matricaria discoidea in North Aberdeen.—In supplement of my note on this species in this Journal last October, I have to add that I found in the end of September a few examples in the north part of the parish of Tyrie, about three miles inland from Rosehearty, where I first observed it some years ago, and that in October I saw a few on the coast at the fishing village of Inverallochy in the parish of Rathen, about seven miles east of Rosehearty as the crow flies. As it does not yet occur between these places, or between Inverallochy and Boddam, its only habitat to the south, this is evidently a new immigration (possibly by a boat from one of its other habitats), apparently of quite recent date.—JAMES W. H. TRAIL.

The British Moss-Flora, by R. Braithwaite, M.D., F.L.S., etc.—Of this work Part XX. has just been issued, being the fourth part devoted to the large and varied family *Hypnaceæ*. It sustains the high reputation of the earlier parts for thoroughness and excellence alike in the texts and in the plates. Subscribers are informed that three more parts will complete the work, one of the finest monographs on the British flora.

In the last instalment of **The European Sphagnaceæ** ("Journ. Bot." 1900, pp. 469-480), Mr. E. C. Horrell gives the following species and varieties as from localities in Scotland:—*S. cymbifolium*, var. *flavo-glaucescens*, Russ., Moidart, Inverness-shire (*Macvicar*); var. *fusco-flavescens*, Russ., Renfrewshire and Cantyre (*Ewing*), Braemar (*Miss Barton*); var. *fusco-glaucescens*, Warnst., Allt-dhubh-Galair, Glen Lochay (*Cocks*); var. *fusco-pallens*, Warnst., Corriegill, Arran (*Ley*), Ardbeg, Islay (*Gilmour*); *S. centrale*, Jensen, foot of Ben More, Perthshire (*Dixon*); var. *glaucescens*, Russ., Glen Lochay (*Cocks*); *S. papillosum*, Lindb., var. *normale*, Warnst., in Ross-shire, Easter Ness, Arran, Stirlingshire, Renfrew, Cantyre, Mid-Perth; forma *conferta* (Lindb.), Mid-Perth and Lanarkshire; var. *sublæve*, Limpr., Ben Lomond, Stirling (*Ewing*); *S. medium*, Limpr., var. *purpurascens*, Warnst., in Jura, Dumfriesshire, Mid-Perth; var. *roseo-pallescens*, Middlehill, Killin (*Cocks*); var. *roseum*, Warnst., Glen Lochay (*Cocks*).

New British Hepaticæ.—Mr. Symers M. Macvicar records in the "Journ. Bot." for January the following species, new to British lists, found by him during a fortnight in June 1900 spent in the Ben Lawers district of Perthshire :—*Cephalozia pleniceps* (Aust.), on Craig-an-lochan, at 1800 feet, on a rocky bank ; *Jungermannia atrovirens* (Schleich), on Craig-an-lochan, at 2100 feet ; *J. quadriloba*, Lindb., on Craig Chailleach, at 2800 feet ; *J. polita*, Nees, in western ravine of Ben Lawers between 2700 and 3300 feet, and *Nardia subelliptica*, Lindb., on Craig-an-lochan, about 2000 feet, near locality of *J. atrovirens*.

On 28th February a fine marble bust by D. W. Stevenson, R.S.A., of Robert Brown, the celebrated botanist, was unveiled in Marischal College, Aberdeen. The bust is a gift to the University of Aberdeen from his cousin, Miss Hope Paton, Montrose, in memory of his having been a student in Marischal College and University from 1787 till 1790.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—January-March 1901.

[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.

Ornithological Notes. By George Bolam, F.Z.S. *Proc. Berwickshire Nat. Club*, vol. xvii. No. 1, pp. 89-108 (October 1900).

Birds in Edinburgh. By James Smail, F.S.A. (Scot.). *Proc. Berwickshire Nat. Club*, vol. xvii. No. 1, pp. 109-110 (October 1900).

Robin in Shetland. O. V. Aplin. *Zoologist* (4), vol. v. p. 106 (March 1901).—Specimen picked up dead on the mainland about the beginning of February.

Early Jack-Snipe (Gallinago gallinula). A. H. Meiklejohn. *Zoologist* (4), vol. v. p. 108 (March 1901).—Two birds seen at St. Andrews towards the end of September or beginning of October 1896.

Lesser Fork-beard, or Tadpole Fish. Raniceps trifurcatus (Turton). By George Bolam, F.Z.S. *Proc. Berwickshire Nat. Club*, vol. xvii. No. 1, p. 112 (October 1900).—Two specimens caught off Berwick in the spring of 1899.

Notes on the Lower Carboniferous Fishes of Eastern Fifeshire. By Dr. R. H. Traquair, F.R.S., F.G.S. *Geol. Mag.* N.S. Decade iv., vol. viii. pp. 110-114 (March 1901).

Entomological Notes from Galashiels during 1899. By W. Shaw. *Proc. Berwickshire Nat. Club*, vol. xvii. No. 1, pp. 87-88 (October 1900).—Seven short notes on moths, and one on the scarcity of wasps.

Notes from Brodick, Arran. Archdale Sharpin. *Entomologist*, vol. xxxiv. p. 24 (January 1901).—Refers to Lepidoptera.

Cleora glabraria in Scotland. John A. Nix. *Entomologist*, vol. xxxiv. p. 56 (February 1901).—Taken several times in Argyllshire during the last four years.

A List of the Tortricidæ and Tineina of the Parish of Bonhill, Dumbartonshire. By J. R. Malloch. *Ent. Mo. Mag.* (2), vol. xii. pp. 33-36 (February 1901).

Additions, etc., to the List of British Coleoptera during 1899 and 1900. By Prof. T. Hudson Beare, B.Sc., F.E.S. *Ent. Mo. Mag.* (2), vol. xii. pp. 1-3 (January 1901).—Hypera elongata, Payk., taken near Edinburgh.

On the Occurrence of Sphodrus leucophthalmus, Linn., in the [Berwickshire] District. By George Bolam, F.Z.S. *Proc. Berwickshire Nat. Club*, vol. xvii. No. 1, p. 128 (October 1900).—A specimen captured in Berwick in September 1893 or 1894.

Chrysis Ruddii, Shuck., in Scotland. William Evans. *Ent. Mo. Mag.* (2), vol. xii. p. 48 (February 1901).

Scottish Aculeates. William Evans. *Ent. Mo. Mag.* (2), vol. xii. pp. 15 and 48 (January and February 1901).

Aculeate Hymenoptera in Perthshire. By A. E. J. Carter. *Ent. Mo. Mag.* (2), vol. xii. pp. 67-68 (March 1901).

Aculeate Hymenoptera in Dumbartonshire. By J. R. Malloch. *Ent. Mo. Mag.* (2), vol. xii. pp. 5-6 (January 1901).

Aculeate Hymenoptera in the West of Scotland. By A. A. Dalglish, F.E.S. *Ent. Mo. Mag.* (2), vol. xii. pp. 6-8 (January 1901).

The Pale Variety of Bombus Smithianus, White, in Scotland. William Evans. *Ent. Mo. Mag.* (2), vol. xii. pp. 47-48 (February 1901).

Aberdeenshire Diptera. By the Rev. E. N. Bloomfield, M.A., F.E.S. *Ent. Mo. Mag.* (2), vol. xii. pp. 43-44 (February 1901).

Note on certain Impressions of Echinoderms observed in the Triassic Reptiliferous Sandstone of Warwickshire and Elgin. By Prof. R. Burckhardt, Ph.D. *Geol. Mag.* N.S. Decade iv., vol. viii. pp. 3-4 (January 1901).—See also Bather, tom. cit. pp. 70-71 (February 1901).

BOTANY.

On the Alpine Flora of Clova. By Miss M. Thomas. *Trans. of Perthshire Soc. N. S.* iii., 1900, pp. 60-69.—Is a good sketch of this most interesting flora.

Plant Associations of the Tay Basin, Part II. By Robert Smith, B.Sc. *Trans. of P. S. N. S.* iii., 1900, pp. 69-87, with a map.—This, the last work of its author's brief life, is a very valuable contribution to our knowledge of plant-distribution in Scotland.

The Woodlands of Perthshire. By Henry Coates, F.R.S.E. *Proc. of P. S. N. S.* iii., 1900, pp. 59-64.

Botanical Notes on the Selkirk Meeting (of the Berwickshire Naturalists' Club). By Rev. David Paul. *Hist. Berw. Nat. Club*, xvii., 1900, pp. 49-50.

On the Cultivation of Mycetozoa from Spores. By Arthur Lister, F.R.S. *Journ. Bot.*, 1901, pp. 5-8.

Some British Violets. By Edmund G. Baker, F.L.S. *Journ. Bot.*, 1901, pp. 9-12.—Discusses and describes the forms into which *Viola tricolor*, L. (*Sensu latiori*) may be divided in Britain.

Robert Smith (1873-1900). *Journ. Bot.*, 1901, pp. 30-32.—Is a reproduction, with a portrait of the obituary by Prof. D'Arcy Thompson in *College Echoes* for 9th November 1900.

A Disease in Turnips caused by Bacteria. By W. Carruthers, F.R.S., and A. Lorrain Smith. *Journ. Bot.*, 1901, pp. 33-36, and *Journ. of Roy. Agric. Soc.*, 1901.—Describes and figures a serious disease very prevalent in parts of Yorkshire, and observed in two localities in Dumfriesshire, most hurtful to Swedish turnips, less so to yellow turnips and to cabbages, caused by an organism named by Prof. Potter *Pseudomonas destructans*.

New British Hepaticæ. By Symers M. Macvicar. *Journ. Bot.*, 1901, pp. 36-37.—Enumerates five species new to British records, as the result of a fortnight's visit in June 1900 to the Ben Lawers district.

On certain Galls in Furcellaria and Chondrus. By Ethel S. Barton. *Journ. Bot.*, 1901, pp. 49-51, t. vii. figs. 1-6.—Describes and figures irregular swellings, caused by a nematode worm, found at Lyme Regis.

Moos-studien in Schottland. By O. Burchard. *Hedwigia*, 1900, pp. 149-159.—Gives a brief account of a visit in autumn 1899 to the Highlands of Perthshire, and enumerates eighty-eight species of mosses, with localities, and usually with details of elevations and habitats.

The European Sphagnaceæ (after Warnstorff). By E. Charles Horrell, F.L.S. *Journ. Bot.*, 1900, pp. 469-480.—Concludes this important paper, and gives a full index of the numerous forms described in it.

Introductions. By W. F. Miller. *Journ. Bot.*, 1900, p. 496. —*Melilotus sulcata*, Desf., in a potato-field near Edinburgh.

Notes from Garden and Field. By Charles Stuart, M.D. *Hist. Berw. Nat. Club*, xvii., 1900, p. 113.—Gives information about a number of winter and spring flowers in cultivation.

List of rarer Plants found within Parish of Bunkle and Preston, Berwickshire. In *Historical and Descriptive Account of Bunkle and Preston*, a supplement to *Hist. Berw. Nat. Club*, 1900, note on pp. 54-55.—The following are marked as now extinct in the parish :—*Trollius europæus*, *Lythrum Salicaria*, *Sedum villosum*, *Trientalis europæa*, *Goodyera repens*. The list includes *Silene noctiflora*, queried for the county in Watson's "Top. Bot.," and *Cuscuta Epithymum*, not previously noted for Berwickshire. Confirmation of both records is desirable.

BOOK NOTICES.

The Wildfowler in Scotland. By John Guille Millais, F.Z.S., etc. With a frontispiece in photogravure after a drawing by Sir J. E. Millais, P.R.A., and photogravure plates, two coloured plates and fifty illustrations from the author's drawings and from photographs. (London : Longmans, Green, and Co., 1901.) 30s. net.

Mr. Millais' new volume is a valuable contribution to the literature of sport and natural history, and is, moreover, the first work ever devoted to Scottish wildfowl and wildfowling. There is no one more competent to handle this subject than Mr. Millais ; for it has been, as he tells us, his special study from very early years. "When I first began wildfowling along the coasts of Scotland," he writes, "I was but a small boy of eleven, with an insatiable craze for natural history. I must find out for myself the haunts and habits of every wild animal in the country, beginning with sea-fowl ; must shoot and collect specimens, and must dissect them in order to learn their anatomy." Taking as a starting-point the south-east corner of Scotland, Mr. Millais worked steadily northward, and for years afterwards holidays were devoted to continuing the exploration ; so that by the time he was sixteen he had three times walked over the whole distance from Dunbar in the south to Thurso in the north, omitting only such portions of the coast-line as consisted of inaccessible cliffs. In the course of these rambles, specimens of most of the British wildfowl were collected, in their

various stages and conditions of plumage; and in after years, when punt and swivel-gun replaced the light 20-bore of earlier trips, it was still Mr. Millais' chief object to secure for his collection such specimens as were necessary to render it complete. These years of hard, and often dangerous, work, added to keen and constant observation of the habits of fowl in all conditions of weather, and at all seasons of the year, well qualify Mr. Millais to be the guide of those less experienced in this most fascinating form of sport.

Mr. Millais' book treats of Scotland as a resort of wildfowl, of wildfowl-shooting on land and shore, as well by night as by day, and of solitary wanderings by the sea; nor does Colonel Hawker himself depict in more glowing colours the pleasures of punt-shooting. Incidentally are related many adventures and some narrow escapes; for the pursuit of wildfowl in such a frail craft as a gunning-punt is seldom unaccompanied by danger from without, while within the boat the bursting of the big gun may not only cause the "chance of a lifetime" to be lost, but will involve the risk of very serious consequences to the punters.

The illustrations are, however, a most attractive feature of the book. There are numerous full-page plates, photogravures of beautiful softness, in which hundreds of ducks and geese of every kind that frequents our seas live again under Mr. Millais' hand. To the writer at least, who has spent many a day in observing with the assistance of a powerful glass the habits and the attitudes of wildfowl when unsuspicious and at rest, Mr. Millais' drawings are entirely satisfactory; and if one or two of the scenes are almost painful in their realism, the fortunate possessor of this book has only to turn to such a restful picture as that of Loch Leven in spring to realise completeness of repose. W. B.

Studies Scientific and Social. By Alfred Russel Wallace, LL.D., D.C.L., F.R.S., etc. In two volumes, with numerous illustrations. (London: Macmillan and Co., Ltd., 1900.) 18s. net.

Alfred Russel Wallace is known to all who are interested in science as a brilliant and original thinker, a distinguished naturalist, and a great traveller. He has written a number of books, chiefly on zoological subjects, of extreme value, all of which have been remarkably and deservedly successful. But Mr. Wallace is also the author of numerous articles on various scientific topics which have appeared in serial literature, such as *The Nineteenth Century*, *The Contemporary* and *Fortnightly* Reviews, *Natural Science*, the journals of the Linnean and Entomological Societies, etc. A selection of the more important of these has been carefully revised and forms the two neat volumes under notice. It was, in our opinion, a happy thought to rescue, as it were, these highly instructive and attractively written contributions from their widely scattered original sources of publication, and to offer them in a collected and convenient form to the

scientific and general public; to whom they should prove not only most agreeable and profitable reading, but on whose bookshelves they should find a place as aidful volumes of reference, and for future re-perusal. To give some idea of the contents of the volumes it is only necessary to quote the titles of a few of the essays:—The Permanence of Ocean Beds—The Ice Age and its Work—Monkeys: their Affinities and Distribution—The Disguises of Insects—English and American Flowers—The Origin of Species and Genera—Evolution and Distribution of Animals—Are Acquired Characters Inherited?—The Method of Organic Evolution—Museums for the People, etc. There is also a series of interesting articles on ethnological, social, and political subjects. The illustrations are both numerous and excellent.

Lord Lilford, Thomas Littleton, Fourth Baron, F.Z.S., President of the British Ornithologists' Union. A Memoir by his Sister, with an Introduction by the Bishop of London. Illustrated by Thorburn and others, and a portrait in photogravure. (London: Smith, Elder, and Co., 1900.) 10s. 6d.

Many of those who are the fortunate possessors of the late Lord Lilford's works on the Birds of the British Islands and the Birds of Northamptonshire will, we are sure, desire to have this volume in memoriam of their distinguished author.

Though widely known as the President of the British Ornithologists' Union, and as a talented naturalist, Lord Lilford had other attributes which made his personality singularly attractive. But while these were ever manifest to those who enjoyed the privilege of his friendship, others must peruse this memoir, which lifts the veil, as it were, and reveals to them a man of singular nobility of character, of great attainments, and of charming personal qualities.

But the book affords more than this. To those in search of zoological matter his Lordship's voluminous correspondence with such well-known naturalists as Professor Newton, Dr. Günther, Canon Tristram, Lord Walsingham, Colonel Irby, and others will prove interesting and instructive reading.

The description of the great aviaries at Lilford from the pen of their late lord and master, and the portraits of many of their rare and beautiful tenants from the pencils of Mr. Thorburn and Mr. Lodge, also add considerably to the attractiveness of the work.

This story of the late Lord Lilford's life, around which there is, alas, much which is singularly pathetic, is written in an extremely pleasing style, and one which breathes of sisterly affection for, and admiration of, a distinguished and noble brother.

A fine photogravure portrait forms the frontispiece to the volume, which is very neat in its get-up, and abundantly illustrated.

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NATTERER'S BAT (*VESPERTILIO NATTERERI*, KUHL) IN SCOTLAND.

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

The right of Natterer's Bat to a place in the list of Scottish Mammals rests on: (1) the existence of a specimen (ad. ♀) in the British Museum, labelled Inveraray, August 1858, and recorded in Dobson's "Catalogue of the Chiroptera," p. 308; and (2) a statement published in the "Proceedings of the Glasgow Natural History Society," vol. iv. p. 303, announcing the occurrence of the species near Dalkeith, made by the late Robert Gray to Mr. Harvie-Brown in a letter dated 28th September 1880. Mr. Gray's words were: "I find a new bat to our Scottish lists in some plenty near Dalkeith, viz. *V. nattereri*," and "*Nattereri* was in dozens in the hole of a tree."

With regard to the second of these records, I did my best some years ago, when writing my "Mammalian Fauna of the Edinburgh District" (1892), to find out on what evidence it was based. The results of my inquiries are fully stated in the book referred to (p. 22), and are shortly as follows: From Mr. Hope, taxidermist, Edinburgh, I learned that in 1880 he had in his shop some bats from Dalkeith Park, which Mr. Gray remarked were of an uncommon kind, and

one of which was given to him at his request. No specimen, however, in any way bearing on the question could be traced at the time of my inquiries. That Mr. Gray continued to regard these Dalkeith bats as belonging to this species, seems clear from the following circumstance related to me by the late Malcolm Dunn. In the spring of 1886, a large colony of bats was found clustering beneath the rone and eave, and behind a rain-pipe in a corner of his house at the gardens, Dalkeith Park; on his mentioning this to Mr. Gray sometime afterwards, the latter said they would no doubt be the kind called Natterer's Bat.

The above, then, was the position of matters till a few weeks ago, when I received from Mrs. Gray the preserved skin of a bat, answering the description of *V. nattereri*, which she had found in a box along with some other objects of natural history that belonged to her late husband. Unfortunately there is no label attached to the specimen, but I think there can be no doubt it is of local origin, and in all likelihood the very bat obtained by Mr. Gray from Dalkeith Park in 1880. I have shown it to Mr. Eagle Clarke, who confirms my identification.

That the claim of *V. nattereri* to be regarded as a *bona fide* Scottish species does not rest on a broader and surer basis is, I cannot but think, owing rather to want of observation than absence of the bat. In England, though somewhat local, it is, as we learn from Mr. Harting's article in the "Zoologist" for July 1889 and subsequent records, widely distributed, having been obtained in two-thirds of the counties, and as far north as Durham on the east side and Cumberland on the west. In Ireland it has occurred several times, one example being from Donegal in the north-west of the island ("Zoologist," 1891). On the Continent it reaches Sweden.

Being, according to Harting, essentially a woodland species, well-timbered parks and grounds, like those of Dalkeith Palace, are the localities in which one would expect it to be most likely to occur; and I venture to predict with some confidence that if readers of the "Annals" who have it in their power to secure bats from such localities in the different Scottish counties will take the trouble to do so for a few seasons, we shall not have long to wait for fresh records of

Natterer's Bat. The fringe of short stiff hairs on the membrane, between the tail and the feet, will serve to distinguish it from any of the other British Chiroptera. From the common Pipistrelle it is abundantly distinct, apart from the above and other characters, by reason of its larger size (expanse of wings about 10½ inches) and more ample ears with long lanceolate earlet or tragus. It is eminently gregarious in its habits, and the colonies, which are usually composed of scores of individuals, are said to take up their abodes alike in lofts or other spaces under the roofs of buildings, in caverns, and in hollow trees. If molested, they are liable to shift their quarters, and may even quit the neighbourhood altogether.

ON THE OCCURRENCE OF *LINOTA ROSTRATA* (COUES), A GREENLAND REDPOLL, IN BARRA, OUTER HEBRIDES.

By Wm. Eagle Clarke, F.L.S.

A knowledge of the various races of the Arctic or Mealy Redpolls inhabiting the Old and New Worlds is desirable for the more precise study of the British birds of the group.

During each autumn and winter some portion or other of the British area is visited by Mealy Redpolls, and, given the knowledge to which of the forms these immigrants belong, it is possible in certain cases to determine with some degree of accuracy whence our visitors came, for each race has its own particular habitat.

The study of these interesting birds has fortunately received the attention of several naturalists, but the conclusions arrived at by Dr. Stejneger appear to be those most generally accepted.[1] Dr. Stejneger's investigations were based upon the examination of several hundreds of specimens from Europe, Asia, and America, and the results were published in "The Auk" for 1884 (vol. i. pp. 145-156), under the title of 'Notes on the Genus Acanthis.' Dr.

[1] Dr. Sharpe does not accept one of Dr. Stejneger's subspecies, *Acanthis linaria pallescens* (Homeyer) ("Brit. Mus. Cat. Birds," xii. pp. 245-247).

Stejneger recognised two species and several subspecies. His species are *Acanthis hornemannii* (Holböll), with one subspecies; and *Acanthis linaria* (Linn.), with four subspecies.[1]

It is to one of Dr. Stejneger's Nearctic subspecies of *Linota linaria*—to use the generic name most usually accepted in Britain — that the bird under consideration belongs, namely to his *Acanthis linaria rostrata* (Coues).

When my friend Mr. W. L. MacGillivray informed me that he had obtained another Mealy Redpoll in Barra ("Annals," 1901, p. 115), I expressed a strong desire to see this and the other Barra specimens in his possession, with a view to determine, if possible, to what race these rare visitors to that far western island belonged. Mr. MacGillivray kindly sent me three specimens,—all that have been obtained,—and I have no hesitation in assigning these examples to the bird originally described by Dr. Coues as *Ægiothus rostratus*, but now, as I have already indicated, awarded subspecific rank by American ornithologists as "*Acanthis linaria rostrata* (Coues), Stejneger," and also known to them by the somewhat unfortunate name of the "Greater Redpoll."

This well-marked species, or subspecies, or race, whichever it may be considered, is characterised by its stout, obtuse bill, which has the upper mandible "decidedly decurved and its outline noticeably convex"; by its dark colour, and the heavy black streaks on the breast, sides of the abdomen, and flanks; and by its large size, the wing measuring some 3 inches or more. It is a native of Greenland and north-eastern North America, moving south irregularly in winter to New England, New York and Northern Illinois ("Am. Orn. Union Check-list" (2 ed.), p. 218), but has also occurred in winter in Connecticut and Montana ("The Auk," 1901, p. 195).

Linota rostrata has not hitherto been detected in any portion of Great Britain. In Ireland, however, it has occurred as a rare straggler on several occasions on the islands of Achill and Tearaght, off the West Coast, and

[1] In the former species and its ally, the lower back and uropygium are pure white; in the latter and its allies these parts are streaked with brown.

specimens obtained therefrom were submitted to Dr. Bowdler Sharpe for determination (*cf.* Ussher's "Birds of Ireland," pp. 64-65). The three Barra specimens occurred singly as follows: a male on the 8th of October 1896; one, sex undetermined, on the 10th of November 1898; and, finally, one on the 13th of October 1900. None of the specimens show any signs of pink on the breast. Their respective wing measurements are 3.08 ins., 3.06 ins., and 3.02 ins.

ON THE OCCURENCE OF THE BLACK KITE (*MILVUS MIGRANS*) AT ABERDEEN.

By George Sim, A.L.S.

A male of this species was shot near the city of Aberdeen on the 16th of April last.

In this specimen the expanse of the wings was 49 inches; length from tip of bill to end of outer tail feathers 21 inches; weight 28¾ ounces. Its stomach contained a few small feathers only.

In this species the tail is much less forked than in the Common Kite (*Milvus ictinus*), and the tail feathers are crossed by broad dark bands which are most conspicuous on the under surface. The head and throat are dull gray. Upper parts dark brown, each feather being tipped with reddish-brown and its shaft black. Breast and abdomen lighter brown, each feather having a rather broad central stripe of black.

I can find no mention of this species having occurred in Britain other than the single record made by the late Mr. John Hancock in the "Ibis" for 1867, (p. 253), of a specimen having been captured in a trap in the deer-park at Alnwick, in Northumberland, on the 11th of May 1866.

[We are informed that the Peterhead Museum has "recently acquired a specimen of this bird from a local source." If this is a Scottish example we shall be glad to have full particulars.—Eds.]

REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1900.

By T. G. Laidlaw, M.B.O.U.

(*Continued from p.* 79.)

Emberiza citrinella (Yellow Bunting).

Sutherland—Cape Wrath, April 19, one. *Outer Hebrides*—Barra, April 23, one. Flannan Isles, Sept. 17, one resting on island. *Clyde*—Carmichael, Sept. 14, nest with three eggs.

Plectrophanes nivalis (Snow Bunting).

Shetland—Dunrossness, Oct. 26, large flock. *Orkney*—Sule Skerry, March 18, a large flock remained a week; April 10, last seen; Sept. 30, first; Oct. 24, at lantern all night with Redwings, Thrushes, etc.; Nov. 1, at lantern with Fieldfares, Blackbirds, etc. North Ronaldshay, Oct. 5, about 20; Nov. 1, a good number with Thrushes, Blackbirds, etc. *Sutherland*—Cape Wrath, April 19, at lantern. *Tay*—Bell Rock, Oct. 24, on rock; Nov. 4, at lantern. *Tweed*—Cramilt, Sept. 27, two, never saw them so early. *Outer Hebrides*—Barra, March, 3rd week, ♂ and ♀, few seen this spring. Flannan Isles, Sept. 23, caught at lantern, five several days on island. *Argyll and Isles*—Dhuheartach, March 30, several; Sept. 24, one.

Sturnus vulgaris (Starling).

Orkney—Noup Head, Feb. 25, all night at lantern, in great numbers, with Blackbirds, N.E., fresh. *Sutherland*—Cape Wrath, April 19, one. *Dee*—Rattray Head, April 14, at lantern. *Tay*—Bell Rock, Oct. 17, several striking, with Redwings, etc.; Oct. 31, striking, with Blackbirds, Redwings, and Larks, S.E., haze; Nov. 4, several striking. *Argyll and Isles*—Skerryvore, July 24, one on rock; Oct. 15, one struck dome, next day on rock. Dhuheartach, April 15, several. Corran, Oct. 30, flock; Nov. 21-28, flock, Blackbirds, Thrushes, etc.

Corvus monedula (Jackdaw).

Shetland—N. Unst, April 1, one, killed on 8th inst. *Argyll and Isles*—Tiree, Oct. 25, large flock, first time I have seen such a flock in Tiree.

Corvus frugilegus (Rook).

Shetland—Dunrossness, Nov. 7, seventeen, passing S.E. *Orkney*—N. Ronaldshay, April 7, swarms all day. Sule Skerry, Dec. 28, one. *Argyll and Isles*—Tiree, Oct. 23, flocks. Skerryvore, May 13, flock going S.; May 24, flock flying past, going inland.

Alauda arvensis (Skylark).

Orkney—Noup Head, Feb. 4, numerous all night, with Blackbirds. *Sutherland*—Cape Wrath, March 4, at lantern. *Tay*—Bell Rock, Oct. 25, four at lantern; Oct. 31, all night, a few killed, S.E., light haze and rain. *Forth*—Isle of May, March 11, about a dozen, two killed (leg and wing sent). *Tweed*—Chirnside, Feb. 10, migrating flocks passing over. Rodono, May 7, a pair, seldom seen even in summer, though a pair have nested occasionally. *Outer Hebrides*—Monach, Feb. 19, at lantern with Thrushes, Blackbirds, Linnets, and Goldcrests; rush of birds, April 16, in swarms with Wheatears, Thrushes, and small birds; Nov. 16, at lantern with Thrushes, Blackbirds, etc. Island Glass, April 21-23, all night with Wheatears. *Argyll and Isles*—Skerryvore, Feb. 8, eight on rock; Feb. 23, large numbers with Thrushes, Meadow Pipits, etc.; March 22, at lantern, several killed, Thrushes, Fieldfares, etc.; May 7, at lantern with Wheatears. Dhuheartach, Feb. 18-25, several with Thrushes; March 23, in numbers throughout the day; March 24, rush of small birds; April 19, numbers with Pipits, etc.; Oct. 2-9, many passing.

Principal movements, Feb. 4, 19, 23; March 22-24; April 16-23; Oct. 9-31.

Cypselus apus (Swift).

Orkney—Sule Skerry, Aug. 21 and 30, one. *Moray*—Struy, May 27. *Dee*—Aberdeen, May 18, one; Aug. 15, last. *Tay*—Blair Atholl and Perth, May 7. Auchinblae, Aug. 13, last seen. *Forth*—Linlithgow, May 2, pair. Doune, May 7. Edinburgh, May 4; Aug. 13, last seen. *Tweed*—Halmyre and Chirnside, May 10, Aug. 30. Cramilt, May 11, single bird, seldom seen here; Sept. 29, one. *Outer Hebrides*—Flannan Isles, June 11, one. *Argyll and Isles*—Skerryvore, June 13, one died in window; June 26, two flying past. Tiree, July 27, single bird, flying east. *Clyde*—Beith, April 29, pair. Carmichael, May 7. Port Bannatyne, Sept. 7, one. *Solway*—Hoddam, May 7.

Earliest, April 29, Beith; latest, Sept. 29, Cramilt.

Caprimulgus europæus (Nightjar).

Dee—Aberdeen, Aug. 15, two. *Clyde*—Loch Fad, Bute, April 23.

Dendrocopus major (Great Spotted Woodpecker).

Tweed—Bred at Duns Castle.

Cuculus canorus (Cuckoo).

Shetland—Unst, Aug. 8, young bird caught, others seen and heard many times during the summer ("Zoologist," 1900, p. 426). *Orkney*—Sule Skerry, May 8, one captured, first I have seen here. Binscarth, several noted, commoner than usual in the islands ("Annals," 1900, p. 246). *Moray*—Strathglass, May 2. *Tay*—Pitlochry, April 25, one. Newport and Auchinblae, May 1, heard. Blair Atholl, May 5. *Forth*—Gifford, E. Lothian, April 27. Loch Vennachar, April 28. Dalmeny, May 3. Winton, May 6. Barnton, Aug. 29. *Tweed*—Cramilt, April 21, one; May 8, numerous; Aug. 14, last. Broughton and Halmyre, April 25. Chirnside, April 28, not very plentiful; young bird seen in September. *Argyll and Isles*—Skerryvore, April 29, one. Dhuheartach, April 29, at shore station. *Clyde*—Glendoune, Ayrshire, April 19. Lamlash L.H., April 27, first heard.

Earliest, April 19, Glendoune.

Strix flammea (Barn Owl).

Orkney—Skaill, Aug. 13, one seen at Yesunbie ("Annals," 1900, p. 246.

Asio otus (Long-eared Owl).

Shetland—Dunrossness, Nov. 1, one. *Outer Hebrides*—Barra, Jan. 2, three; Feb. 2, two; Sept., last week, one, Eoligary House, remained till Oct. 18.

Asio occipitrinus (Short-eared Owl).

Dee—Aberdeen, Aug. 15, one. *Argyll and Isles*—Dhuheartach, May 9, two.

Scops giu (Scops Owl).

Shetland—Foula, April, end of (wing and leg sent) ("Annals," 1900, p. 184); another on main island at same time.

Falco candicans (Greenland Falcon).

Outer Hebrides—Barra, Oct., first week, either the above or Iceland Falcon seen.

Falco islandus (Iceland Falcon).

Argyll and Isles—Skye, Feb. 15, a young bird obtained near Carbost ("Annals," 1900, p. 184).

FALCO ÆSALON (Merlin).

Outer Hebrides—Flannan Isles, Sept. 19, one caught at lantern (sent). *Argyll and Isles*—Dhuheartach, Aug. 24, one; Sept. 1, one; Oct. 8, one killing Starling; Oct. 14, one. Skerryvore, Oct. 3, one flying about rock; Oct. 12, two.

FALCO TINNUNCULUS (Kestrel).

Orkney—Sule Skerry, Sept. 4, one. *Tay*—Bell Rock, Aug. 19, rested on tower.

SULA BASSANA (Gannet).

Orkney—North Ronaldshay, May 18, swarms all day, flying N. *Dee*—Rattray Head, May 20, large numbers have been passing N. for a week. *Clyde*—Lamlash L.H., March 2, two, first seen this spring.

BOTAURUS STELLARIS (Bittern).

Moray—Jan. 10, one seen on river Nairn ("Annals," 1900, p. 122). *Dee*—Aberdeen, Jan. 25, one killed, another seen. *Forth*—Denny, several seen, and one shot, on the Carron, in Dec. ("Annals," 1900, p. 122). *Clyde*—Ayr, a pair (♂ and ♀) shot early in Jan. (1900) ("Annals," 1900, p. 122).

ANSER BRACHYRHYNCHUS (Pink-footed Goose).

Tay—Auchinblae, April 19, thirty flying N. Newport, Sept. 29, first seen. *Forth*—Aberlady, Oct. 12, forty, first seen.

ANSER ALBIFRONS (White-fronted Goose).

Shetland—Dunrossness, Dec. 1, two at Spiggie. *Argyll and Isles*—Tiree, April 27, a flock of over a hundred left about 8 p.m. going towards Barra; Oct. 1, a flock arrived; Oct. 8, large flocks.

There are numerous records of "Geese" or "Gray Geese" which cannot be quoted, the species not being identified.

BERNICLA LEUCOPSIS (Barnacle Goose).

Orkney—Sule Skerry, Oct. 12, a large flock rested on island, two shot; Oct. 24, a flock passed S. *Sutherland*—Sandside, Dec. 27, a ♀. *Dee*—Rattray Head, Feb. 20, seven. *Outer Hebrides*—Barra, May 2, very numerous this spring; Oct., 1st week, arrived.

BERNICLA BRENTA (Brent Goose).

Outer Hebrides—Barra, March, 3rd week, last seen, not numerous. *Clyde*—Fairlie Roads, Jan. 1, about twenty; Feb. 10, about a hundred; "a regular late winter resort."

Cygnus musicus (Whooper Swan).

Shetland—North Unst, April 21, a large flock passed going W. *Sutherland*—Thurso, Dec. 27, eight on Lochend. *Dee*—Rattray Head, March 30, a flock on Loch Strathbeg most of the winter. *Outer Hebrides*—Barra, May 2, about thirty going N. *Argyll and Isles*—Tiree, March 30, have left, very numerous here all winter; Oct. 26, twelve on Favil; Nov. 3, numerous. *Solway*—Extraordinary immigration of wild swans (Whoopers and Bewicks) all over the area during the winter ("Annals," 1900, p. 120).

Cygnus bewicki (Bewick's Swan).

Sutherland—Jan. 19, a ♀ killed near Wick; April 17, two at Scrabster Dam; Dec. 21, a ♀ at Barrock. *Dee*—Rattray Head. March 30, a flock, with Whoopers, on Loch Strathbeg, one killed, *Argyll and Isles*—Tiree, March 30, have left, numerous all winter; Nov. 3, numerous.

Tadorna cornuta (Sheld Duck).

Shetland—North Unst, Feb. 19, several. *Orkney*—North Ronaldshay, Sept. 18, fifteen seen, a few pairs breed. *Argyll and Isles*—Dhuheartach, April 18, a pair; May 6, a pair.

Anas streperus (Gadwall).

Argyll and Isles—Tiree, Oct. 12, have arrived. *Solway*—Feb. 3, a ♀ shot on the Solway: "first record" ("Annals," 1900, p. 120).

Spatula clypeata (Shoveller).

Argyll and Isles—Tiree, May 23, ♂ and ♀, on Island House Loch.

Dafila acuta (Pintail).

Shetland—North Unst, Nov. 10, seen on Loch. Dunrossness; Sept. 17, ♀, Pool of Virkie ("Annals," 1901, p. 8).

Mareca penelope (Wigeon).

Shetland—Dunrossness, Sept. 9-24, small parties all over district ("Annals," 1901, pp. 8-9). *Argyll and Isles*—Tiree, April 16, have left; Sept. 27, a few have arrived. *Clyde*—Lochend Loch, April 13, twelve.

Fuligula ferina (Pochard).

Orkney—July, 2nd week, a flock of quite a hundred on Loch of Skaill ("Annals," 1900, p. 245). *Tweed*—St. Mary's Loch, March 6, only come in very hard seasons; Oct. 20, several.

Fuligula marila (Scaup).

Shetland—Dunrossness, Sept. 13, a pair on Loch Clumlie.

CLANGULA GLAUCION (Golden-eye).

Shetland—Dunrossness, Sept. 14, a pair on Loch Spiggie ("Annals," 1901, p. 9). *Dee*—Rattray Head, May 3, several; left on May 6. *Tweed*—Rodono, May 3, three immature. *Argyll and Isles*—Tiree, Nov. 5, several, Loch Vasapol.

HARELDA GLACIALIS (Long-tailed Duck).

Shetland—Dunrossness, Oct. 1, one on Spiggie, first of season. *Sutherland*—Forss, April 17, two ♂'s. *Dee*—Rattray Head, Feb. 17, large flocks driven inshore by gale; May 3, large flocks, left May 16. *Tay*—Bell Rock, Nov. 20, flock of eighteen, first of season. *Outer Hebrides*—Barra, Sept., last week, arrived.

SOMATERIA MOLLISSIMA (Eider Duck).

Orkney—Sule Skerry, Jan. 20, first. *Dee*—Rattray Head, Feb. 20, twelve; May 3, large flocks, left on May 10. Aberdeen, Sept. 29, hundreds along coast.

ŒDEMIA NIGRA (Common Scoter).

Dee, Rattray Head, May 3, large flocks, left May 19. Peterhead, Sept 24, two, first of season. *Argyll and Isles*—Tiree, June 18, a pair off shore.

MERGUS SERRATOR (Red-breasted Merganser).

Shetland—North Unst, Aug. 5, three. *Orkney*—Sule Skerry, Sept. 25, one caught, first time seen here.

COLUMBA PALUMBUS (Ring Dove).

Shetland—Dunrossness, Oct. 6, two. Scousburgh, Oct 7, one.

TURTUR COMMUNIS (Turtle Dove).

Outer Hebrides—Flannan Isles, Sept. 14, one shot: on island for over a week (wing sent). *Argyll and Isles*—Dhuheartach, Aug. 29, one rested on rock.

COTURNIX COMMUNIS (Quail).

Shetland—Dunrossness, Sept. 13, a nest with nine fresh eggs taken ("Annals," 1901, p. 9).

CREX PRATENSIS (Corn Crake).

Shetland—Dunrossness, Nov. 21, one. *Orkney*—Sule Skerry, May 11, one. *Moray*—Strathglass, May 10. *Dee*—Aberdeen, May 9, one; Sept. 14, one killed. *Forth*—Tranent, May 4, heard. Comiston, May 5. Doune, May 7, heard. *Tweed*—Halmyre, April 28, heard. Chirnside May 1. *Outer Hebrides*—

Barra, April 30, one. *Argyll and Isles*—Tiree, May 12, have arrived. Dhuheartach, May 4, at shore station. Skerryvore, Aug. 17, one struck lantern. *Clyde*—Kennishead, April 22, was not generally heard until later than usual. Girvan, Dec. 16, one shot.

Earliest, April 22, Kennishead.

Porzana maruetta (Spotted Crake).

Argyll and Isles—Dhuheartach, Aug., one (leg sent).

Rallus aquaticus (Water Rail).

Shetland—Dunrossness, Nov. 6, one shot. *Orkney*—Sule Skerry, Dec. 20, one. *Forth*—Isle of May, Nov. 14, killed at lantern (leg and wing sent). *Argyll and Isles*, Tiree, Feb. 6, two shot.

Eudromias morinellus (Dotterel).

Shetland—Dunrossness, Sept. 26, adult ♂ ("Annals," 1901, p. 10).

Charadrius pluvialis (Golden Plover).

Shetland—North Unst, Nov. 12, large flocks. North Ronaldshay, Feb. 25, about twenty; July 8, beginning to flock. Sule Skerry, Sept. 9, flock. *Dee*—Rattray Head, Feb. 7-15, large flocks. Peterhead, Sept. 3, large flocks. *Forth*—Isle of May, Nov. 2, two at light, one killed. *Tweed*—Cramilt, March 10, returned from coast; Oct. 2, last seen. *Outer Hebrides*—Monach, Jan. 12-13, large numbers throughout the island. Flannan Isles, Sept 28, six; Oct. 2, eight; Oct. 8, fourteen for a few days. *Argyll and Isles*, Tiree, April 2, migrating N.; May 10, in large flocks; Sept. 19, arriving in large flocks; Oct. 16, extraordinarily numerous, wind S.E., stormy and wet. Skerryvore, Sept. 16, two on rock. Dhuheartach, Feb. 26, one; Aug. 21, passing in flocks; Aug. 28, flying round lantern.

Squatarola helvetica (Gray Plover).

Shetland—Dunrossness, Sept. 18, bird of the year, Pool of Virkie ("Annals," 1901, pp. 9-10).

Vanellus vulgaris (Lapwing).

Shetland—North Unst, Nov. 13, seen on hill. Dunrossness, Sept. 17-22, a few seen. *Orkney*—Sule Skerry, Feb. 24, six rested on island; March 6, eight; Nov. 13, one here since 4th inst. *Forth*—Isle of May, March 21, a few dozens all day; Nov. 3, large flock, midnight. *Tweed*—Cramilt, Feb. 25, returned from coast. *Outer Hebrides*—Flannan Isles, Oct. 28, five. *Argyll and Isles*—Skerryvore, March 6, one on rock; July 19, six; August 26, two. Dhuheartach, Feb. 22, one; March 21-22, in numbers going E. and N.E. *Clyde*—Carmichael, Feb. 23, returned.

STREPSILAS INTERPRES (Turnstone).

Shetland—North Unst, May 28. Dunrossness, Sept. 28, one, Pool of Virkie. *Orkney*—Sule Skerry, April 28, last seen; Aug. 10, returned. *Tay*—Bell Rock, Aug. 25, a small party. *Outer Hebrides*—Barra, Aug., last week, arrived. *Argyll and Isles*—Skerryvore, July 29, returned after an absence of three months. *Clyde*—Blairmore, Loch Long, June 2, several.

HÆMATOPUS OSTRALEGUS (Oyster-catcher).

Orkney—Sule Skerry, Feb. 24, arrived. *Tweed*—Rodono, May 19, two. *Argyll and Isles*—Dhuheartach, Feb. 17, one. Skerryvore, March 19, two, first seen this year. *Clyde*—Lamlash L.H., Feb. 20, five, first arrivals. Elvanfoot, Sept. 21, several passing S.

PHALAROPUS FULICARIUS (Gray Phalarope).

Orkney—North Ronaldshay, Oct. 15, one shot, very rare in district. *Argyll and Isles*—Dhuheartach, Sept. 24, one.

SCOLOPAX RUSTICULA (Woodcock).

Orkney—Sule Skerry, Nov. 10, one seen. *Tay*—Bell Rock, Nov. 7, one on rock at low water. *Forth*—Isle of May, Oct. 17 and Nov. 7, a few. *Argyll and Isles*—Tiree, Feb. 7 to 14, numerous, seventy-seven shot. Skerryvore, March 2, two on rock; Nov. 15, one. *Clyde*—Campsie Fells, April 7, one, alt. 1792 feet.

GALLINAGO MAJOR (Great Snipe).

Forth—Stirlingshire, Sept. 15, one seen on Denny Hills ("Annals," 1900, p. 247).

GALLINAGO CŒLESTIS (Common Snipe).

Orkney—Sule Skerry, Sept. 27, first appearance. *Outer Hebrides*—Monach, Jan. 12-13, large numbers. *Argyll and Isles*—Skerryvore, Feb. 8, one on rock; Aug. 30 and Oct. 17, one; Dhuheartach, Aug. 17, one killed.

GALLINAGO GALLINULA (Jack Snipe).

Tay—Bell Rock, Nov. 4, one struck, 1 A.M. *Forth*—Isle of May, Dec. 31, two at lantern, one killed (leg and wing sent). *Argyll and Isles*—Tiree, Sept. 26, at Crosspol.

TRINGA STRIATA (Purple Sandpiper).

Shetland—North Unst, April 12, remain all winter. *Orkney*—Sule Skerry, Oct. 18, first appearance for season. *Dee*—Rattray Head, March 15, one struck, killed. *Outer Hebrides*—Barra, Aug., last week, arrived.

Tringa canutus (Knot).

Shetland—Dunrossness, Sept. 14, three; Sept. 18, two, Pool of Virkie. *Forth*—Isle of May, Nov. 2, two killed at lantern (leg and wing sent). *Argyll and Isles*—Tiree, Sept. 1, four.

Machetes pugnax (Ruff).

Shetland—Dunrossness, Sept. 17, a ♂, Spiggie Marsh; Sept. 18, one, Pool of Virkie ("Annals," 1901, p. 11). *Orkney*—Sept. 2, two shot, Loch of Fabiston (*op. cit.* 1900, pp. 184-185).

Calidris arenaria (Sanderling).

Shetland—Dunrossness, Sept. 10-24, abundant. *Outer Hebrides*—Barra, Aug., last week, arrived. *Argyll and Isles*—Dhuheartach, Aug. 18, one; Aug. 31, several. Skerryvore, July 29. *Solway*—Jan. 4, several seen, not common in winter ("Annals," 1900, p. 120).

Totanus hypoleucus (Common Sandpiper).

Moray—Glen Affric, April 21. *Tay*—Pitlochry, April 21, a pair. *Forth*—East Linton, April 16. Loch Achray, April 21, pair, common a few days later. Bo'ness, April 24, pair. Avon, Aug. 22. *Tweed*—Halmyre, April 16. Broughton, April 22. Rodono, April 24, several pairs. St. Mary's Loch, Oct. 9, single bird. *Outer Hebrides*—Barra, May 5. *Argyll and Isles*—Tiree, May 9, have arrived. Skerryvore, April 21, three; Oct. 17, one. *Clyde*—Lamlash L.H., April 19, several, numerous after this. Crossford, April 15; April 22, common throughout district; July 23, in flight across S.E. Glasgow, 11 P.M. Renfrew, Aug. 25, several, Glen Dam.

Earliest, April 15, Crossford, Clyde.

Totanus canescens (Greenshank).

Forth—Callander, April 17, one in meadow by the Teith. *Argyll and Isles*—Tiree, July 22, three on Favil; Oct. 9, one. *Clyde*—Renfrew, Aug. 4, one, Glen Dam.

Limosa lapponica (Bar-tailed Godwit).

Shetland—Dunrossness, Sept., several small parties, Pool of Virkie. *Forth*—Aberlady, July 14, one hundred and fifty in bay. *Outer Hebrides*—Barra, Aug., last week, arrived. *Clyde*—St. Ninian's, Bute, June 4, three.

Limosa belgica (Black-tailed Godwit).

Argyll and Isles—Tiree, May 2, four; Sept. 21, five; Oct. 22, three.

Numenius arquata (Curlew).

Tay—Auchinblae, May 7, arrived at breeding grounds. *Tweed*—Cramilt, March 22, several; Oct. 3, last seen. *Argyll and Isles*—Tiree, Sept. 13, large flocks arriving. Dhuheartach, May 11, several; Aug. 17, in flocks. Skerryvore, July 27, a flock passing; Aug. 9 and 19, flocks. *Clyde*—Newton, Lanarkshire, May 6, passing N.E. Glasgow, Aug. 5-8, passing S.W.

Numenius phæopus (Whimbrel).

Shetland—Dunrossness, Sept. 14, one, Grutness Voe. *Orkney*—A pair bred near Finstown on the Mainland this year, a new locality ("Annals," 1900, p. 245). North Ronaldshay, June 6, three. *Forth*—Dalmeny, May 12, Aug. 7. *Outer Hebrides*—Barra, April 25. *Argyll and Isles.*—Tiree, April 30, several flocks have arrived; May 10, in large flocks. Earraid, April 28, four, passing. Skerryvore, May 2, two on rock. Dhuheartach, May 8, two. *Clyde*—Lamlash L.H., Aug. 2, three. Cardross, Aug. 4, one. St. Ninian's Bay, Bute, Aug. 28, seventeen.

Sterna fluviatilis (Common Tern).

Dee—Rattray Head, April 26, six, first seen; May 7, many. Aberdeen, May 7, six; Oct. 6, two killed. Peterhead, Sept. 24, still here. *Tay*—Newport, May 1. Bell Rock, Aug. 31, many passing daily for the last fortnight; Oct. 19, four passed. Bo'ness, May 8. Portobello, May 12, many. Dalmeny, Oct. 16, heard overhead. *Outer Hebrides*—Barra, May 14. *Argyll and Isles*—Dhuheartach, May 7, several; May 27, numbers passing all week.

Sterna macrura (Arctic Tern).

Shetland—Dunrossness, Sept. 18, six, Grutness and Pool of Virkie. *Orkney*—Sule Skerry, May 17, first, much later than usual this year; Sept. 16, last seen. North Ronaldshay, May 21, good many. *Dee*—Aberdeen, May 6, twenty-six; Sept. 9, about ten. *Outer Hebrides*—Flannan Isles, July 1, two. Monach, May 16, ten; May 20, large numbers. Island Glass, Sept. 16, one at lantern, fog. *Argyll and Isles*—Tiree, May 4, one; May 7, several. Skerryvore, May 21, several. Dhuheartach, May 1, eight; May 27, passing; Sept. 1, one rested on rock.

Sterna minuta (Lesser Tern).

Shetland—Dunrossness, Sept. 20, about six adults, Grutness Voe, first record for Shetland ("Annals," 1901, pp. 11-12). *Dee*—Aberdeen, May 6, about thirty. *Argyll and Isles*—Tiree, May 17, have arrived.

Larus minutus (Little Gull).

Forth—North Berwick, Dec. 31, immature bird shot east of Tantallon.

Larus glaucus (Glaucous Gull).

Shetland—Dunrossness, Nov. 4, two. *Orkney*—Sule Skerry, Dec. 28, one.

Larus leucopterus (Iceland Gull).

Shetland—North Unst, Oct. 14, two. *Clyde*—Port Bannatyne, Jan. 12, one obtained ("Annals," 1900, p. 123).

Megalestris catarrhactes (Great Skua).

Shetland—North Unst, April 9, two more nests than last year on hill. Dunrossness, single examples observed till Sept. 20.

Stercorarius crepidatus (Arctic Skua).

Shetland—North Unst, April 12, one. *Orkney*—North Ronaldshay, July 15, one. *Sutherland*—Thurso, Aug. 14-22, a dozen or so killed at Melvich and Scrabster. *Dee*—Rattray Head, May 7, one, chasing a Tern. *Tay*—Bell Rock, Aug. 31, occasionally during last fortnight. *Argyll and Isles*—Tiree, June 4, have arrived. Skerryvore, July 31, one. Dhuheartach, May 16, one; Sept. 23, Oct. 7 and 12, one.

Alca torda (Razorbill).

Shetland—North Unst, March 27, large flock. *Orkney*—Sule Skerry, March 31, first seen.

Uria troile (Guillemot).

Tay—Bell Rock, Oct. 15, large numbers passing S. *Tweed*—Halmyre, one on pond at Noblehouse Farm from late summer till captured in Jan. 1901.

Mergulus alle (Little Auk).

Shetland—North Unst, Jan. 4, a great number along shore. *Dee*—Aberdeen, Feb. 16, many along coast. *Forth*—Feb. 22–March 20, several obtained at Portobello, and along the Dalmeny shores of the Forth. Bo'ness, March 31, two picked up. *Solway*—Feb. 5, shot near Silloth.

FRATERCULA ARCTICA (Puffin).

Shetland—North Unst, April 13, arrived; Sept. 1, all left the rock. *Orkney*—Sule Skerry, April 7, first; Sept. 11, last seen. *Argyll and Isles*—Dhuheartach, May 16, numbers; several odd birds seen a week ago.

COLYMBUS ARCTICUS (Black-throated Diver).

Argyll and Isles—Tiree, May 15.

COLYMBUS SEPTENTRIONALIS (Red-throated Diver).

Argyll and Isles—Tiree, July 3, a pair on a freshwater loch. *Solway*—May 10, on Loch Skene.

PODICIPES CRISTATUS (Great Crested Grebe).

Forth—North Berwick, Oct. 2, a ♂. *Argyll and Isles*—Tiree, May 22, two pairs in breeding plumage on loch.

PODICIPES GRISEIGENA (Red-necked Grebe).

Solway—Feb. 20, shot at Port Mary. ("Annals," 1900, pp. 120-121.)

PODICIPES AURITUS (Sclavonian Grebe).

Orkney—Sule Skerry, Dec. 1, one. *Argyll and Isles*—Tiree, Oct. 15, on Favil.

FULMARUS GLACIALIS (Fulmar).

Sutherland—July 10, seen "sitting" on the grassy slopes at Cape Wrath ("Annals," 1901, p. 50). *Dee*—Aberdeen, Oct. 12, one picked up. *Forth*—North Berwick, Nov. 17, caught alive after storm; Nov. 24, picked up on beach.

PUFFINUS ANGLORUM (Manx Shearwater).

Argyll and Isles—Dhuheartach, March 19, several; March 25, in great numbers; April 27, great numbers passing; Aug. 23, in numbers. Skerryvore, Aug. 1, two.

PROCELLARIA PELAGICA (Storm Petrel).

Shetland—North Unst, Aug. 22, about eighty. *Orkney*—Sule Skerry, Aug. 30, at lantern; Sept. 29, one caught; Oct. 20, at lantern. *Outer Hebrides*—Island Glass, Aug. 20, two at lantern. *Argyll and Isles*—Skerryvore, June 19, twelve, rare to see so many together so early in the year.

THE HABITS OF SALMON.

By the Right Hon. Sir Herbert Maxwell, Bart., M.P., F.R.S., etc.

So long as Mr. Harvie-Brown records his own observations, one feels that, even in so obscure a problem as the life-history of the salmon, he may be trusted as a sure-footed guide. If, therefore, I venture to demur to some of the hypotheses in the writings of so well trained a student of nature, it is where he asks his readers to accept certain conclusions resting upon wholly *a priori* grounds. The whole of the argument in his paper on British Salmonidæ in the April number of the "Annals," or nearly the whole of it, seems to rest on the assumption that salmon normally spawn once in each year; and this assumption leads Mr. Harvie-Brown to condemn a most valuable class of salmon as "these oldest and most worthless fish."

I allude to what he says about the large fish which run up the Tay during the winter months, and are taken as "early spring salmon" with spinning baits. Now, I have never fished Loch Tay, and therefore have never seen these fish: it may therefore appear the height of presumption to offer any criticism upon Mr. Harvie-Brown's diagnosis of them. But they are either true spring fish, or something else. Accepting Mr. Harvie-Brown's opinion that they are something else, then I am very familiar—agreeably familiar—with their analogues in other waters.

Mr. Harvie-Brown identifies these large Tay fish with the well-known "grey schule" of the Tweed. I venture to dispute that conclusion. The "grey schule" fish are gravid; at all events their reproductive organs are in an advancing stage of development, and they spawn before returning to the sea; whereas in the winter-running fish of the Tay and many other rivers the reproductive organs are as quiescent and undeveloped as those of the real spring fish which follow them one, two, three, and four months later.

The assumption to which I demur is that every fish entering a river and ascending to the breeding-grounds does so to spawn. If this is not an assumption, it must rest on complete evidence; but there is not only no satisfactory

evidence that salmon spawn annually, but there is some evidence pointing to the return of salmon to the sea from the extreme upper waters of our rivers without having spawned since they left the sea.

In January 1900, with five other infatuated anglers, I took over the whole of the Cree and its tributary the Minnick: both naturally very prolific salmon rivers, but grievously depleted by unmerciful netting within the river, and by whammle and stake nets through the whole length of the Solway Firth.[1] We have removed all draft and haaf nets from the inland and tidal waters; obtained a lease of two stake nets near the mouth; put down one of these altogether; and imposed sixty hours' weekly close-time on the other in place of thirty-six. In consequence, a very considerable number of salmon and grilse had run up to the upper waters by the beginning of July 1900. In one portion of the Minnick, so far into the moors and so small in volume that it is rarely fished, one of our watchers counted 120 fish, many of them grilse, but many of them also salmon of 7 to 12 lbs., which had run up in April and May, and had become dark and discoloured.

Early in July there was a heavy spate. When it subsided, the watcher missed his fish. They had not run up, for in that part of its course the river becomes a mere confluence of burns and becks, where the presence of fish would have been easily detected; so he set down their disappearance to poachers. There was much rain all July, and a heavy run of grilse. Personally, I was absent that month in Norway, but almost the first thing I happened to hear on my return to the Cree was that the nets in the bay had been taking a number of dark fish which had been "washed out" of the river. Now, it takes a very severe operation to "wash" a salmon out of a river where quarters are to his liking: witness the provoking reluctance of kelts to clear out to sea until they feel quite of the mind to do so. Moreover, the physical character of the channel of the Cree puts it out of the question that these fish from the upper

[1] Happily the whammlers have accepted the judgment of the House of Lords in the case of the Tay hang-nets, and that most destructive form of fishing has been discontinued.

reaches had been "washed out" to sea, however heavy the spate may have been. They would have had to be forced through three miles of deep sluggish water between Penninghame and Minnick-foot, besides about eight miles of winding, muddy tidal estuary. No; the migration, if migration it should prove to have been, must have been deliberate—voluntary.

I took immediate steps to secure some of these discoloured fish for examination. Unluckily, I was too late, and only succeeded in obtaining one—a male, which was sent to Dr. Noel Paton on 25th August. Here are his notes upon it:—

Male—length 71.5 cm., girth 34.5 cm., depth 14 cm., total weight 3545 grammes, testes 142 gr., flesh 2064 gr., viscera 257 gr. A few parasites in gills; no sea lice; gall-bladder empty; pyloric appendages coated with a little fat; stomach empty; intestines contained yellow particles giving reaction of bile pigments; muscle pale in colour; red colouring marks on head and tail.

Analysis—

Testes	Solids	19.8 per cent.	Total	28.11
	Fats	1.9 ,,	,,	2.7
Muscle (thick)	Solids	32.7 ,,	,,	506.2
	Fats	9.8 ,,	,,	151.7
Muscle (thin)	Solids	36.1 ,,	,,	186.3
	Fats	14.4 ,,	,,	74.3

Calculating the various figures out in terms of a standard fish of 100 cm. in length, we have—

Weight.	Weight of muscle.	Solids of muscle.	Fats of muscle.	Weight of testes.	Solids of testes.	Fats of testes.
9625[a]	5573	1869[b]	610[c]	392[d]	76.7[e]	7.4[f]

[(*a*) (*b*) and (*c*). Higher than upper-water fish previously examined in August.

(*d*) (*e*) and (*f*). Higher than any fish previously examined, even in November.

The enormous weight of the testes made me think that some mistake had been made in weighing it, but on weighing what was left after a part had been taken for analysis I find that it is correct.

The points favouring the view that the fish had been up the river are—

1st, the colour of the skin, commencing to turn red.
2nd, the parasites in the gills.

I do not think that too much should be based on this one fish.

I agree with Dr. Noel Paton in his closing observation, but it is to be noted that the fishermen are quite familiar with the regular appearance in their nets of these dark fish, which they have no doubt have been up the river and down again.

In the present season I hope to obtain several of these fish, for the netsmen tell me that they always get them about the end of July.

It may not be apparent what bearing this fact has upon Mr. Harvie-Brown's theory that the big winter fish of the Tay are the fag-end of the run of autumn spawners, and neither an independent run of (temporarily) barren fish nor the beginning of the ordinary spring migration. The connection which I suggest may be traced between the presence of big barren fish in the Tay during the winter and the descent of unspawned fish in the Cree during summer is that neither of these "schools" entered the river for the purpose of reproduction. Both of them, before leaving the sea, had laid up in their tissues enough nutriment to carry them through a long physiological fast, until appetite returned with the necessity for replenishing waste, sending them back to the sea, where their necessary provender was to be found.

The late Mr. Dunbar long ago claimed that he had proved that the heavy winter fish, of which there is a well-marked run in the Thurso, returned to the sea during summer floods without spawning.

Mr. Harvie-Brown observes that these fish rarely or never rise to the fly in Loch Tay, but must be angled for with spinning baits. Is not that because Loch Tay is too deep for salmon-fishing with fly? just as there are places in most rivers where salmon lie, but, because they are so deep, never give a salmon to the fly. But it is quite different where such fish run in winter into a shallow loch. In January 1896 I was fishing the Thurso with a friend. We had fairly good sport: I killed nine salmon in the last week of January, besides landing a prodigious number of kelts. The clean fish consisted in about equal proportions of heavy fellows from 15 to 20 lbs., and newly run springers 7 to 9 lbs. Some of the big ones were quite bright and clear;

others had become slightly tinged from some weeks' or months' sojourn in the river.

With February set in a spell of warm, dry weather; the river fell very low, and the fish would look at nothing. My companion, weary of whipping a dwindling stream, declared he would go up and cast a fly on Loch More—a shallow sheet of water, whence the Thurso runs a course of some twenty miles to the sea. It is not usual to fish it until the beginning of April. It was three o'clock on a February afternoon before he got out a boat. Before dark, which falls very early in a Caithness winter, he had four salmon averaging 17 lbs. Evidently the loch was full of fish which had been running into it ever since the previous November, but no further attempt was made to take them until, as usual, the anglers moved up to Strathmore Lodge at the end of March from their early quarters on the lower reaches.

Now, what motive impelled these big fish to run into Loch More during the dark winter months? The lake does not average more than nine feet in depth, and is usually a solid sheet of ice, often until far into March. The most probable hypothesis is, that they had fed in the sea till they could feed no longer; appetite failed, and they returned "home." For it may be assumed, I think, as *chose jugée* that these anadromous fish belong to—are natives of—the fresh water, and that their migration to the sea is no more than an excursion in search of food which river and lake will not afford.

The habits of another anadromous fish, the eel, are precisely converse to those of the salmon. The eel spawns in the sea, and must therefore be deemed a native of salt water. The ascent of rivers and streams by the elvers—"eel-fare," as the Saxons scientifically termed it, meaning that the young eels "fared" up from the sea—is one of the best marked of our vernal phenomena. The eel, unlike the salmon, finds plenty of suitable diet in fresh water, including, unluckily, a large proportion of salmon ova and fry; but, like the salmon, the reproductive organs of the eel remain undeveloped until it returns to its native region. The eel, so far as we can trace its economy, spawns but once, and does not return to the fresh water. We *assume* that the

salmon spawns annually, because some salmon are seen on the redds every autumn and winter ; but there is nothing to disprove, and a good deal to suggest, that many salmon spawn only in alternate years, or even at longer intervals. It is quite possible, then, to conceive that these heavy winter fish, which are not gravid when they enter the river, drop down to the sea during the summer, and re-ascend in autumn to perform the function of reproduction. If this be so, they cannot spawn more frequently than in alternate years.

One more word about them before I have done. Mr. Harvie-Brown regards the winter fish of Loch Tay as identical with the "grey schule" of the Tweed, and therefore includes them in the observation that "their flesh is inferior and fetches a smaller price in the market." This observation alone suffices to show how different the (temporarily) barren winter fish are from the gravid "grey schule." Referring once more to the Thurso, which is a convenient microcosm of salmon angling, including river and loch, it is a well-observed maxim among those who have fished it for many seasons, not only that the winter fish fight hardest and give the best sport when hooked, but also that they are best on the table. If one wants to send a good fish to an epicure friend, let it be a good thick winter fish, even though his jacket show a tinge of purple, rather than the glittering eight-pounder which has just left the tide.

I am far, very far, from anything approaching dogmatism on a question so full of obscurity : I only give the impression left on my observant faculties, after wasting much good time in pursuit of salmon in many rivers. That impression is, that the run of heavy winter salmon is continuous with the run of smaller spring fish, just as the heaviest sea-trout precede in June and July their smaller congeners of August. In one case the run of grilse coalesces with and succeeds that of spring salmon ; in the other, that of herling, finnock or whitling—sea-trout of from ½ lb. to 1 lb. weight, presumably the grilse stage of sea-trout—coalesces with and succeeds the summer run of their larger kin.

Upon Mr. Harvie-Brown's opinion as to the cause of

early and late rivers, I may remark that his observation does not lead me to the same conclusion as his.

"If," says he, "I find a river which has no great reservoirs at its sources, and if it is a river which offers sufficient inducements to fish to ascend; and if, notwithstanding these inducements, it is a *late* river, or a river which only stocks up in the late season, *then* I would be inclined to pronounce that it *ought to be* an earlier river, and would be so if it were properly treated. I would unhesitatingly pronounce that it is over-fished by bag-nets at the coast in spring, and had an insufficient estuary free of nets; that it was probably over-fished by other nets in the river itself; and that cruives and obstructions aided in its destruction."

Now, I will instance two rivers in which a salmon is never taken before July, where none of these detrimental conditions exist, and where the spawners are carefully and effectively protected.

The first is the Luce, flowing into Luce Bay. This has been kept as a river exclusively for angling, to my knowledge, for more than thirty years. It possesses no great reservoir at its source, but its channel is well suited for salmon and sea-trout; the nets that used to fish the estuary were removed, and in the whole of Luce Bay, the largest bay in Scotland, there are but two bag-nets. The rest were all removed by the Solway Commissioners in 1867. Sea-trout begin to run early in June, fine fellows up to 6 lbs. weight, followed by an extraordinary number of others from 1 to 3 lbs. I have once heard of a salmon being taken with the fly in June, but in most seasons none are caught until the Lammas floods. There are generally plenty after that: I once killed nine in two consecutive days, and last year Mr. James Walker took one of 38 lbs. in September.

The other river I shall mention is the Amhuinn Aodh or Inverie river, debouching in Loch Nevis in Inverness-shire, after a short course of four miles from the inland lake Dulochan. There are no bag-nets in Loch Nevis, neither has netting been permitted in the river for forty years past. The sea-trout and salmon runs correspond in date and character with those of the Luce, save that the salmon in the Highland river are not of equal average weight to those of the Lowland stream.

I should add that in neither river are there any natural or artificial obstructions. There used to be cruives in the Amhuinn Aodh, but these were removed when Mr. James Baird bought Inverie about fifty years ago.

Here, then, are two rivers (I might mention several more) where salmon are protected and encouraged solely for the object of sport, yet no spring fish ever shows his nose in them. I greatly doubt whether it would be practicable to introduce an early run of fish into them. Possibly the seasonal movements of herring and other food-fishes have something to do with the advent of salmon to the estuaries; but here we enter upon purely speculative ground.

I will conclude by observing that of all the rivers known to me which give spring fish, there is not one which does not either flow out of an easily accessible reservoir, like Loch Tay, or contain in its course a large extent of still, deep, canal-like water, like No. 4 beat on the Helmsdale, the "dubs" of the Tweed, and the so-called Loch Ken on the Kirkcudbright Dee; or both these features, like the Thurso.

Features such as these may be pronounced indispensable to attracting spring salmon, but their presence does not necessarily ensure that spring salmon will be attracted by them. The Amhuinn Aodh above referred to is a typical example of many such Highland streams, affording an easy run into a deep reservoir, to which no spring salmon resort; but a more conspicuous instance is that of the Bann, a noble stream issuing from the broad expanse of Lough Neagh, into which river no salmon runs till May; while the ditch-like Bush, some six miles to the east and flowing into the same bay, affords excellent spring salmon angling in February, March, and April. Nearer home there are the Doon and the Ayr, with their mouths less than three miles apart. The first, flowing out of Loch Doon, receives an abundant run of spring fish; the second, with neither reservoir nor long, deep reaches, gives nothing to the salmon angler till late summer and autumn. Of these two streams, the Doon is far more severely netted than the Ayr.

I trust that Mr. Harvie-Brown will find in these notes no trace of disrespect to him as an eminent naturalist.

They are written solely with the view of contributing something towards the solution of one of the most complex and obscure problems in the life-history of one of our most familiar food-fishes, and with the conviction that nothing but severe abstinence from predilection, *a priori* speculation, and opinion based on evidence short of comprehensive, will serve towards elucidating the mystery of salmon-movement.

SOME RECORDS OF COLLEMBOLA AND THYSANURA FROM THE "CLYDE" AREA.

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

So little is known from actual observation of the distribution of the Aptera in these islands, that authentic records, however few, from almost any district can scarcely fail to contain some useful items of information—hence the present communication.

During the past two years I have had occasion to visit several localities in the Clyde area in search of spiders; and while so engaged a good many Aptera have naturally come under my observation also. Two species of Thysanura occurred, and the number of Collembola of which specimens have been secured is thirty-two. Most of them are well-known common forms, but several have only quite recently been added to the British list, in which connection I would refer those interested in the subject to a paper by Mr. G. H. Carpenter and myself on 'The Collembola and Thysanura of the Edinburgh District,' which was published in the "Proceedings of the Royal Physical Society" for 1899. Perhaps the most interesting item in the present list is the occurrence of *Sminthurus cæcus* in an ants' nest among the Lowther Hills.

The only person who seems to have previously paid any attention to the Aptera of "Clyde" is Mr. D. A. Boyd, who has recorded, in the "Proceedings of the Natural History Society of Glasgow" (vols ii. and iii. of new series), 18 or 19 species from the neighbourhood of West Kilbride, Ayrshire.

As usual, I am indebted to Mr. Carpenter for kindly going over the specimens and verifying my determinations.

COLLEMBOLA.

Fam. SMINTHURIDÆ.

Sminthurus viridis (Linn.).—Elvanfoot, fairly common, September 1900; Lanark, October.

S. novemlineatus, Tlb., var. *insignis*, Reut.—Common on herbage about pools on a moor near Elvanfoot, September.

S. bilineatus, Bourl.—Elvanfoot and Leadhills, a few specimens off heather, etc.

S. luteus, Lubb.—Elvanfoot, a few specimens off bracken at the edge of a wood.

S. quadrilineatus, Tlb.—Three examples (typical), under pieces of wood lying on grass at the side of the Clyde at Elvanfoot, 30th September 1900.

S. malmgrenii, Tlb., var. *elegantulus*, Reut. — This exceedingly minute and interesting form was common on mossy pools on a moor at Elvanfoot in September last.

S. cæcus, Tlb.—On 8th September 1900 I found six typical examples of this blind species in a nest of the common ant, *Myrmica rubra*, under a stone at about 1200 feet elevation on a hillside a mile or so east of Leadhills. They were all more or less marked with red dots. The occurrence of *S. cæcus* in this situation is of considerable interest, seeing the only previous British records are from caves at Mitchelstown, Ireland, and near Edinburgh; while abroad it is got under flower-pots.

Papirius cursor, Lubb. — Douglas, November, 1900, a few; The Newton, Elvanfoot, etc.

P. ornatus (Nic.), Lubb.—Carluke, Cleghorn, Douglas, Elvanfoot. Abundant in woods.

P. minutus (O. Fab.).—Cleghorn; near Elvanfoot, among grass, rather common.

Fam. ENTOMOBRYIDÆ.

Tomocerus plumbeus (Linn.).—Peaton, Loch Long, several examples, June 1900; Douglas, November.

T. tridentiferus (Tlb.) — Peaton, Carluke, Lanark, Douglas, Elvanfoot. Abundant.

Lepidocyrtus lanuginosus (Gmel.), Tlb.—Peaton, Cleghorn, Douglas, Elvanfoot, etc. Abundant everywhere.

L. cyaneus, Tlb.—Ardpeaton, Loch Long, a few under flower-pots.

Entomobrya albocincta (Templ.).—Ardpeaton, Loch Long, a few.

E. nivalis (Linn.).—Peaton, Fiddler Gill, Cleghorn, Douglas, Elvanfoot. Abundant.

E. muscorum (Nic.).—Near Lanark, October 1899; Douglas, Elvanfoot, Peaton. Some uniformly pale examples from the second locality might pass for *E. lanuginosa* (Tlb.).

E. multifasciata (Tlb.).—Ardpeaton, a few about flower-pots.

E. marginata (Tlb.).—Ardpeaton, Loch Long, a few under flower-pots in greenhouse, June 1900.

Orchesella cincta (Linn.).—Peaton, Cleghorn Glen, Elvanfoot, etc. Common.

Templetonia nitida (Templ.).—Ardpeaton, a few, June and August 1900.

Isotoma viridis, Bourl.—Peaton, Cleghorn, Lanark, Douglas, Elvanfoot, etc. Abundant.

I. palustris (Müll.).—Near Lanark, and Elvanfoot, common about pools. Var. *maculata*, Schf., Ardpeaton, about flower-pots.

I. maritima (Tlb.).—Peaton, Loch Long, common among cast-up seaweed, 30th June 1900. This is but the second British record.

I. grisescens, Schäff.—Elvanfoot, a few on an old plank lying on damp grass.

I. sensibilis, Tlb.—Douglas, Elvanfoot. A good many under bark on dead branches.

Fam. Poduridæ.

Achorutes armatus (Nic.).—Elvanfoot, common on old planks and cow-dung.

Anurophorus laricis, Nic.—Elvanfoot, a few on old plank.

Lipura armata, Tlb.—Lanark, Peaton, Elvanfoot. Common under bark and stones.

Anurida maritima (Guer.).—Common among seaweed-covered rocks at Peaton, Loch Long, August 1900.

A. granaria (Nic.).—A few under stones near Leadhills, 8th September.

Anura muscorum (Templ.).—Under bark on rotten branches, Elvanfoot, Cleghorn, Douglas.

THYSANURA.

Fam. Campodeidæ.

Campodea staphylinus, Westw.—Peaton and Lanark; a few under stones.

Fam. Machilidæ.

Machilis maritima (Leach).—Peaton, Loch Long; common on rocks by the shore, June 1900.

NOTES ON SOME FRESH AND BRACKISH WATER ENTOMOSTRACA FOUND IN ABERDEENSHIRE.

By Thomas Scott, F.L.S.

In the "Annals of Scottish Natural History" for October 1899 I submitted a few notes on some Entomostraca which had been obtained on the shores of a number of the lochs of Aberdeenshire, by means of a hand-net, during the preceding summer.

Some time after the publication of these notes I made the acquaintance of Mr. R. M. Clark, B.Sc., F.L.S., Aberdeen, and learned that he had already, in 1898, examined several of the lochs and tarns in the western part of the county—a part which had been somewhat beyond my reach. He informed me that the materials he had then collected were still in his possession, and very generously permitted me to overhaul them for any Entomostraca they might contain. Some of the lochs and tarns represented by the gatherings in Mr. Clark's collections are situated at considerable altitudes, and this circumstance added very much to their interest. The lochs represented included, amongst others, Loch Kandor, Loch Vrotachan, Loch Callater, Loch Phadruig, and Loch-an-eion, all to the southward of Castleton of Braemar; and Loch Etichan and a tarn near Loch Avon, which are situated to the north. There were also gatherings from Loch Kinord, Loch Davan, and some others nearer the city of Aberdeen.

But besides the examination of these gatherings from the highlands of Western Aberdeenshire, I have also, on three different occasions during the past autumn and spring, examined a number of the pools situated on that portion of the Links of Aberdeen known as the King's Links; the part where the pools referred to occur is near the north end

of the Golf Course, and between that and the mouth of the Don. As these pools are not much above the level of the sea, their situation is in marked contrast to that of the lochs and tarns examined by Mr. Clark. A few rare species, both of the Cladocera and Copepoda, were captured in these pools; but the most interesting feature of their Entomostracan fauna is the comparatively large variety of the Ostracoda observed in them, and which will be recorded in the sequel.

In the present paper I do not propose to give lists of the Entomostraca obtained in the gatherings from all these various lochs and pools: that may be done later on in a more general report on the fresh and brackish water Crustacea of Aberdeenshire. All I intend to do now is (1) to refer to some of the rarer species found in Mr. Clark's collections, and (2) to notice a few of the forms observed in the pools on the King's Links.

(1) The Cladocera and Copepoda were well represented in several of these gatherings, but the Ostracoda were very scarce. These captures were made chiefly by tow-netting, and of course this may account, in part at least, for the scarcity of Ostracoda; but even in the hand-net gatherings which Mr. Clark collected the Ostracoda were somewhat rare, and this agrees to a large extent with my own experience of the distribution of this group in the lochs of Aberdeenshire. In lochs which I myself have examined, where the conditions appeared to be favourable for the development of the Ostracoda, and where special efforts were made to capture them, these organisms, though perhaps plentiful enough individually, did not present the same variety of forms as is to be found in many of the lochs farther south. The only notable exception to this want of variety amongst the Ostracod fauna of the Aberdeenshire lochs which I have yet met with is the comparatively large number of species recently obtained in the pools on the King's Links, and which will be referred to further on.

Amongst the Cladocera obtained I have to record *Holopedium gibberum* (Zaddach), and *Bythotrephes longimanus*, Leydig, which, so far as I know, have not before been recorded for the county. The *Holopedium* occurred in Loch-an-eion, but was somewhat rare; *Bythotrephes*, on

the other hand, was observed in two of the gatherings from Loch Callater, obtained by tow-netting. Both these species of Cladocera have been found moderately common in some of the lochs of the south and west of Scotland. *Sida crystallina* (Müller) occurred in Loch Vrotachan and Loch Phadruig; *Ceriodaphnium quadrangula* (Müller) was also obtained in Loch Phadruig. *Acantholeberis curvirostris* (Müller) was moderately frequent—it occurred in four gatherings from Loch Phadruig, in one from a loch or tarn above Loch Vrotachan, and in another from a large pool near Loch Avon. The pretty *Graptoleberis testudinaria* (Fischer) was obtained from Loch Vrotachan, and *Alona rustica* from Loch Phadruig. A single specimen of the somewhat rare *Chydorus globosus*, Baird, was obtained from Loch Callater and also from Loch Davan. *Chydorus barbatus* (Brady) was another of the Loch Callater species, and it also occurred in Loch Phadruig. In my previous paper I referred to the absence of *Leptodora hyalina*, Lilljeborg, in the lochs which had at that time been examined; and it also appears to be an absentee from the lochs examined by Mr. Clark. Its absence from these lochs can scarcely be attributed either to their limited size or to their situation; for its distribution in Scotland shows that although it occurs in several of the larger lochs it is not confined to them, but is moderately frequent in others which differ little in size or depth from those in Aberdeenshire. Perhaps if these lochs could be more extensively tow-netted during the summer months interesting results might be obtained. I have shown by numerous statistics[1] that *Leptodora*, while frequent or common in lochs during summer and autumn, was often altogether absent during the colder months. In order to show the extensive distribution of *Leptodora*, I give here the names of a number of lochs, beginning with those in the south of Scotland, in which this fine species has been found:—Loch Maben (where, in 1882 or 1883, *Leptodora* was discovered for the first time in Scotland, by the Rev. A. M. Norman); Loch Doon (Ayrshire); Loch Lomond; Loch Arklet; Loch Katrine and Loch Achray

[1] Seventeenth "Annual Report of the Fishery Board for Scotland," part iii. p. 132 *et seq.*

(Trossachs); Loch Tay (Perthshire); Loch Leven (Kinross); Rescobie Loch (near Forfar); Loch Ness, Loch Oich, Loch Lochy, and Loch Morar in Inverness-shire. So far as known to me, Loch Ness is at present the northern limit of the distribution of *Leptodora* in Scotland.

The Copepoda obtained in Mr. Clark's collection included, amongst others, the somewhat rare *Diaptomus laciniatus*, Lilljeborg, which in Scotland has only hitherto been found in Loch Doon in Ayrshire. This well-marked species was moderately frequent in Loch Vrotachan and Loch Phadruig, and also in a small loch above Loch Vrotachan. *Diaptomus gracilis*, G. O. Sars, was common in Loch Callater, as well as in the neighbouring Loch Kandor. The *Cyclops* observed in these lochs of West Aberdeenshire were for the most part common forms. *Cyclops strenuus*, Fischer, and *Cyclops albidus* (Jurine), occurred in several of the lochs; while *Cyclops fuscus* was only observed in one of the Loch Phadruig gatherings.

The Harpacticidæ were somewhat scarce in the collections, but they included one or two moderately rare forms; for example, the rare *Canthocamptus cuspidatus*, Schmeil, was obtained from Loch Etichan, to the northward of Braemar, and from Loch-an-eion: this loch, by the way, is not the one near the boundary line that divides the county of Perth from that of Aberdeen, but is situated on the north-west side of Lochnagar. *Canthocamptus zschokkei*, Schmeil, occurred in Loch Kandor and in Loch Phadruig; while another species, *Moraria anderson-smithi*, was obtained in Loch Phadruig and in Loch Etachan.

The Ostracoda, as has already been remarked, were poorly represented in these collections; the following three species, all of which are more or less common, were the only ones observed, viz. *Cypris ophthalmica* (Jurine), Loch Vrotachan; *Cyclocypris serena* (Koch), Loch Phadruig; while the third, *Cypridopsis villosa* (Jurine), was moderately rare in Loch Vrotachan, along with *Cypria ophthalmica*.

Leaving to a future paper a more detailed discussion of Mr. Clark's collections, I will now proceed (2) to notice some of the rarer species of Entomostraca obtained in the pools on the King's Links.

Some of these pools, which were examined in September last year, and again in February and May of the present, are more or less brackish, being situated very little above the high-water level of ordinary spring tides. The Cladocera observed in them, though moderately abundant, exhibited very little variety, and the predominating form was the almost ubiquitous *Chydorus sphæricus* (P. F. Müller). One of the species collected last September was *Ilyocryptus sordidus*, Lievin, a species which has a wide distribution in the smaller lochs and tarns of Scotland, but which, when I first began the study of the fresh-water Entomostraca, was scarcely so familiar to students as it now is. Another Cladoceran recently found in the pools on the King's Links is the rare *Macrothrix hirsuticornis*, Norman and Brady, but only five or six specimens were observed. This is the largest of the three British species of *Macrothrix*, and the finest of my specimens measure almost a millimetre in length, which is practically identical with the size ($\frac{1}{28}$ of an inch) given by the Rev. A. M. Norman and Dr. G. S. Brady in their description of the species.[1] In this species the dorsal edge of the carapace is smooth, but "the most marked character consists in the anterior antennæ, which are somewhat club-shaped, sub-truncated, rounded at the extremity, and, in contrast with the long tentaculiform setæ of *M. laticornis*, are only furnished with fine hairs distributed round their extremity; but arranged here and there throughout the length of the antennæ are tufts or semi-verticils of fine hairs, which are more evident on the anterior margin, but are also present on the sides; on the posterior margin there are no hairs except near the distal extremity." The only other place in Scotland where this species has been obtained is Loch of Beiton, Unst, Shetland, where it occurred in a gathering collected by Mr. Robert Duthie, Fishery Officer.[2] It is of interest to notice that the Loch of Beiton is near the sea and not much above sea-level, and

[1] 'A Monograph of the British Entomostraca belonging to the families Bosminidæ, Macrothricidæ, and Lynecidæ,' "Trans. Nat. Hist. Soc. Northumb. and Durham," vol. i. p. 10 (separate reprint), pl. xxiii. figs. 6 and 7.

[2] 'The Inland Waters of the Shetland Islands,' by Thomas Scott and Robert Duthie, part iii., "Fourteenth Annual Report of the Fishery Board for Scotland," part iii. pp. 237 and 242, pl. ix. figs. 12 and 13.

that the species was first discovered in a slow-running stream at Ashburn, Sunderland, which appears also to be not far distant from the sea. My friend Mr. D. J. Scourfield, F.R.M.S., who found the species in Connaught Water, Epping Forest, has the following remarks on its distribution: "Since the species was first described in 1867, it appears to have been only once again recorded in the British Islands (viz. in Loch of Beiton, Unst, by T. Scott and R. Duthie), and on the Continent it has only been found by a few observers. It is a fine species, being, in fact, the largest of the genus. Numerous specimens were taken in Connaught Water on the 10th of March 1894, but curiously enough none could be found about a month later, nor has the species been seen since."[1] The gathering from the pools on the King's Links in which the *Macrothrix* was found was obtained on 4th May of the present year. A short-spined variety of *Daphnia pulex* was also observed in the same gathering.

Several species of Copepoda have been observed in the gatherings from the King's Links. *Cyclops vernalis* was obtained in September and in May; several specimens of *Cyclops bisetosus* were also obtained, but only in May; *Tachidius littoralis*, Poppe (*T. crassicornis*, T. Scott), occurred in both the gatherings mentioned, while *Thersites gasterostei*, Pagenstecher, which I recorded last year as an addition to the British fauna,[2] was frequent on the inside of the gill-covers of small three-spined sticklebacks, *Gasterosteus aculeatus*, captured with the hand-net while examining the pools in September. Altogether about nine species of Copepoda have so far been observed in these pools.

The Ostracod fauna of these pools presented a greater variety of forms than that of the other two groups, but the gathering which yielded the largest number as well as variety was the one collected in September. *Cypria ophthalmica* was obtained in all the three gatherings, but *Cypria exculpta* was only obtained in September. *Cyclocypris serena* (Koch) and

[1] 'The Entomostraca of Epping Forest,' by D. J. Scourfield, part ii., "The Essex Naturalist," vol. x. p. 317 (1898).

[2] "Eighteenth Annual Report of the Fishery Board for Scotland," part iii. p. 146, pl. v. figs. 1-7.

lævis (Müller) were both obtained in September only. *Cypris incongruens*, Ramdohr, occurred in all the three gatherings, but was most frequent in those collected in September and May. *Cypris virens* (Jurine) was also obtained in the three gatherings, but was scarce in all of them. The prettily coloured *Cyprinotus prasinus* (Fischer) was common in September, and was also taken in May. *Cypridopsis aculeata* (Costa), and *villosa* (Jurine), were obtained in September only; the first in abundance, but the other was very rare. *Ilyocypris biplicata* (Koch) was observed both in September and in May. The form of *Ilyocypris* which I ascribe to this species, and which is moderately common in some of the pools on the Links, possesses the transverse bisulcations of the shell, but it is not tuberculated. *Candona candida* was common in February, when the ice with which some of the pools were covered had to be broken to permit the hand-net to be used. The same species was also observed in the other gatherings, and it is worthy of note that in neither of them were any adult males observed. In the gathering collected in September I observed one or two specimens of a *Candona* which I have for the present ascribed to *Candona lactea* (Baird). These specimens, seen from above as well as laterally, present a more cylindrical shape and are more equally curved at the ends than is usual in specimens of *Candona candida* of similar size, but in these respects they agree very well with *Candona lactea*. The diminutive and curious *Limnicythere inopinata* (Baird) was moderately frequent in the pools in September, but it has not been observed in the other two gatherings.

It may be mentioned in closing that the two species of *Cypris* and also the *Cyprinotus* recorded above are additions to the Entomostracan fauna of Aberdeenshire, and further, that I have, as in my last paper, to note the continued scarcity of species of *Candona*. Perhaps when a more systematic and thorough study of the Entomostraca of the county is taken in hand, the genus *Candona* may not be so poorly represented as it appears to be at present.

THE FLORA OF BUCHAN.

By James W. H. Trail, A.M., M.D., F.R.S., F.L.S.

During the past year I have spent some time investigating the flowering-plants and fern-allies of the district of Buchan, cut off from the remainder of the counties of Aberdeen and Banff by the rivers Ythan on the south and Deveron on the west, and by an irregular line of about four miles in length, where these streams approach most closely. I was induced to do so by finding, in the endeavour to prepare a brief account of the flora of this district for the Buchan Field Club, that information was very incomplete for even many common plants, and that much of what could be found required to be verified.

The district is irregularly four-sided, and measures in greatest length, westward from Buchan Ness, about thirty miles, and in greatest breadth, in its eastern part, about twenty-six miles. Its surface is undulating; but its highest hill reaches a height of only 769 feet. Here and there peat-mosses of varying extent still remain, and there are woods in some of the valleys; but agriculture has left only a small part of the country in its natural condition. The coast varies much, sand dunes extending for miles along the east coast, near the mouth of the Ythan, at Cruden Bay, and from Peterhead to Fraserburgh, alternating with miles of cliffs south of Peterhead and from Cruden Bay to Collieston. The north coast, along the Moray Firth west of Fraserburgh, is rocky. Its eastern portion is low, but to the west it rises into rugged cliffs, which reach their greatest height in the headlands at Pennan, Troup, and Gardenstown.

On these cliffs *Saxifraga oppositifolia*, *S. hypnoides*, and *Sedum roseum* grow, and the last is plentiful also on cliffs south of Peterhead. With these exceptions, the flora is quite of a lowland character, varying with the habitats in each locality.

The Rev. Charles Birnie kindly lent me a collection of dried plants made in the parish of Aberdour. In it were some plants, especially ferns, that I did not myself meet with in Buchan.

A number of critical forms have been submitted to Mr. A. Bennett, the brambles to the Rev. W. Moyle Rogers, the roses to Mr. W. Barclay, the forms of *Ranunculus acris* and of *Euphrasia* to Mr. F. Townsend, and the Characeæ to Mr. James Groves. To these gentlemen my very sincere thanks are due for their assistance.

Buchan includes 19 entire parishes and parts of 7 others. Gamrie and the part of Alvah that lies in Buchan both belong to Banffshire, though east of the Deveron. All the others are in the vice-county of North Aberdeen. Their names as used below always refer to the parishes, not to towns or villages of the same names. Of the plants referred to below some have not previously been recorded for these districts. These are indicated by the Watsonian numbers 93 (N. Aberdeen) and 94 (Banff) followed by an asterisk. The others have been selected for notice as rare in the district, or as local in their distribution.

Ranunculus Drouetii, Godr.—93*, in the Loch of Strathbeg, on the coast a few miles north of Peterhead, and in a small pond near the ruined castle of Pittullie in Pitsligo.

R. Baudotii, Godr.—93*, in the old canal in St. Fergus.

R. sceleratus, L.—Is very local and scarce.

R. Flammula, L.—The form *radicans*, Nolte, is of frequent occurrence in suitable habitats in 93*.

R. reptans, L.—I have already recorded this plant from the Loch of Strathbeg; and I now refer to it only to say that it was common in August 1900 on the muddy margin of the loch, and that Mr. Bennett confirmed my determination of its name. Not improbably it owes its introduction to this locality to waterfowl migrating from the continent of Europe, as the loch is a very favourite resort of these birds.

R. acris, L.—Some specimens collected in Buchan last autumn were named for me by Mr. Townsend as follows:—Var. *Boræanus*, Jord., a, *tomophyllus* (Jord.), by roads in Tarves and Strichen, 93*; var. *rectus*, Boreau, in various localities in 93*; var. *Steveni* (Andrz.), in various localities in 93*; and var. *Friesianus*, b, *vulgatus* (Jord.), in Slains, 93*.

Castalia speciosa, Salisb.—In small lochs at Mormond House in Rathen, at Crimonmogate House in Lonmay, and at Auchry House in Monquhitter, all in 93*, but probably introduced into each of these.

Papaver Rhœas, L.—Once found in Alvah in a field; a very doubtful native.

Fumaria pallidiflora, Jord.—Local, but abundant as a field weed in some parishes *e.g.* Auchterless, Turriff, King Edward, and Methlick in 93*, and in Alvah and Gamrie in 94*.

F. confusa, Jord.—93*, locally plentiful as a field weed in nine parishes, chiefly in the valleys of the Ythan and Deveron and bordering the north coast; also in Alvah, in 94*.

Barbarea vulgaris, L.—Scarce and local.

Cardamine flexuosa, With.—93*, more frequent along the Ythan than *C. hirsuta*.

Sisymbrium officinale, Scop.—Very plentiful by roads on sandy soil in north-east corner of Buchan, but elsewhere very local (near towns or villages) and scarce.

S. Alliaria, Scop.—Local, and very doubtfully native.

Coronopus Ruellii, All.—Confined to one or two fishing villages or towns; this appears to have been introduced by man into Buchan.

Lepidium hirtum, Gren. and Godr.—I have found this in only one locality in the district; but it is plentiful in 93 around Inverurie.

Teesdalia nudicaulis, R. Br.—Is locally abundant on the sands of Forvie in Slains.

Reseda Luteola, L.—93*; an example was among the dried plants from Aberdour. I found one or two examples in August in the neighbouring parish of Gamrie. It is very uncertain in its occurrence anywhere in N.E. Scotland.

Helianthemum Chamæcistus, Mill. — Scarcely frequent, though common in a few localities.

Viola ericetorum, Schrader.—Local in 93*, and not common.

V. arvensis, Murray.—A common field weed.

V. Curtisii, Forster—93, confirmed. On the sandy coasts, often abundant, and varying much in size and colour of flowers. I have found it also a good many miles up the Ythan valley.

Polygala vulgaris, L. segr.—93*, here and there, *e.g.* on the coast of Cruden.

Silene Cucubalus, Wibel.—This appears to be a scarce plant in Buchan.

Lychnis alba, Mill.—Is very plentiful by roads on the sandy soil in the north-east corner of Buchan; but it is scarce elsewhere.

Cerastium tetrandrum, Curtis.—93*, on the sandy coast along the east side.

Stellaria nemorum, L.—A few plants were found on the east bank of the Deveron in Alvah near Banff. (I found it, in August 1899, beside the Fiddich near Craigellachie, also in Banffshire.)

Sagina ciliata, Fr.—Rather abundant on a rock on the coast of Slains in 93*; also at Tarlair on the coast of Gamrie.

Spergula arvensis, L., b, *vulgaris*, Bœnn.—In this journal I have already recorded my having found this form in 93. It occurred scattered in fields in the parishes of Lonmay, Rathen, Strichen, Fyvie, and Auchterless. It appears nowhere to be so common as the form *sativa*, Bœnn.

Buda marina, Dum., c, *neglecta* (Kindb.).—Common in many places on the coasts of 93* and 94*.

Claytonia sibirica, L.—Appears to be naturalised in Aberdour and at Nethermuir in New Deer.

Radiola linoides, Roth.—Observed only in one locality in Slains.

Trifolium arvense, L.—Very scarce, in Aberdour and Monquhitter.

T. agrarium, L.—Observed in four parishes in 93 and in Gamrie, but only one or two plants in each. It seems to be gradually becoming established in N.E. Scotland.

Vicia hirsuta, Gray.—Rare in Buchan.

V. sylvatica, L.—Seen only in Gamrie.

Prunus Avium, L.—93*, occasionally in the valleys of the Ythan and Deveron.

P. Padus, L.—93*, by the Ythan at Gight in Fyvie.

Rubus carpinifolius, Weihe and Nees.—An example from Rathen, in 93, is "almost certainly" referred to this.

R. villicaulis, Koehl.—93*, in Strichen.

[*R. infestus*, Weihe.—Examples from King Edward in 93 and from Alvah and Gamrie in 94, though not sufficient to give certainty, are "probably" this form.]

R. radula, Weihe.—94*, in a hedge near farm of Melrose in Gamrie.

R. foliosus, Weihe and Nees.—93*, near the Ythan in Methlick. Other specimens from Alvah, in 94, "probably" should also be referred to *foliosus*. Mr. Rogers writes that he had not before seen examples from Scotland, and that Yorkshire is its northern limit in England as far as known to him.

R. Koehleri, Weihe and Nees.—94*, in Gamrie on the coast at Tarlair.

R. corylifolius, Sm.—93*, in St. Fergus and Fyvie.

[The brambles are not common in most parts of Buchan, but are more frequent in the valleys of the Ythan and Deveron than elsewhere.]

R. saxatilis, L.—This is local and scarce. I have seen it only in Gamrie.

Geum urbanum, L., is local; and *G. rivale*, L., is both local and scarce.

Potentilla Fragariastrum, Ehrh.—Appears to be rare in Buchan. I have seen only a dried specimen from Aberdour.

P. procumbens, Sibth.—Local and scarcely common.

Alchemilla vulgaris, L.—Though locally common, this does not appear to be so generally diffused as in neighbouring districts, and appears to be almost absent from some parishes. Of the forms recorded as British I have found *pratensis* (Schmidt) in twelve parishes of 93*, and in Alvah in 94*, and *alpestris* (Schmidt) in seven parishes in 93*.

Agrimonia Eupatoria, L.—Very local, at Gight in Fyvie, and in Gamrie.

Rosa pimpinellifolia, L., f. *spinosissima*, L.—Rather local on the coast in Cruden and in Gamrie.

R. involuta, Sm.—A large clump grows on the bank of the Ythan about three miles below Ellon. The parentage of the form is uncertain.

R. mollis, Sm.—Gathered in Slains, Tyrie, Turriff, and King Edward, all in 93, and in Gamrie in 94.

R. tomentosa, Sm.—In the valleys of the Ythan and the Deveron, and in Tyrie and Strichen, in both 93 and 94.

R. rubiginosa, L.—93*, in St. Fergus, Logie-Buchan, Ellon, and King Edward, apparently wild; and in other parishes in hedges and other situations that suggest intentional introduction by man.

R. canina, L.—A rare species in Buchan.

var. *lutetiana*, Leman.—94*, in Alvah.

var. *dumalis*, Bechst.—93*, At Gight, in Fyvie.

R. glauca, Vill.—93*, in the parishes of Ellon, Fyvie, Turriff, King Edward, and Tyrie. 94*, in Alvah and Gamrie.

var. *coriifolia*, Fr.—94*, not uncommon in Gamrie.

[The roses are scarce in many parts of Buchan. Indeed, they can be called common only in a few localities in the valleys of the rivers and along the west part of the northern seaboard.]

Saxifraga oppositifolia, L.—Has for many years been known to grow on a rock on the sea-coast near the ruins of Dundarg Castle in Aberdour; and *S. hypnoides*, L., is found on the coast of Aberdour and of Gamrie.

S. granulata, L.—Is locally plentiful on the coasts of Slains and Cruden.

Chrysosplenium alternifolium, L.—Is not common; but I have met with it by the Ythan above Ellon, and by the Deveron near Turriff.

Parnassia palustris, L.—Is local; but it is plentiful in places, especially on the coast.

Ribes Grossularia, L., *R. rubrum*, L., and *R. nigrum*, L.—All occur here and there in Buchan by roads and streams and in small plantations, but are doubtless outcasts of cultivation, or have sprung from seeds scattered from gardens by birds.

Sedum roseum, Scop.—Is very abundant on the cliffs of the east coast between Slains Castle and Boddam, and of the Moray Firth coast in Aberdour and Gamrie. It is very often galled by a mite.

Drosera anglica, Huds.—Appears to be very scarce, and *D. rotundifolia* is local and seldom common.

Myriophyllum spicatum, L.—93*, this is fairly common in the Loch of Strathbeg, and in the burn from the loch; but I have not seen it elsewhere.

Callitriche hamulata, Kütz.—Common in both 93* and 94*.

C. autumnalis, L.—93*, common in the Meikle Loch of Slains, and in the small lakes at Crimonmogate in Lonmay and at Auchry in Monquhitter.

Epilobium hirsutum, L.—In St. Fergus, apparently native. Previously recorded from 93 as introduced.

E. parviflorum, Schreb.—Local, but not rare near the coast in Slains, Peterhead, and Crimond.

E. obscurum, Schreb.—Common in many parts of both 93* and 94*.

Smyrnium Olusatrum, L.—Here and there by roads near houses in 93*, no doubt as a relic of cultivation.

Apium inundatum, Reichb., f.—Found in only two localities in 93, though in these localities it is rather plentiful.

Carum Carui, L.—A favourite in old gardens, from which it has probably been diffused near the farm buildings; often common.

Sium erectum, Huds.—Very local, on the coast of Slains and beside east end of Loch of Strathbeg.

Chærophyllum temulum, L.—Very local, in a hedge in Crimond and St. Fergus.

Myrrhis Odorata, Scop.—Occasionally plentiful, by streams; but always in situations that suggest it has escaped or been spread from gardens.

Œnanthe crocata, L.—Common along the estuary of the Ythan; less frequent and local up the Ythan to Tarves; and occasionally in a dwarfed state on damp slopes on the coast of Slains.

Ligusticum scoticum, L.—Often abundant in suitable localities on the coasts.

Peucedanum Ostruthium, Koch.—93*, occasionally by roads near houses, but no doubt as a relic of past cultivation.

Galium Cruciata, Scop.—Recorded in 1836 by Dr. A. Murray, in his "Northern Flora," for "Buchan," without a voucher, has never been confirmed. There can be little doubt that the record was erroneous.

G. palustre, L., var. *Witheringii* (Sm.).—Not rare in 93*.

Valerianella olitoria, Poll.—Very local; on the links at Cruden Bay.

Solidago Virgaurea, L.—Is local and not common in Buchan. I have observed it chiefly on the rocky coasts.

Matricaria discoidea, DC.—The immigration of this species into Buchan has been already discussed by me in this journal. It seems likely not only to become a permanent settler, but to spread widely from its starting-points.

Tanacetum vulgare, L.—Here and there, always in places that indicate its introduction by man.

Artemisia vulgaris, L.—Abundant in the north-east corner of Buchan, especially near the fishing villages: elsewhere seldom common.

A. maritima, L.—On two cliffs in Slains; not seen elsewhere.

Petasites albus, Gaertn.—93*, naturalised at Gight in Fyvie, Kinmundy in Old Deer, and Boyndlie in Tyrie.

Carlina vulgaris, L.—On dry slopes along the coast of Slains, but local.

Arctium minus, Bernh.—93*, 94*, in every sea-coast parish, often abundant in the fishing villages, but probably an introduction. Not seen inland.

A. intermedium, Lange.—93*, rare at the village of Collieston in Slains.

Carduus pycnocephalus, L.—Local and rare at Fraserburgh and in St. Fergus; perhaps introduced by man.

C. crispus, L.—93*, local and nowhere common; but observed in the parishes of Old Deer, St. Fergus, Fraserburgh, and Pitsligo, always near ruins. It may owe its place to man.

Cnicus heterophyllus, Willd.—One pretty large plant was found by a road in Methlick; but it has not been found elsewhere in Buchan.

Centaurea Cyanus, L.—Local, as a weed in fields, almost certainly not native.

Taraxacum officinale, Weber., var. *palustre*, DC.—93*, in swamps in the Ythan valley.

Sonchus asper, Hoffm.—94*, in Alvah and Gamrie. Also in almost every parish of 93.

Tragopogon pratense, L.—Very local and scarce, on Cruden Links.

Vaccinium Vitis-idæa, L.—Very local and scarce, in Longside.

Primula veris, L.—Locally abundant on the sea-coast of Slains, Cruden, and St. Fergus.

Lysimachia nemorum, L.—Not common.

Anagallis arvensis, L.—93*. I have seen an example gathered in the parish of Aberdour.

A. cærulea, Schreb.—93*, I found a plant (no doubt a casual) in a potato-field in Auchterless last autumn.

A. tenella, L.—Occurs on the coast south of Peterhead and near the Loch of Strathbeg.

Vinca minor, L.—93*, here and there in woods, looking wild, but no doubt originally introduced.

Gentiana Amarella, L.—Locally abundant on the sandy coasts from the mouth of the Ugie to Fraserburgh.

G. campestris, L.—Much less abundant than *G. Amarella;* in Slains, St. Fergus, Aberdour, and Gamrie.

Polemonium cœruleum, L.—By a roadside in Methlick, no doubt originally introduced by man.

Symphytum officinale, L.—A specimen was in the dried collection from Aberdour.

S. tuberosum, L.—Is locally abundant, but can scarcely be called general in Buchan.

S. peregrinum, Ledeb.—I found examples of this in six parishes of 93*, and in Gamrie,—vestiges of its cultivation some years since.

Anchusa sempervirens, L.—Is semi-naturalised in St. Fergus and in Old Deer, 93*.

Volvulus sepium, Junger.—93, this was found on the sea-coast near the old castle of Slains,—doubtless introduced by man,—and also by the side of a road in Longside.

Solanum Dulcamara, L.—Grows in a hedge at the ruins of Inverugie Castle. It cannot be regarded as indigenous.

Linaria repens, Mill.—93*. I found this growing in two places in Fyvie—no doubt introduced, though well established.

L. vulgaris, Mill.—Occurs naturalised here and there in both vice-counties.

Scrophularia nodosa, L.—Is not common in Buchan. I have found it along the Ythan and in Gamrie.

Mimulus Langsdorffii, Donn.—Is often extremely common along streams; and was observed in fourteen parishes of 93 and in both those of 94.

Digitalis purpurea, L.—Is not a common plant except in a few localities, chiefly in the valley of the Ythan.

Veronica hederæfolia, L.—Is markedly scarce, in contrast to its abundance near Aberdeen.

V. Tournefortii, C. Gmel.—Was observed in nine parishes of 93, and is abundant in several places.

V. scutellata, L., and *V. Anagallis-aquatica*, L.—Are both local, and can scarcely be looked on as common plants.

Euphrasia officinalis, L.—As the aggregate is abundant in every parish, I made numerous gatherings, which yielded the following to Mr. Townsend's inspection :—

E. borealis, Wettst.—93*, in Slains, Cruden, Peterhead, and King Edward; 94*, in Gamrie.

var. *eglandulosa*.—93*, in Slains and Cruden.

E. brevipila, Burnat and Gremli.—93*, in Old Deer, Tyrie, and Fraserburgh.

E. curta, Fr.—93*, in Cruden.

var. *glabrescens*, Wettst.—93*, in Cruden and Crimond.

E. gracilis, Fr.—93*, 94*, frequent on bare moorland.

E. scottica, Wettst.—93*, in Slains and Logie-Buchan.

E. Rostkoviana, Hayne.—93*, in Monquhitter and Aberdour; 94*, in Gamrie.

E. Kerneri, Wettst.—A small form on the links of St. Fergus is "probably" this.

A number of gatherings could not be determined with certainty, several being regarded by Mr. Townsend as probable hybrids or varieties of some of the above; but others he referred confidently to hybrids, including *brevipila* × *curta* from Pitsligo, and *brevipila* × *Rostkoviana* from Fyvie, Auchterless, and Tyrie.

Rhinanthus major, Ehrh.—93*. Of this I have found only one specimen, flowering in a field of grass near Auchnagatt.

Utricularia minor, L.—93*. This is the only bladderwort observed by me in Buchan, despite careful search in apparently favour-

able localities. Indeed, the peat-mosses in the district seem singularly poor in plant life. This *Utricularia* grows plentifully in a swamp near the southern boundary of Turriff.

Pinguicula vulgaris, L.—Not a common plant, though pretty wide spread.

Mentha viridis, L.—93*, in Methlick and Crimond, no doubt introduced originally by man.

M. Piperita, L.—93*, well established by streams; seen in eight parishes.

M. sativa, L.—93*, in Tarves, Methlick, and Fyvie; 94*, in Alvah.

var. *paludosa*, Sole.—93*, in Ellon and King Edward.

M. rubra (Sm. ?)—93*, by the Ythan near Ellon.

Stachys arvensis, L.—Locally plentiful as a field weed in a few parishes, especially in the north of Buchan.

Lamium intermedium, Fr.—Is almost the most abundant dead nettle in Buchan in 93; and in 94* it occurs at Gamrie.

L. hybridum, Vill.—93*, very local, but was found in Lonmay and near Fraserburgh.

Plantago Coronopus, L.—Common in suitable habitats along the coast; shows an extraordinary extent of variation in the leaves, and a good deal in the inflorescences.

Chenopodium album, L.—The varieties *incanum*, Moq., and *viride*, Syme, were found in 93*.

C. Bonus-Henricus, L.—Is occasionally met with near houses, a relic of former cultivation.

Atriplex patula, L.

var. *erecta*, Huds.—93*, gathered near Ellon, and 94*, in Gamrie.

var. *angustifolia* (Sm.).—93*, in several places.

Some examples gathered on the coast of Cruden, Mr. Bennett regards as approaching near to *A. calotheca*, Fr., but they are not in a state to permit of certainty.

A. hastata, L.—93*, in Logie-Buchan and Cruden.

Polygonum aviculare, L.—The following varieties were gathered in 93*, and are not previously recorded from that vice-county, viz.: var. *agrestinum* (Jord.), in Slains; var. *vulgatum*, Syme, in Slains and Cruden; and var. *littorale* (Link.), in Pitsligo, Fraserburgh, and Rathen.

P. Hydropiper, L.—Only on the bank of the Deveron near Banff.

P. lapathifolium, L.—93*, locally common as a field weed, chiefly in the northern parishes. 94*, in Alvah.

P. Bistorta, L.—Only one small patch by the Ythan a mile below Ellon.

Rumex conglomeratus, Murray.—93, only at Gight, very scarce; 94, on the bank of the Deveron near Banff, rather common.

R. propinquus, Aresch. (= *crispus* × *domesticus*). — 93*, in Logie-Buchan. Previously found in Britain by Mr. Beeby in Shetland.

R. domesticus, Hartm.—Very general, though seldom abundant.

R. conspersus, Hartm. (= *domesticus* × *obtusifolius*). — 93*, wide spread; 94*, in Gamrie.

Mercurialis perennis, L.—Very local, though abundant where it occurs.

Betula verrucosa, Ehrh.—93*, 94*; generally distributed in the valleys, but doubtfully indigenous.

B. pubescens, Ehrh.—93*, Ythan valley below Ellon, doubtfully indigenous.

Quercus Robur, L., var. *pedunculata* (Ehrh.).—93*, 94*, in a good many parishes, but possibly introduced, though the remains of oaks occur in the peat-mosses.

Castanea sativa, Mill.—In various parishes in 93 and 94, but only where introduced.

Salix pentandra, L.—Observed in several parishes, but scarce.

S. fragilis, L.—93* and 94*, not rare, but probably planted in most localities.

S. viminalis, L.—93 and 94*, frequent, especially near fishing-villages, but apparently not indigenous.

S. purpurea, L.—93, not common, and probably planted.

Populus tremula, L.—Seen only in the parishes of Turriff and King Edward.

Elodea canadensis, Michx.—93, well established in the Burn of Cruden, and in the Ugie.

Goodyera repens, R. Br.—Local.

Orchis mascula, L.—Coast of Cruden, local, and a dried specimen from Aberdour.

O. latifolia, L., segr.—93*, 94*. Observed in nearly half the parishes, but not plentiful.

O. maculata, L.—Not abundant anywhere, and local.

Habenaria Conopsea, Benth.—Is not common. I have not myself gathered it in Buchan.

H. bifolia, R. Br., segr.—93*, scarce and local, in Cruden.

Allium ursinum, L.—Very local; a dried specimen seen from Aberdour.

Scilla festalis, Salisb.—A dried specimen seen from Aberdour.

Juncus supinus, Mœnch, var. *comosus*, Breb.—93*, Moss of Auchleuchries, Cruden. Identified by Mr. Ar. Bennett.

Luzula vernalis, DC.—93, not common.

L. maxima, DC.—Is decidedly local and scarce, though plentiful in a few woods beside streams, *e.g.* near Gight.

L. erecta, Desv.—93*, general and common.

Alisma ranunculoides, L.—Is common on the margin of the Loch of Strathbeg, but has not been found elsewhere in Buchan.

Potamogeton natans, L.—

var. *prolixus*, Koch.—93*, in the North Ugie in parish of Longside.

P. alpinus, Balb.—Scarce, in the Ythan at Gight; and *P. heterophyllus*, Schreb., in the Meikle Loch of Slains.

P. pusillus, L.—In Loch of Strathbeg.

var. *tenuissimus*, Koch.—93*, with the type in Loch of Strathbeg.

P. pectinatus, L.—Loch of Strathbeg.

P. filiformis, Nolte.—93*, in Loch of Strathbeg.

Scirpus pauciflorus, Lightf.—93*, local, in Slains, Peterhead, and Fyvie.

S. setaceus, L.—Observed in only one locality, in Slains.

S. Tabernæmontani, Gmel.—Grows in small quantity in the estuaries of the Ythan and the Ugie. Earlier records of *S. lacustris* from these estuaries are evidently due to a mistake in identification of the plants. I have not seen *S. lacustris* in Buchan.

Carex dioica, L.—Seems to be very local, as I have found it only in Peterhead and Fyvie.

C. incurva, Lightf.—Is plentiful in a small space on the beach near the old Castle of Slains, and also in Fraserburgh, at the mouth of Philorth Water.

C. vulpina, *L.*—93*, is fairly abundant here and there along the rocky coasts of Slains and Cruden.

C. aquatilis, Wahl., var. *elatior*, Bab.—Is not uncommon along the Ythan, Ugie, and Philorth.

C. distans, *L.*—93*, is common in many places on the coast of Slains, and also near Boddam, in Rathen, and in Gamrie (94).

C. hirta, *L.*—Locally abundant in St. Fergus and Rathen.

C. riparia, Curtis.—Observed only at the mouth of the Philorth, in the parishes of Rathen and Fraserburgh.

Phalaris canariensis, *L.*—93, here and there as a casual.

Avena strigosa, Schreb., and *A. fatua*, *L.*—Both occurred here and there as weeds among cereals in both 93 and 94.

Catabrosa aquatica, Beauv.—Was observed only in Rathen.

Briza media, *L.*—Appears to be scarce. I found it only in one locality, in Slains.

Glyceria aquatica, Sm.—93*, grows near the mouth of the Burn of Auchmacoy in Ellon, beside both the burn and the Ythan. Its distribution in Scotland leads to a suspicion that it is probably not indigenous in Aberdeenshire, though well established.

Festuca sciuroides, Roth.—Very scarce in 93, though seen in three parishes.

F. elatior, *L.*, var. *pratensis*, Huds.—93*, here and there in Slains and Ellon.

Bromus secalinus, *L.*—93*, rare, and possibly introduced among grass seeds.

Brachypodium gracile, Beauv.—Very local; coast of Slains and Cruden, and at Gight in Fyvie.

Agropyron repens, Beauv., var. *barbatum*, Duval Jouve.—93* and 94*, common in many places.

A. pungens, Roem. and Schult.—93*, on sandy coasts in various localities.

Juniperus nana, Willd.—93*, on cliffs on coasts of Slains and Cruden. *J. communis* has been recorded from Peterhead and Aberdour, but probably should be referred to *J. nana*.

Polystichum Lonchitis, Roth.—I have seen a dried specimen from Aberdour.

Equisetum palustre, *L.*, var. *polystachyum*, auct.—93*, plentiful in one locality on the Links of St. Fergus.

Lycopodium.—This genus appears to be remarkably scarce in Buchan. The only example I observed was a single small plant of *L. clavatum* in Monquhitter. Both *L. clavatum* and *L. Selago* have been recorded from the district previously.

Selaginella selaginoides, Gray.—Locally common, though stunted, on the bar that separates the Loch of Strathbeg from the sea.

Chara aspera, Willd.—93*, Loch of Strathbeg.

C. vulgaris, *L.*—93*, Canal of St. Fergus.

A few critical forms still await determination, and may form the subject of a later note.

ON THREE SPECIES OF RHINANTHUS NEW TO THE SCOTTISH FLORA.

By G. Claridge Druce, M.A., F.L.S.

The genus *Euphrasia* has been very thoroughly studied and monographed by Dr. von Wettstein, with the result that a considerable number of forms have been raised to specific rank. Any one who has paid attention to the genus *Rhinanthus* must have also noticed the great range of variability even of our British forms, but from the fact of specimens becoming so blackened in drying, herbarium specimens do not adequately represent this variability.

The well-known Austrian botanist Dr. J. von Sterneck has been investigating the genus for some time, and he has recently determined the specimens in my herbarium with some interesting results. I may say, that following many Continental authors, Dr. Sterneck uses the name *Alectorolophus* for the genus instead of *Rhinanthus*.

Alectorolophus major, Reichb., *Rhinanthus major*, Ehrh.—I have from East Ross as the var. *apterus*, from Arbroath, Forfar (coll. A. Croall), from near Richmond, York (Herb. Oxon.), and from Llyn Coron near Bodorgan, Anglesey, collected by myself last year, and new to that county. Another specimen from Bucks is doubtfully referred to *A. major* by Sterneck.

Alectorolophus minor, Dumort, *Rhinanthus minor*, Ehrh.—Is a widely distributed plant, which I have from Polglass, West Ross; as a narrow-leaved form from Ballater, South Aberdeenshire, at 1000 feet; from Perth and Argyll; and from Berks and Oxfordshire as a stout plant which I referred to the var. *fallax*, Koch, but which Sterneck simply calls *minor;* from Northants; East and West Gloucestershire; Bucks; Beds; Middlesex, etc. It is a very common and generally distributed plant in Anglesey and Carnarvonshire, where I gathered it from the sea-level to over 1000 feet on the Glyders. *R. minor* is also the plant which is labelled "*R. major*" from Harlington in Beds by Mr. Saunders, and the

"*R. major*" of Mr. J. S. Rowse from Lincolnshire. Dr. Sterneck gives specific rank to the plant named *R. Crista-galli*, var. *Drummond-Hayi* by Dr. Buchanan White, and which I have from Perth, Argyll, Forfar, and West Ross; and this form ascends to over 3000 feet on Ben Lawers.

Alectorolophus stenophyllus, Schur., "Enum. Pl. Transs.," Index. *Rhinanthus stenophyllus*, Schur., "Enum. Pl. Transs.," p. 512. *Rhinanthus Crista-galli*, var. *angustifolius*, Gren. & Godr., for the larger portion of my printed records.—This I first gathered near the Boat of Garten, Easterness, in 1888, and in Glen Spean, Westerness, in 1891, at Polglass and Braemore, West Ross, in 1893, and from Forfarshire and South Aberdeenshire. It is the plant which Mr. Hanbury gathered near Tain, East Ross, in 1890, and first named *R. major*, but I believe afterwards thought to be a variety of *R. Crista-galli*. I gathered it at Glengariff in Co. Cork in June 1890; and it is the plant distributed through the Exchange Club in 1896, from Bog of Lynn, Mullingar (coll. H. C. Levinge), and from Lough Owel, Co. Westmeath (coll. W. R. Linton, 1895), under the name "*R. Crista-galli*, var. *fallax*." I have it from Newbury, Berkshire, etc., in 1891, and we may presume it has a wide distribution in the British Isles.

Alectorolophus borealis, Sterneck, in "Ann. du Cons. et du Jard. Bot. de Genéve," 1899, p. 25. *Rhinanthus borealis*.—This plant, which I gathered at high elevations on several Scottish mountains, and which I noted as a variety of *minor*, but not *Drummond-Hayi*, because the capsules were hairy all over, I noticed on Ben Lawers in 1890 and 1898 at 2600 feet, on Lochan na Larige at 2400 feet, on Ben Heasgarnich at 3000 feet, and on Ben Laoigh, Argyll, at 2200 feet.

Alectorolophus monticola, Sterneck, *Rhinanthus monticola*.—A small pretty branching form which I first gathered at Munlochy in the Black Isle in 1880, near the coast level, and at Invercauld, South Aberdeen, at nearly 1500 feet elevation in 1896.

EUPHRASIA IN NORTHERN SCOTLAND.

By James W. H. Trail, A.M., M.D., F.R.S., F.L.S.

In addition to the collections of *Euphrasia* made by me in Buchan (discussed on p. 172 of this issue), Mr. Townsend most kindly examined a number of my gatherings from other parts of Scotland, and a few specimens contained in the herbarium of the University of Aberdeen. The result has been that, while many are regarded by him as probable hybrids, or cannot be determined with confidence, a good many forms have been determined as occurring in counties or vice-counties for which they had not been previously recorded. I subjoin a list of these records, additions to districts being marked by an asterisk.

E. borealis (Towns.), Wettst.—91*, "Rocks near Cove, Kincardineshire, August 27, 1849, Paul MacGillivray"; 92, links on coast north of Aberdeen, August 1900, and elsewhere; 110*, "Berneray, Harris, Mrs. Marion MacGillivray, July 1828"; 111*, shore at Oyce, Firth, Orkney, August 22, 1888.

E. brevipila, Burnat and Gremli.—85*, "Inchcolm, Firth of Forth, August 1881, G. Nicholson"; 92, Dinnet, August 1890, and Links of Eggie, on coast north of Aberdeen, August 1900; 93, Towanrief Hill, near Rhynie and Towie, August 1897; 94, near Dufftown, August 1899; 96*, near Clava, Nairnshire, September 1897; Drumnadrochit, in Glen Urquhart, September 1895.

Var. *subeglandulosa*, Towns.—92*, Eggie Links, August 1900; Towie, August 1899; 111*, Harray, Orkney, August 1888.

E. curta, Fr.—92, Scotston Moor, near Aberdeen, among grass and whins, August 1900; sandhills on Old Aberdeen Links, September 1897.

Var. *glabrescens*, Wettst.—94*, slope of hill at Auchindoun, August 1899; 95*, coast at Burghead, September 1897; 111*, Syradale, Harray, and coast of Firth, Orkney, August 1888.

E. latifolia, Pursh.—A curious small plant gathered on top of the Brough of Birsay in Orkney, in August 1888, Mr. Townsend thinks may be this.

E. gracilis, Fr.—On moors and in poor pastures; widespread in 91*, 92, 93, 94, 95*, and in 111*, in Firth, by seashore.

E. scottica, Wettst.—88*, Corrie na Chait, Ben Lawers, August 17, 1892; 92, on moor at Coull, near Tarland, August 1890; Scotston Moor, near Aberdeen, August 1900; by Socaugh Burn in Towie, August 1897; 96, moor near Clava, Nairnshire, September 1897.

E. Rostkoviana, Hayne.—92*, Hill of Coull, near Tarland, August 1890; Potarch, on Deeside, September 1888; 94, near Cullen and Findochty, August 1895.

Mr. Townsend also detected among the specimens forwarded by me the hybrids *brevipila* × *curta*, 92, Scotston Moor, August 1900, and probably this from the Khoils of Glen Muick, near Ballater, July 1888; *brevipila* × *Rostkoviana*, 92, Cairn Lea, in Strathdon, August 1897, probably this from Scotston Moor, August 1900, and 94, near Dufftown, August 1899; *brevipila* × *scottica*, Scotston Moor, August 1900.

ZOOLOGICAL NOTES.

Badger in Ayrshire.—Mr. Richard Bolton, Glengarnock Lodge, Kilbirnie, informs me that in April of the present year Andrew Ferguson killed a female Badger (*Meles taxus*), in young, close to the march between Glengarnock and Blairpart. It was lying out amongst some wet heather, and was left where it was killed. The man had no idea of what it was; and it was not until ten days after its death that Mr. Bolton saw it. It was then past preserving. There are no recent records of the occurrence of the Badger in this district; but the new "Statistical Account" (1845) vol. v., under Kilbirnie, says that it was formerly met with in the glens, but is no longer to be found.—Hugh Boyd Watt, Glasgow.

Smew and other Birds in Shetland.—An immature Smew (*Mergus albellus*) was shot on Loch Spiggie, on the 14th of February last, and is the second specimen of this species that I have ever seen here. On the 1st of January, a Long-eared Owl (*Asio otus*) was observed, and a specimen found dead on the 16th was probably the same bird. It had struck against a wire fence and injured its breast. On the 1st of February, a Redbreast (*Erithacus rubecula*) appeared, the first I have seen for a long time. On the 12th of January, a Swan was noted in the loch, which, from its small size and the colour of its bill, I believe to be a Bewick's Swan. We had a visit from a Woodpigeon (*Columba palumbus*) and a Chaffinch (*Fringilla cœlebs*) during the winter. We rarely see these species here after the early part of December.—Thomas Henderson, Jun., Dunrossness.

Marsh Tit nesting in West Lothian.—In passing through a wood-strip near Bo'ness on the morning of 10th June, I was attracted by the characteristic "chay, chay, chay" of a Marsh Tit (*Parus palustris*), and on looking in the direction of the sound I saw one of these birds flitting about with food in its bill. In a few minutes I found the nest-hole in the stump of a tree, and, breaking away the bark, I displayed to view a group of seven or eight young Marsh Tits, nearly full-fledged. I examined the brood, then repaired the hole as well as I could—Robert Godfrey, Bo'ness.

Great Spotted Woodpecker in East Lothian.—On 15th May Mr. Tunnard, while fishing at Presmennan Lake, both heard and saw a Greater Spotted Woodpecker (*Dendrocopus major*). I have not heard of its occurrence in this neighbourhood for many years, and never before during the nesting season. Turnbull, in his "Birds of East Lothian," states, "Very rare; I have shot it twice in Gladsmuir Woods. It has also occurred near Pitcox, the late Dr. Nelson having obtained one or two specimens there." The last mentioned locality is close to Presmennan.—Archibald Buchan-Hepburn, Smeaton-Hepburn, East Lothian.

[This would seem to indicate an interesting extension of the bird's present breeding range in Scotland. Hitherto it has only been known to breed at Duns, in Berwickshire. We are informed by Mr. Charles Campbell that this bird is believed to have been seen at Dalmeny during June of this year.—Eds.]

Persecution of the Gannet on the Bass Rock.—A correspondent, who has recently visited the Bass Rock, draws our attention to the shameful treatment the Gannets are receiving at the hands of the numerous workmen engaged in the erection of the lighthouse on that island. These men not only take large numbers of eggs, but amuse themselves by pelting the birds to death with stones. Our

informant writes, "I was anxious about the Solan Geese on the Bass Rock, but things are worse than I supposed. Can anything be done?"

Bernicle Geese in Perthshire.—I have been asked to record the fact that a flock of Bernicle Geese (*Bernicla leucopsis*) were seen flying up the valley of the Tummel on the 2nd of May. My attention was drawn to these birds by a young lad in our service, who called us out of the house to see them. Having been brought up on the shores of the Solway Firth, he has been familiar with Bernicle Geese from infancy, and readily recognised their call at a long distance. The birds flew over in a broad V formation, which I estimated roughly as containing from sixty to seventy birds, followed by four of their number flying in a single line. They were also independently noticed about a mile farther north by my friend Mr. Sandbach, who has shot many geese in Ireland. Being a keen sportsman he came to ask me if we had observed them. These birds appeared to be coming from the Tay estuary, and were possibly making for the Moray Firth. An old resident tells me that geese not unfrequently pass up or down this valley and that of the Tay in spring and autumn, taking a line from Fincastle to Kinnoul Hill, or the reverse, according to the season. A flock of about fifty gray geese passed up this valley on 21st April, and two birds flew in the same direction on 22nd April. The only local gray goose that I happen to have examined was a Pink-footed Goose.—H. A. Macpherson, Pitlochry.

Little Gull on the Solway Firth.—The Little Gull (*Larus minutus*) has occurred so often upon the Solway Firth, that I should hardly have referred to the fact, were it not that this bird is rare in western Britain in the spring of the year. Early in April last, an adult Little Gull appeared on a ploughed field near Allonby, on the English side of the Firth. It had newly commenced to don the black hood and was in very perfect plumage.—H. A. Macpherson, Pitlochry, 5th June.

Little Gull in Orkney.—On landing at Stromness on the 29th of March, I was informed by Mr. Begg, a man who takes much interest in bird-life, that there were a lot of Little Gulls (*Larus minutus*) in the harbour. He told me that he first saw them that afternoon, and that there were about twenty of them. The following day, I saw several of them flying along the shore in twos and threes, and occasionally they were hovering over the water. Most of them had black heads, but two had not, and one had the black on the head only partially developed. I did not see them after the 30th of March. There can be no doubt as to the identity of these birds, for the Blackheaded Gull (*Larus ridibundus*) is very common and well known to me, and was, moreover, at hand in plenty for

comparison at the time I saw the Little Gulls. Mr. Begg tells me that this is the fourth occasion on which he has seen the Little Gull at Stromness. He saw one in November last, but the other occasions are far back, and he does not keep notes.—James Tomison, Sule Skerry.

Clausilia laminata (*Mont.*), **and Helix virgata**, *Da C.*, **in the Forth area.**—On 24th April last I was delighted to find *Clausilia laminata* fairly common in a ravine near Oakley, Fife. The only Scottish locality given for the species in Roebuck's "Census" is, near Perth. On 27th April I visited an old ballast heap near Kincardine-on-Forth, and found on the side of it facing the south, plenty of dead shells of *Helix virgata*. A few that had been carried some distance by the tide were also picked up. No doubt the "station" for the species mentioned by Buchanan-White in the "Scottish Naturalist" for July 1891, was either this very ballast heap or had a close connection with it. — William Evans, Edinburgh.

Additions to the list of Scottish Coleoptera.—Since the publication of my paper on Scottish Coleoptera in this Magazine a little more than a year ago, the following further additions to the Scottish list have been recognised among my specimens, namely :—

Tachyporus formosus, Matth.—One, Lag, Arran, April 1895.

Pseudopsis sulcata, Newm.—One in haystack refuse, Torduff, Colinton, March 1900.

Bryaxis helferi, Schm.—Kincardine-on-Forth, April 1901, a dozen under pieces of wood lying on the side of a muddy ditch : verified by Mr. G. C. Champion.

Hister merdarius, Hoff.—One, Merchiston, Edinburgh, June 1894, verified by Dr. Sharp.

Cis fuscatus, Mell.—One, Brodick, April 1895, verified by Mr. Champion.

A number of other good species have also been met with recently, but as they are already on the Scottish list, I need not mention them at present. I am greatly indebted to Mr. Thornley for continuing to help me with the identifications. — William Evans, Edinburgh.

Agriotypus armatus, *Curtis*, **in Midlothian.**—With reference to Mr. Morton's note in the "Annals" for April (*ante*, p. 120), I am glad to be able to record the capture of this interesting insect in this county on the 3rd of May last. On that day I found a good many flying in the sunshine over the surface of a small stream at the foot of the Pentland Hills, near Kirknewton. They frequently alighted on the dry parts of stones in the stream, but I saw none make any attempt to enter the water. Males were much more

plentiful than females, of which I only secured three.—William Evans, Edinburgh.

Orthostira brunnea, *Germ.*, and other Hemiptera in the Edinburgh District.—To my records of Heteroptera in last year's "Annals," I can now add the following:—

Orthostira brunnea, Germ.—One, among moss in Rosslyn Glen, 22nd December 1900. First record for Scotland.

Cryptostemma alienum, H.-S.—A few among shingle by the Heriot Water, 11th May last.

Salda elegantula, Fall.—A few on the side of a muddy ditch, Kincardine-on-Forth, 27th April last.

Specimens of each have been submitted to Mr. Saunders.

There are also in my collection the following Homoptera nearly all unrecorded from Scotland. I am much indebted to Mr. J. Edwards for verifying and correcting my determinations.

Agallia puncticeps, Germ.—Leven, Fife, August 1895.

Allygus mixtus, Fab.—Tynefield near Dunbar, August 1894.

Livia juncorum, Latr.—Pentland Hills, and Elvanfoot.

Psylla melanoneura, Först.—Heriot, off hawthorn, May 1901.

P. pineti, Flor.—Kirknewton, May 1895.

P. betulæ, Linn.—Pentlands, October 1897, several specimens off heather. Mr. Edwards names them "probably" this species.

P. peregrina, Först.—Polton, off sallows, June.

P. alni, Linn.—Blair Adam, off alder, July 1895; Rosslyn, June 1893.

P. spartii, Guér.—Polton, common on broom, June.

Arytæna genistæ, Latr.—Lanark, September 1899, off furze; Heriot, May 1901, off broom.

Trioza albiventris, Först.—Near Balerno, May 1895.

T. urticæ, Linn.—Culross, April 1901. "Probably" this species (J. Edwards).—William Evans, Edinburgh.

Scottish Myriapoda.—Since my last note on this subject was sent to the "Annals" (*ante*, p. 120), I have obtained the following further additions to the Scottish list, namely:—

Lithobius melanops, Newp.—Near Balerno, under bark on dead tree, April.

Geophilus truncorum, Mein.—Pentlands above Colinton, and Kincardine-on-Forth, April, under stones.

Linotænia maritima, Leach.—Dalmeny, Aberdour (in abundance) and Culross, March and April; under stones from high-water mark to nearly twenty yards below it.

Atractosoma polydesmoides (Leach).—Morningside, South Queenferry, and Culross, March and April; one specimen from each locality.—William Evans, Edinburgh.

BOTANICAL NOTES AND NEWS.

Viola tricolor, *L.*, and its allies in Britain.—The great diversity of forms that are included under this name in the older floras, both those of the British Islands as a whole and provincial floras, is familiar to every one that attempts to work out their relationships, even within a limited area; for the most various are connected by many intermediate grades. A number of forms have been named by Continental botanists, and it is most desirable that the British forms should be studied in relation to the results arrived at elsewhere, difficult as it often is to reach a definite conclusion.

Mr. Edmund G. Baker, F.L.S. (in the "Journal of Botany," 1901, pp. 9-12), has recently discussed some forms sent to the British Museum in the past year, with special references to the occurrence of the following:—

1. *V. Curtisii*, Forster, *β Pesneaui*, Rouy and Foucaud.—Said to differ from typical *V. Curtisii* in petals violet, the upper one deeper coloured, pubescence greater, lobes of stipules larger, and bracteoles on or very little below curvature of pedicel. Near Harlech.

2. *V. carpatica*, Borbás.—Agreeing with *V. lutea* in having flowers showy with petals longer than sepals, and in being perennial or subperennial, while it agrees with *V. tricolor*, segr., in having the stipules pinnately (not digitately) partite. West Lancashire, on land reclaimed from peat-moss.

3. *V. nana*, DC.—From maritime sands on Jersey and Guernsey, and also in the Scilly Islands. It was noticed in 1871 by Trimen ("Journ. Bot.," 1871, p. 99) as *V. nemausensis*, Jord.; and it is by some regarded as a variety of *V. Kitaibeliana*, Roem. and Schultes. Mr. Arthur Bennet comments ("Journ. Bot.," p. 72) on this form, which is described in "English Botany," ed. 3, suppl., p. 32.

He also alludes (*l.c.*) to another form gathered by Rev. W. H. Purchas in North Staffordshire, and named by Mr. Lloyd "*V. confinis*, Jordan, *V. Provostii*, Bor." ("Exch. Club Report" for 1885, p. 124). This "has much the facies of *lutea*, but the colour is paler, and the growth that of *tricolor*." Very little has yet been put on record as to the discrimination of the Scotch forms of *V. tricolor*.

Rubus idæus, *L.*, *var.* obtusifolius, *Willd.*, in North Aberdeen (93).—This well-marked form has been recorded, as var. *Leesii* (Bab.), from various counties in Scotland south of the Tay; but I am not aware of its having been observed in the north-east of Scotland. In May 1901 I found a small group of it growing by the side of a

wood near Tolquhon, a ruined castle in the parish of Tarves in North Aberdeen. The ordinary form of *R. idæus* was plentiful about a hundred yards away; but I saw none close to the variety.—James W. H. Trail.

Scottish Mycetozoa.—In a paper, 'Notes on Mycetozoa,' by Mr. Arthur Lister, F.R.S. (in the "Journal of Botany," 1901, pp. 81-90, pl. 419), the following are recorded from Scotland:—

Badhamia versicolor, n. sp. (*l.c.* p. 81, pl. 419, fig. 2).—Figured and described from specimens sent from near Rhynie, Aberdeenshire, by Rev. W. Cran. Found growing "in tolerable abundance," in September 1899, on trunks covered with moss and lichens, especially with *Physcia parietina*, at breast height from the ground. It appears to be allied on the one hand to *B. hyalina*, and on the other to *B. nitens*. The sporangia are sessile, subglobose, .3 to .5 mm. diam., gray.

B. lilacina, Rost.—Sporangia developed from a yellow plasmodium found on *Sphagnum* on an open moor near Arisaig.

Physarum contextum, Rost., var. *splendens*, De Bary.—Near Rhynie, in October 1900, W. Cran.

Ph. straminipes, Lister.—On straw near Rhynie, in August 1899, W. Cran.

Chondrioderma simplex, Schrœt.—Sporangia developed from a yellow-brown plasmodium found on *Sphagnum* on a common near Aberdeen in July 1899.

Arcyria Œrstedtii, Rost.—Woods of Humbie, Haddington, July 1899.

Prototrichia flagellifera, Rost.—Near Rhynie, W. Cran.

Angelica archangelica and Lamium lævigatum in Midlothian.—At Hallyards, near Kirkliston, on 15th June last, the Edinburgh Field Naturalists found *Angelica archangelica* growing wild in considerable quantity and seemingly naturalised. Boswell Syme says that he found it growing in Fisherrow Links, but failed to find it in succeeding years. Hallyards would therefore seem to be the only locality in Scotland where the plant has been naturalised. *Lamium lævigatum* was also found in the neighbourhood, but at a considerable distance from the spot where it has hitherto been found.—A. B. Steele, Edinburgh.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—April-June 1901.

[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.

Notes from Shetland. T. Edmondston Saxby. *Zoologist* (4), vol. v. p. 189 (May 1901).—Notes on five species of birds.

Robin in Shetland. O. V. Aplin and T. Edmondston Saxby. *Zoologist* (4), vol. v. p. 154 (April 1901).—Two specimens recorded.

Orthoptera from Renfrewshire. W. J. Lucas. *Entomologist*, vol. xxxiv. p. 130 (April 1901).—Three species recorded.

Lepidopterological Notes of the Year 1900. Percy C. Reid. *Ent. Record*, vol. xiii. pp. 130-133 (April 1901).—Several species recorded from Rannoch and Mount Schehallion.

Lepidoptera from South-west Scotland. A. A. Dalglish. *Ent. Record*, vol. xiii. pp. 133-135 (April 1901).

Lepidoptera in the Western Highlands. W. G. Sheldon. *Ent. Record*, vol. xiii. pp. 135-136 (April 1901).

On a Probable New Locality for Anthrocera exulans. W. G. Sheldon. *Ent. Record*, vol. xiii. pp. 136-137 (April 1901).—Refers to the capture of this species in the Glencoe district in July 1898.

Selenia bilunaria, *Sp.* (= illunaria, *Hb.*), apparently not Double Brooded in Scotland. William Evans. *Ent. Mo. Mag.* (2), vol. xii. p. 126 (May 1901).

Selenia tetralunaria (illustraria) in Scotland. Francis C. Woodbridge. *Entomologist*, vol. xxxiv. p. 179 (June 1901).—A male bred from a larva taken near Dunkeld in September 1900.

Zonosoma pendularia in October. Francis C. Woodbridge. *Entomologist*, vol. xxxiv. p. 179 (June 1901).—Specimen bred in October from larva taken at Kingussie.

Tipulidæ in the West of Scotland. By Robert Henderson. *Ent. Mo. Mag.* (2), vol. xii. pp. 113-115 (May 1901).—A list of 133 species, including four new to Britain. Corrections are given at p. 150 of the same magazine.

On New and Rare British Spiders. By Rev. O. Pickard-Cambridge, M.A., F.R.S. *Proc. Dorset Nat. Hist. and Antiq. Field Club*, vol. xxi. pp. 18-39 (1900).—Records fourteen species taken in Scotland by Mr. W. Evans, among them being, Sintula fausta (from Lauder, not Glen Farg as stated at p. 22), S. nescia (from Comrie), Gongylidium gibbum (from Comrie), and Evansia merens (from Glen Farg)—all new to science; and Tapinocyba pallens, Camb. (from Lanark)—its first record as British. It should be noted that the locality for Tmeticus reprobus, Camb., is given as near Aberdeen instead of near Aberdour in Fife.

On a Remarkable Volcanic Vent of Tertiary Age in the Island of Arran, enclosing Mesozoic Fossiliferous Rocks. Part II. Palæontological Notes. By E. T. Newton, F.R.S., F.G.S. *Quart. Journ. Geol. Soc.*, vol. lvii. pt. ii. pp. 229-241, pl. ix. (May 1901).—Seven species are recorded from beds of Rhætic age, about thirty from the Lower Lias, and nine from the Chalk.

BOTANY.

British Botany in the Nineteenth Century. By W. A. Clarke. *Journ. Bot.*, 1901, pp. 128-140. Is a brief history of progress.

Reports of Excursions and Proceedings of Glasgow Natural History Society, Session 1899-1900. *Trans. Nat. Hist. Soc. Glasg.*, vi. pp. 158-179.—Give measurements of trees of various species at Bargany and Dalquharran in Ayrshire, at Dougalston, and at Ross Priory; lists of plants observed on Ben Lomond on 30th June, and in Gallingad Glen and valley of the Glen Water near Darvel on 18th August. In the *Proceedings* are enumerated (p. 174) lichens from Dumbartonshire; (p. 178) *Buda rupestris*, *Vicia lutea*, and *Scilla verna* from South Ayr; and (p. 179) *Scutellaria galericulata* and *Gentiana campestris* from Arran, and *Polyporus varius* and *P. melanopus* from near Symington.

Notes on a Cruise in "Clyde" Waters in June 1900. By John Paterson. *Trans. Nat. Hist. Soc. Glasg.*, vi. pp. 154-158.—Enumerates the plants observed on Sheep Island and Sanda.

Meteorological Notes and Remarks upon the Weather during the Year 1899, with its General Effects upon Vegetation. By James Whitton, Superintendent of Parks, Glasgow. *Trans. Nat. Hist. Soc. Glasg.*, vi. pp. 141-153.

British Hieracia. *Journ. Bot.*, 1901, pp. 104-107.—Is a reprint of the notes issued with the sixth fascicle of the collection prepared by the Messrs. Linton, in which are several endemic forms, some of them from Scotland.

Notes on the Occurrence of Trichomanes radicans, *Sw.*, in Scotland. By William Stewart. *Trans. Nat. Hist. Soc. Glasg.*, vi. pp. 18-21, March 1901.—Discusses and supports its claim to be regarded as indigenous.

Carboniferous Lycopods and Sphenophylls. By Robert Kidston, F.R.S.E., F.G.S. *Trans. Nat. Hist. Soc. Glasg.*, vi. pp. 25-140, with figures.—Is a comprehensive monograph of these groups of fossil plants.

Elgin Mosses. By J. A. Wheldon, F.L.S. *Journ. Bot.*, 1901, pp. 94-95.—Gives a list of mosses collected by Mr. S. M. Macvicar in an afternoon near Grantown in 1899. They number nearly 100 species, with varieties of several.

A Key to the Genera and Species of British Hepaticæ. By Symers M. Macvicar. *Journ. Bot.*, 1901, pp. 154-167.—Is a valuable aid to the identification of these plants.

The Rothiemurchus Fungus Foray, 17th to 22nd Sept. 1900. *Trans. Brit. Myc. Soc.* for 1899-1900, pp. 119-123. With list of species found, being over 230, including a few from Murthly grounds in Perthshire.

New British Discomycetes. By George Massee, F.L.S., and Charles Crossland, F.L.S. *Naturalist*, 1901, pp. 177-189, pls. 1-2.—Gives descriptions of numerous species (largely from Yorkshire), and notes. *Humaria carneola*, Winter, was found on a living moss on Quinag, near Inchnadamph, Sutherland, and described by Salmon in *Quekett Micr. Journ.*, vii. p. 372, pl. 20, figs. 4-7.

Fungi new to Britain. By Annie Lorrain Smith. *Trans. Brit. Myc. Soc.*, pp. 150-158, pl. 8.—Thirty species described, of which five, from dead branches (*Coniothyrium Boydeanum* on Fuchsia, *Libertella blepharis* on Prunus Cerasus and Pyrus Malus, *L. corticola* on Pyrus communis, *L. Ribis* on Ribes rubrum, and *L. Salicis* on Salix cinerea), are described as new, from specimens sent from Ayrshire by Mr. D. A. Boyd.

Notes on Mycetozoa. By Arthur Lister, F.R.S. *Journ. Bot.*, 1901, pp. 81-90, pl. 419.—*See* Botanical Notes and News, p. 186.

On the Biology of a Næmatelia, *Fr.* By H. Marshall Ward, F.R.S. *Trans. Brit. Myc. Soc.*, pp. 143-150, pls. 6-7.

The Nutrition of Fungi. By H. Marshall Ward, F.R.S. *Trans. Brit. Myc. Soc.*, pp. 124-142.—Very valuable contributions to the subjects of both papers.

BOOK NOTICES.

A Handbook of British Birds, showing the distribution of the resident and migratory species in the British Islands, with an Index to the records of the rarer visitants. By J. E. Harting, F.L.S., F.Z.S. New and revised edition with 35 coloured plates carefully reproduced from original drawings by the late Professor Schlegel. (London: John C. Nimmo, 1901). 42s. net.

In the year 1872 Mr. Harting gave us the original edition of the "Handbook of British Birds," a work which, owing to its special features has proved to be most useful to ornithologists. That a second edition was a desideratum we venture to think no one will deny.

The book before us, however, is something more than a new and revised edition. It has been enlarged from the modest 198 pages, which formed the book of 1872, to 520 pages; and there has been added a series of coloured plates whereon are depicted the heads and feet of nearly every British bird; both sexes being figured where necessary, and, in some cases, seasonal plumage. These pictures are reproductions of the excellent drawings in Professor Schlegel's "De Vogels van Nederland."

The subject is treated of in two sections. Part I. deals with the British birds, properly so called, being residents, periodical migrants, and annual visitants. Part II. is devoted to the rare and accidental visitants, a list of whose occurrences is furnished. It is on this last section that the *raison d'etre* of the book mainly rests. The study of our British birds has progressed so rapidly during recent years that the modern standard works on the subject have found it impossible to enumerate all the occurrences of rare visitors to our shores. Mr. Harting's book aims, among other things, at supplying this want, and therein lies its special value.

We do not propose to criticise Part I., though Scottish ornithologists will very properly take exception to a goodly number of the statements made regarding native birds, such as, for example, the averment that the Red-necked Phalarope breeds in Perthshire, Inverness, and Sutherland. In Part II. one regrets extremely to find that the omissions of Scottish records of rarities are both numerous and important. The following have been detected during a somewhat rapid perusal of the lists:—Nutcracker in Wig-

town, Barred Warbler at Dhuheartach, Blue-throated Warbler at the Isle of May, Red-breasted Flycatcher at Monach Isle, Ortolan Bunting in Shetland, Scops Owl in Shetland, Squacco Heron in Mid Lothian, King Duck at St. Andrews, adult Sabine's Gull in Mull and in East Lothian, Ivory Gull in Shetland, Sooty Shearwater at North Berwick, etc. etc.

In spite, however, of the unfortunate inaccuracies and defects from the Scottish standpoint, the book contains a fund of valuable information, affords a much needed index to the occurrences of rare species recorded in the pages of "The Zoologist" and "The Field," and is a handsome addition to the library of an ornithologist.

The Birds of Siberia. A record of a Naturalist's visits to the Valleys of the Petchora and Yenesei. By Henry Seebohm, F.L.S., F.Z.S., F.R.G.S. With Map and Illustrations. (London: John Murray, 1901.) 12s. net.

This volume requires little introduction. It is not, however, a book devoted to the birds of Siberia, as its short title would lead one to expect, but is practically a reprint of the late Mr. Seebohm's two well-known and interesting works entitled respectively, "Siberia in Europe," and "Siberia in Asia," volumes which have long been out of print, are much sought after, and which command exceptionally high prices when found. The book does not appear to have been edited to any appreciable extent, and consequently some errors are perpetuated. A little additional information has been added, chiefly the results of Mr. Leybourne Popham's ornithological successes achieved on the Yenesei. It is a handsome volume and evidently supplies a demand, and that at a very moderate figure.

Charles St. John's Note Books, 1846-1853: Invererne, Nairn, Elgin. Edited by Admiral H. C. St. John. (Edinburgh: David Douglas, 1901.)

This neat little book reproduces the late Charles St. John's journals which he kept during his residence at Invererne near Forres, at Nairn, and at Elgin in the years 1846-1853. Though most of the facts contained in these notes were utilised for the well-known "Natural History and Sport in Moray,"—a book which is now entirely out of print—yet these daily records have a charm of their own which renders them well worthy of reproduction in their original form. A chapter is added on "Life at Rosehall," in Suther-

land; and a Memoir of St. John, the latter by Mr. Cosmo Innes. Admiral St. John contributes short articles on "Moray Revisited," and on "Salmon Fishing." Nine full page plates and numerous illustrations in the text from St. John's sketch books add to the attractiveness of an acceptable volume.

Practical Hints for the Field Lepidopterist. By J. W. Tutt, F.G.S. (London: Elliot Stock, April 1901.) Price 5s. 6d. net. (interleaved 6s.).

This useful little brochure is essentially a reprint of a series of papers contributed by the author to the "Entomologist's Record and Journal of Variation," although at the same time a considerable amount of new matter is added. Arranged under the various months, the hints cover all groups of Lepidoptera, and whether the collector pays attention to butterflies alone or to moths also, large or small, he will find in the book exactly the kind of information he requires to ensure success. The collecting of the insects in all stages, the rearing of the larvæ, pupa-digging, and other branches of the subject are all dealt with according to the season. A good index would have added much to the value of the book.

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OBITUARY NOTICES.

Rev. George M'Conachie, M.A., died early in May 1901, as minister of the parish of Rerrick in Kirkcudbrightshire, where he had been settled since 1877. During this time he devoted study to the plants of the district, especially to the lower cryptogams, and contributed papers on them and on subjects of historical interest to the "Transactions of the Dumfriesshire Natural History Society." He was a native of Glenrinnes in Banffshire, and passed through the curricula of arts (graduating in 1867 with honours in the mathematical sciences) and of theology in the University of Aberdeen.

John Sim, died on 24th June 1901 at the age of 77. Trained as a gardener, he became a farmer, and continued to be so for a number of years, first at Whitestripes, a few miles north of Aberdeen, and afterwards at Gateside in Strachan, where he was one of the pioneers in growing strawberries as a farm crop, now an important industry on Deeside. In later life, with the aid of his sons, he took up business as a florist, at first in Banchory and afterwards near Stonehaven. He had a strong love of field-botany, and studied the plants of the various localities in which he resided with great assiduity and success. He contributed papers to the "Transactions of the Aberdeen Natural History Society," and to the local press. One on the 'Botany of Scotston Moor' was an excellent example of a local florula. His eldest son Thomas has been in the Forestry Department in South Africa for a number of years, and has written monographs on the Ferns of South Africa.

ON THE NESTING OF THE REDSTART (*RUTICILLA PHŒNICURUS*) AND THE WILLOW WREN (*PHYLLOSCOPUS TROCHILUS*) IN SHETLAND IN THE SPRING OF 1901.

By Charles A. Sturrock, F.R.C.S.E.

Messrs. Evans and Buckley, in their "Vertebrate Fauna of Shetland," state that Redstarts have gradually become more numerous visitors to the Islands, especially in the autumn, since March 1846—when one was shot—until the spring of 1898, when at the end of April and the beginning of May they were singularly abundant in Dunrossness, according to Mr T. Henderson. All observations hitherto put on record make no allusion to the Redstart nesting or breeding. The present notice may therefore be of interest, and encourage some one to discover a complete nest another year.

I stayed at Spiggie in the spring of this year, from 4th to 14th May, spending all the long days in bird-watching. I had the good fortune on 10th May to observe a Redstart, with some building material in its beak, enter through an aperture in the roof of one of the grist mills, nine of which there are within a short distance of each other on the Mill Burn. Having quickly closed the holes in the roof of the mill which the Redstart had entered, I went inside quietly, and caught the bird in the act of intertwining the various items of moss, hay, grass, etc., which it had collected for building purposes. The nest was little more than begun, and I doubt if I should have known that a nest was in process of construction, had I not seen the builder at work. The bird worked for about a couple of minutes before detecting me, when at once it made frantic efforts to escape, trying first the hole, now closed, through which it had entered, then fluttering against the small glass window. I had no difficulty in gently catching it with my handkerchief, but almost immediately I found it was dead. I had, therefore, the unexpected opportunity of having the specimen for identification. Mr. Eagle Clarke, to whom I gave it, at

once pronounced it to be a male Redstart in full plumage. For two days after the capture, I saw its mate, on several occasions, haunting the vicinity. My observation, so far as it went, proves without any doubt that the Redstart purposed nesting in Shetland this spring.

I am at a loss to understand the reason why the Willow Wren has not figured as a breeding species in the "Avifauna of Shetland," for, with the exception of one or two other species, I observed this bird most frequently during my residence in Shetland, and its usual occupation, when under observation, was singing or carrying suitable material for building its nest.

I have stated in another place that only in the nests of the Wheatear and the Lark did I see eggs; but then I left the island on 14th May—and bird life is not so up-to-date as on the neighbouring mainland. Bearing this in mind, I could not reasonably expect to find the eggs of the Willow Wren so early in May, but should rather consider myself fortunate in having discovered an incomplete nest.

I found two nests in the process of construction, one by the side of the high road to Sumburgh, a short distance before the descent to the Pool of Virkie commences, and another by the Mill Burn before it crosses the high road. The former nest was made known to me by the noiselessness and rapidity of my bicycle enabling me to detect the bird in the very act of alighting on its nest with a piece of moss in its beak. The nest, which I so suddenly discovered, was almost completed, in fact the finishing touches alone remained to be put on; it was built upon the grass border to the road, almost at its edge, which was about a foot above the level of the road.

The other nest was being built between a stone dyke and the Mill Burn, on the grassy ground where weeds and grass were long enough to give it some concealment. I was watching Redstarts at the time; but was interested in the movements of a Willow Wren busy making a tiny collection of suitable building materials, which it placed on the bank of the Burn. I did not see two Willow Wrens at the same moment while this was going on, but occasionally one of the pair made a selection from the collection and added it to the

nest. I am inclined to believe that the hen did this part of the work. The nest had been commenced on the preceding day, I think, and was not far advanced in construction. The collection I alluded to was not deposited in a heap, but spread over an area of about two square yards, and would never have been observed by me, or, if it had, I should not have discovered its significance.

I saw many Willow Wrens in pairs in the neighbourhood of the Pool of Virkie, and I am certain that many of them must have bred there this year.

NOTES ON THE BIRDS OF THE ST. MARY'S LOCH DISTRICT, SELKIRKSHIRE.

By James M'L. Marshall, M.B.O.U.

These notes were made during a three months' stay in the district, from 19th April to 19th July 1900, most of the time being spent on the sheep-farm of Henderland; others were made about Rodono, and during my wanderings on the hills. I have added the names of a few birds at the end of the list which I did not actually see myself, but about which I got a few notes from the keeper.

Missel Thrush (*Turdus viscivorus*).—A few scattered pairs. I understand it does not occur in the neighbourhood of the loch during winter.

Song Thrush (*Turdus musicus*).—Not numerous, is absent during the winter months.

Fieldfare (*Turdus pilaris*).—Large flocks arrive in the autumn. On 5th May my brother and I saw a single bird; the last few days had been very stormy and wet.

Blackbird (*Turdus merula*).—Fairly numerous. During mild winters they stay down about the loch, but Sim says he has never seen them up at Meggat.

Ring Ouzel (*Turdus torquatus*).—On 19th April I saw three, two males and a female, between Innerleithen and Rodono. That evening I heard from Sim that he had seen the first of the season on the 17th. By 29th April they were quite numerous, and almost every hill burn had its pair. I saw the first nest

and eggs (4) on 12th May. In seasons when the crop of wild fruit is scarce they do considerable damage in the fruit gardens.

Redstart (*Ruticilla phœnicurus*).—I saw a female at Rodono on 21st April, and on 3rd May a male and a female, but at different spots. My brother got a nest and eggs later on at Cramilt, Meggat.

Wheatear (*Saxicola œnanthe*).—On 19th April I saw a few, all males, the first female I did not see till several days later. By 30th April both sexes were numerous.

Whinchat (*Pratincola rubetra*).—I saw a pair on the hill above Henderland in the early morning of 21st April. On 7th May I saw several pairs between Rodono and the foot of the loch. During the breeding season a pair were to be found almost anywhere on suitable ground.

Stonechat (*Pratincola rubicola*).—Much more scarce than the previous. On 15th May I saw two pairs up at Meggat-head. This was the only occasion on which I noticed this bird in the district.

Redbreast (*Erithacus rubecula*).—Fairly numerous. One of the few birds which stay the winter.

White-throat (*Sylvia cinerea*).—Scarce in the immediate neighbourhood of the loch. I heard the first on 17th May and saw it the following day near the mouth of the Capper.

Gold-crested Wren (*Regulus cristatus*).—A pair in most of the small fir plantations.

Willow Wren (*Phylloscopus trochilus*).—Arrived on 28th April and afterwards numerous.

Hedge Sparrow (*Accentor modularis*).—Scarce. Saw the first on 5th May at Meggat, sitting on four eggs. Does not stay the winter (Sim).

Dipper (*Cinclus aquaticus*). — Common. Several pairs on the Meggat.

Great Tit (*Parus major*).—Several pairs. Can scarcely be said to be common.

Cole Tit (*Parus ater*).—Considerably more common than the above.

Blue Tit (*Parus cæruleus*).—I never saw this bird in the neighbourhood of the loch, though I saw one as far up the Yarrow as the Gordon Arms. Sim tells me he saw one some years ago near the Capper post-office.

Wren (*Troglodytes vulgaris*).—Common. Often frequents peat sheds during winter (Sim).

Pied Wagtail (*Motacilla lugubris*).—Common. One of the earliest spring arrivals.

Gray Wagtail (*Motacilla melanope*).—Found it on my arrival on 19th April. I knew of two or three pairs at Rodono. It arrives about three weeks later than the Pied (Sim).

Tree Pipit (*Anthus trivialis*).—Saw the first on 7th May. By the 15th there were several pairs in the vicinity. Could not be called common.

Meadow Pipit (*Anthus pratensis*).—Very numerous and one of the earliest arrivals. I found eggs on 22nd April.

Spotted Flycatcher (*Muscicapa grisola*).—Scarce. Saw the first on 8th May in the wood at Rodono.

Swallow (*Hirundo rustica*).—Common. Saw the first in the early morning of 4th May.

Martin (*Chelidon urbica*).—Common. Saw the first on 5th May.

Sand Martin (*Cotile riparia*).—Common. Saw the first, 30th April.

House Sparrow (*Passer domesticus*).—Plentiful about the farm steadings.

Greenfinch (*Ligurinus chloris*).—I have not seen this bird higher up the Yarrow Valley than the Gordon Arms. Sim tells me he has at times seen them as far up as St. Mary's.

Chaffinch (*Fringilla cœlebs*).—Abundant. Is not seen at St. Mary's during the winter (Sim).

Bullfinch (*Pyrrhula europæa*).—I saw a male in Rodono Wood on 7th May. They breed in the thorns on the hillside close to the Capper Church (Sim).

Yellow Bunting (*Emberiza citrinella*).—I found this bird in numbers on my arrival on 19th April. According to Sim it is less than ten years ago since he saw this bird first, as far up the Meggat as Cramilt, though they were always common lower down the Yarrow Valley. They disappear from the loch in winter.

Reed Bunting (*Emberiza schœniclus*).—Scarce. Saw a male on the swampy ground at the mouth of the Meggat on 8th May, and on 18th May my brother saw a female near the same place.

Starling (*Sturnus vulgaris*).—Common.

Magpie (*Pica rustica*).—Fairly common.

Jackdaw (*Corvus monedula*).—Fairly common. There is a small colony of them in the old tower at Dryhope.

Raven (*Corvus corax*).—More than one pair at no great distance from Rodono. I knew of one pair at least that hatched out safely this season.

Gray Crow (*Corvus cornix*).—Have not seen this bird myself, and Sim tells me they are seldom seen at this time of year. He has known them to breed in the neighbourhood, but as often as not one of the pair is a Carrion.

Carrion Crow (*Corvus corone*).—Several pairs. Odd pairs stay during the winter.

Rook (*Corvus frugilegus*).—Common. There is a small rookery on Henderland Farm, which has been established about four years. The two previous years there were only a few pairs, and before that, none at all. There are several other rookeries in the neighbourhood.

Skylark (*Alauda arvensis*).—Scarce. Saw a pair on 7th May near the post-office, and Sim, who was with me, said they were the first he had seen this season. According to him there is usually a pair on Henderland, but he seldom sees any others. On 22nd May I saw a pair near Tibbie Shiels, but these and the ones before mentioned are the only ones I have come across.

Swift (*Cypselus apus*).—My brother saw the first on 2nd June. Several pairs, as a rule, may be seen flying round the Capper Church.

Cuckoo (*Cuculus canorus*).—Fairly numerous. Heard the first on 21st April. By 8th May there were several pairs near the hotel at Rodono.

Long-eared Owl (*Asio otus*).—Nearly every small plantation has its pair.

Sparrow Hawk (*Accipiter nisus*).—Scarce. There was one pair in a small plantation opposite Cramilt. It does not stay the winter.

Peregrine Falcon (*Falco peregrinus*).—I knew of two nests in the neighbourhood, and saw one pair on several occasions.

Merlin (*Falco æsalon*).—I saw a male near Meggat-head on 15th May. At one time a pair frequented a hill behind Cramilt, but during the last two seasons Sim says he has not seen them.

Kestrel (*Falco tinnunculus*).—Fairly common. Stays the winter.

Gannet (*Sula bassana*).—On 10th May I saw a stuffed specimen, an adult, in the shepherd's cottage at Birkhill, which was got in January 1898 in the neighbourhood of Loch Skene. Sim tells me that he shot an immature bird in December 1882 during very hard weather, near Meggat-head.

Heron (*Ardea cinerea*).—Several pairs. One is nearly always to be seen on the strip of water between the Lowes and St. Mary's Loch. A pair or two breed in the vicinity.

Mallard (*Anas boscas*).—A few pairs always breed up some of the burns.

Teal (*Nettion crecca*).—A few pairs nest annually. The mouth of the Capper is a favourite spot, but the tame Swans frequently destroy the young.

Widgeon (*Mareca penelope*).—I have not seen this bird on St. Mary's, but know of its breeding in the district, and on several occasions saw it at some distance from the loch. In winter they come in large flocks (Sim).

Pochard (*Fuligula ferina*).—On 25th March while spending the day at Rodono I saw three adult drakes on the loch. The weather was and had been for some days past very rough. Sim says a few come nearly every winter, and in hard seasons they arrive in fair quantities.

Tufted Duck (*Fuligula cristata*).—On 28th April I saw a drake on the loch, and again on the 25th I saw two near the same spot which I took to be this species, but could not identify for certain.

Golden-Eye (*Clangula glaucion*).—On 3rd May, and on other occasions, I saw three immature birds on the loch. They come in large numbers sometimes during the winter (Sim).

Goosander (*Mergus merganser*).—Appears at odd intervals on the loch (Sim). On 16th May I saw a bird rise from Clearburn Loch which I am almost positive was a drake of this species.

Ring Dove (*Columba palumbus*).—A few pairs. Saw the first on 28th April. A few odd birds are sometimes seen in winter (Sim).

Black Grouse (*Tetrao tetrix*).—Numerous.

Red Grouse (*Lagopus scoticus*).—Abundant.

Pheasant (*Phasianus colchicus*).—A few odd pairs.

Partridge (*Perdix cinerea*).—A few pairs on the cultivated ground and among the bracken on the lower part of the hills.

Landrail (*Crex pratensis*).—Heard the first on 17th May. According to Sim a pair usually frequent the cultivated ground on Henderland.

Moorhen (*Gallinula chloropus*).—A few pairs on St. Mary's and also on the Lowes.

Coot (*Fulica atra*).—A pair or two at the top end of the Lowes. Have not seen them on St. Mary's.

Golden Plover (*Charadrius pluvialis*).—Breeds in fair numbers on the higher parts of the hills.

Green Plover (*Vanellus vulgaris*).—Several pairs nested near the mouth of the Meggat. Comes and goes during the winter according to the weather.

Oyster-catcher (*Hæmatopus ostralegus*).—On 19th May I saw two at the mouth of the Meggat. Sim says he has never seen any so far up the Yarrow.

Dunlin (*Tringa alpina*).—Saw a single bird at the mouth of the Meggat on 1st May and again on the 14th. On the 18th my brother saw three.

Common Snipe (*Gallinago cælestis*).—A few pairs breed in the swampy ground.

Common Sandpiper (*Totanus hypoleucus*).—Numerous. Saw the first on 24th April. By the end of the month they were quite numerous both on the loch and on the Meggat. On 10th May I saw a pair on Loch Skene.

Redshank (*Totanus calidris*).—Two pairs nested at the mouth of the Meggat. They leave in winter.

Curlew (*Numenius arquata*).—Numbers breed on the hills. Absent in winter.

Black-headed Gull (*Larus ridibundus*).—Usually to be seen. Their favourite haunt is the mouth of the Meggat.

Lesser Black-backed Gull (*Larus fuscus*).—A few sometimes at the mouth of the Meggat. All I saw were immature.

Herring Gull (*Larus argentatus*).—A few at times.

Red-throated Diver (*Colymbus septentrionalis*).—On 30th May my brother saw a single bird on Loch Skene. In winter they sometimes appear on St. Mary's Loch (Sim).

—— Goose.—At about 5.30 on the morning of 21st April I saw a lot of about thirty wild geese flying nearly due north. The morning was dark and misty, and the birds high, so I could not make out to what species they belonged beyond the fact that they were neither Brent nor Bernicle. Another lot passed over about 7 P.M., also going north. On 1st or 2nd May Sim says he saw upwards of one hundred pass over.

Birds which I have not seen myself, but which sometimes frequent the district :—

Sheld-duck (*Tadorna cornuta*).—Seen occasionally on the loch (Sim).

Jack Snipe (*Gallinago gallinula*).—Have shot several at the loch (Sim).

Woodcock (*Scolopax rusticula*).—Have shot them several times at the loch (Sim).

Tawny Owl (*Syrnium aluco*).—Some years ago Sim tells me he saw one at Dryhope Tower.

Short-eared Owl (*Asio accipitrinus*).—Very numerous during the years of the vole plague 1891-93, and during those years a few pairs bred. Since then a few birds have appeared from time to time (Sim).

Corn Bunting (*Emberiza miliaria*).—Sim tells me he saw one some years ago on Henderland, and frequently lower down the Yarrow. Personally, I never saw the bird in the district.

Snow Bunting (*Plectrophenax nivalis*).—Large flocks in winter (Sim).

Redwing (*Turdus iliacus*).—Appears in the autumn (Sim).

Linnet (*Linota cannabina*).—Very scarce, Sim says, but he has seen them.

Tree Creeper (*Certhia familiaris*).—Once saw one in the Crow Wood, Henderland (Sim).

FURTHER NOTES ON SALMONIDÆ: A REPLY TO SIR HERBERT MAXWELL.[1]

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

To reply, as shortly as I can, to Sir Herbert Maxwell's paper in the July number of the "Annals," I desire first of all to express my great pleasure in having elicited such an article from one who has had experiences over a far greater area of Salmon-water than I can claim any accurate knowledge of. And I have also to express my pleasure and grateful thanks to him for his expressing his opinions and criticisms in such a perfectly pleasant, indeed flattering way. I feel quite sure both he and I desire only to get at the truth.

I am very willing to admit that I have expressed myself

[1] "Ann. Scot. Nat. Hist." for July 1901. This reply was written before I had seen an article in "Land and Water" of 27th April, which I did not see until to-day,—the 29th April,—written by "*Kon*" (*loc. cit.* p. 617).

not too clearly in my article in "Annals" for January 1901 (p. 23), in the paragraph in which I say: "It seems to me that the earlier spawning of these large, old sea-trout in September—having come up in March and April—goes to indicate that these constitute, not an early run of the coming season, but a late run of the passing season." I ought to have indicated that I meant the *class* of fish, and not the individual run which I gave account of. I did not *necessarily* mean to say that these same big old fish would undoubtedly spawn in the September of the same year that they ran up in, but neither can I feel certain that they *might not*, after the experiences our party had on the Gruinard (referred to again below), and again observed this season on Loch Eilt.

As regards what I said about the large Tay (Loch Tay) Salmon, I also, like Sir Herbert, am one who has never fished Loch Tay for Salmon: I hate trolling, and my statement about these big fish, which are mainly, if not entirely, caught by trolling, is given principally upon the authority I quoted, viz.: the Messrs. Anderson—father and sons—of Dunkeld. And, as far as my reasoning powers go, at present, I cannot yet believe otherwise than that these are the last of the seasonal run, and not the first. These Loch Tay fish, *I know*, *are not the most worthless*, but I adhere to my original belief that they are *the oldest*.[1] It is true that many fine and large fish are caught by the rod on the river Lyon above Loch Tay, and these, I can well believe, may be true "springers," which are running at the same time as the more sluggish fish which lie up for weeks in the deep waters of the loch. And these early Lyon fish seem to me to be the analogues of the 16 and 18 lb. fish which are caught by fly in the spring of the (calendar) year in the Garry; while the *dark* fish, which are caught mostly by trolling in Loch Ness and Loch Oich, and are found running alongside of the said true springers which come fresh from the sea and run right through the river Ness (*vide* Grimble and Buckley), are the prototypes of the big Loch Tay fish which, *though clean run*, *are still the later fish* of the *true* season. The Loch

[1] Only in one sense are these Loch Tay fish to be classed with the estuarial fish of lochless rivers like Tweed, and that is as regards age.

Ness and Loch Oich fish are dark, and have stayed for the better part of winter in the big resting-pools of Loch Ness and Loch Oich, but run in February and March and into April, along with the 16 lb. fish which have run clean, from the tide up and into the Garry.

I must again have expressed myself badly if I gave the impression that I identified the large Loch Tay Salmon with the "Grey Schule" of Tweed. I only desired to compare the seasons of the two runs, and the apparent sizes and ages (?) of the two classes of fish in two different descriptions of river; and if in such a point I am again wrong, I desire to be put right. I confess I may have caused some confusion here.

Now, I try to accentuate the two classes of rivers, viz. those with large reservoirs along their courses or at their upper extremities, such as the Tay, and those with none, or with insufficient reservoirs or lochs along their courses, such as Tweed, Don, and Deveron. I know nothing as to the capabilities of the Cree and Minnick in these respects. Sir Herbert does not say that there are any such reservoirs near the sources, and only mentions the lower sluggish reaches near the estuary, and the long estuary itself; and speaks of the shallow, or narrow, or small volume of one reach of the Minnick holding 120 fish which had come up in April and May. But I would feel surprised—if the Cree is found to hold deep resting-pools along its upper courses —that the red fish mentioned by Sir Herbert as caught in the estuary in July would in such a case have returned voluntarily to the sea before spawning. In this case I would be inclined to judge that the Cree might be improved by the addition of artificial resting-places. I grant this is partly hypothesis, but it may prove a suggestion not to be thrown aside — though not to be entered upon either — without consideration.

Where a few fish are known to go down to the sea, it may be possibly accounted for by saying they are barren fish, or fish which have not obtained mates when in fresh water, and for which there is no call to remain in discomfort; or wounded fish which fight for a female and lose in the battle, as many male fish are seen to do. But for a whole

school to return, as Sir Herbert indicates, is still mysterious, unless they are *all* too old.

The notes I made regarding the two fish which our party killed on the Gruinard in May 1883 I think have interest in this connection. These two fish were females full of ripe ova, as was seen when they were cut up to be made kippers of. And yet these two fish had fully-formed hooks on their lower jaws, like male fish. They would most certainly, I consider, have spawned within a few days—possibly hours—yet they were clear and silvery and fresh run from the sea.

The instance I gave of a female fish which I handled on the Deveron in April 1897, had almost completed the process of spawning, as we found ripe ova on the outside of the vent, but could not press out any more. I returned the fish to the water, in accordance with the law. That fish had, whilst in this condition, taken a phantom-minnow. I consider that all three fish alluded to above were *old fish* and *late fish*, and illustrate what I wish to show, both upon a river which has a large reservoir at its head-waters, as the Gruinard has, and a river which has no such reservoir along its whole course, like the Deveron. I can also instance a fish caught on Loch Eilt this season as late as the 29th July which was full of well-developed ova.

I can scarcely agree with Sir Herbert in his remark that the run of winter fish *is continuous* with the run of smaller springers, just as the heaviest sea-trout precede their smaller congeners in August. If we admit this, at least we must remember that a considerable hiatus takes place during most of May, most of June, and the first half of July, and also that all sea-trout running previous to the spring tides nearest to the middle of July rest and accumulate in the resting-pools of Ailort and Morar, and will scarcely ever *look at a fly* in these pools. A few fish rise to fly *on very exceptional occasions* on Loch Eilt in June and before middle of July ; but these, when caught, are found to be old (*i.e.* black) fish, and not A1 on the table. Most, however, are caught by trolling. Instead of Sir Herbert's remark about the continuity of the winter and spring runs, I would be inclined to say the end of the winter and the first of the next season's runs dovetail—only, however, to a small extent. As regards the seasons for late and

early running of fish, and my attempt to interpret the causes thereof, and Sir Herbert's difference of opinion thereanent, and his examples of the river Luce and of the Amhuinn Aodh, there is another factor which ought not to be lost sight of, and that is the temperatures of the salt and fresh waters at the times of the runs of fish. Of this I had meant to speak later on, but the nature of Sir Herbert's criticisms almost forces me to enter upon it now. The whole question comes, I think, before we are quite prepared to take it up.[1]

Here it is :—Do Salmon and migratory Salmonidæ run from a colder sea to a warmer river? Do they run from a warmer sea to a colder river? Or do they run from sea to river when the temperatures of the two are most nearly assimilated?

North and East Coast rivers are early. They run with a cold, snow-laden current into a cold North Sea. West Coast and especially North-West rivers, *i.e.* west of Cape Wrath, run shorter courses, and are mostly clear of snow-water not much before June, and are later rivers. There these rivers hurry down to meet the warmed-up waters of the Gulf Stream. I do not know if I am quite correct in saying that the rivers south of Clyde are earlier than those north—let me say—of the Mull of Cantyre ; but from what I have heard of the Stincher and the Doune, these rivers do yield earlier fish. North of Clyde, the exceptionally early rivers are the Awe, or rather the Orchy and the Lochy ; and there is reason to believe that the Gruinard *was* at a prior period of its history a much earlier river than it has been since "Kennedy's Commission" and the initiation of bag-nets in the bay. Now, I would like to ask Sir Herbert, Is it possible that the shallow area of the Solway Firth has

[1] The depths at which Salmon *lie* in fresh water may, I believe, yet be proved to be dependent upon temperature, and the temperatures of surface and bottom of the pools to be dependent upon the force of the currents running into and out of the pools : in other words, upon the aeration caused by falling or moving water. The greatest ascertained depth at which Salmon lie I believe to be about 12 feet, and it is known that in the deep pool of the Deveron at Alva Bridge the nets are used only down to the depth of 12 feet. The Alva Bridge pool is profoundly deep—it is said 60 feet (?). I would be obliged by any one giving thoroughly reliable statistics of Salmon lying at greater depths than 12 feet, if such can be ascertained.

anything to do with the comparative temperatures of river and sea, as regards the descent of fish voluntarily, *in the middle of summer*, to the tidal reaches? And have these comparative temperatures nothing to do with this descent —irrespective of long and short courses and presence or absence of reservoirs along their courses? One point more before we leave this stage of the inquiry. How are fish—I refer to Salmonidæ—and the temperatures of sea and river affected by the prevailing winds? On the North and East Coasts, N. and N.E. and S.E. winds prevail all through the best spring fishing, and the snow-water is really far from being utterly destructive of sport; but on the West Coast the west wind rarely comes, as yachtsmen know, before June, and often not then. Does an on-shore wind produce warmer surface water close to shore, and does an off-shore wind cause a colder upper stratum of sea-water at the surface? (On such points consult Sir John Murray's early articles upon this very subject.)

I cannot dogmatise upon these questions, nor offer a solution of the phenomenon related of the descent of Salmon from the shallow Loch More as verified (?) by the late W. Dunbar, nor can I do so as regards Sir Herbert's Cree fish doing the same, and I can only throw out a hint that possibly temperatures have more to do with it than anything else.

In conclusion, I may mention that my remarks, quoted at length by Sir Herbert, really referred to the rivers I thought were typical of my own remarks, and such as I had more or less acquaintance with, viz. Dee, Don, and Deveron, leaving out Spey, as it has certain reservoirs at its source and on its course, though its tributaries have none to which Salmon have access. I desire to avoid speculation certainly, and in proof thereof I propose to relate the history of a river with which I have been very intimately acquainted for about thirty-five years, viz. the Inver. If, unavoidably, questions be started when these relations are in course of preparation and evolution, I hope none may be taken as absolute experience, unless backed up by a reasonable amount of actual observation.

A CONTRIBUTION TO THE ENTOMOLOGY OF ABERDEEN.

By J. Mearns.

(*Concluded from p.* 99.)

COLEOPTERA.[1]

Carabidæ.

Cychrus rostratus, *L.*—Bay of Nigg, not uncommon.
Carabus nemoralis, *Müll.*—Common under stones.
C. glabratus, *Payk.*—Invercannie, near Banchory, not common.
C. violaceus, *L.*—Common under stones.
Nebria brevicollis, *F.*—Invercannie.
Broscus cephalotes, *L.*—Murcar Links, occasionally.
Badister bipustulatus, *F.*—Under stones, not very common.
Harpalus æneus, *F.*—Not very common.
H. tardus, *Panz.*—Common in many places.
Pterostichus versicolor, *Sturm.*—Not common.
P. madidus, *F.*—Common under stones.
P. nigrita, *F.*—Common under stones.
Amara ovata, *F.*—Murcar Links and Scotston Moor.
A. lunicollis, *Schiod.*—Under moss-grown stones, not uncommon.
Calathus flavipes, *Fourc.*—Abundant under stones.
C. melanocephalus, *L.*—Common under stones.
Pristonychus terricola, *Herbst.*—One specimen.
Anchomenus angusticollis, *F.*—Once taken.
A. dorsalis, *Müll.*—Common under stones.
A. parumpunctatus, *F.*—Common under stones.
Bembidium anglicanum, *Sharp.*—Bridge of Don, once taken.
Trechus lapidosus, *Daws.*—Scarce, under stones, etc.

Dytiscidæ.

Agabus nebulosus, *Forst.*
Colymbetes fuscus, *L.*—Neatherley Moss, not very common.
Dytiscus marginalis, *L.*—Common in ponds.
Acilius sulcatus, *L.*—In ponds on Scotston Moor.

[1] Nomenclature of Sharp and Fowler's Catalogue, 1893.

Hydrophilidæ.

Hydrobius fuscipes, *L.*—Not uncommon.

Staphylinidæ.

Creophilus maxillosus, *L.*—Common.
Leistotrophus nebulosus, *F.*—One taken.
Staphylinus stercorarius, *Ol.*—Not common.
Ocypus olens, *Müll.*—Common in damp places.
O. cupreus, *Rossi.*—Common under stones, etc.
O. morio, *Grav.*—Aberdeen Links.
Philonthus politus, *F.*—Common under stones.
Xantholinus glabratus, *Grav.*—Common under stones.
Othius fulvipennis, *F.*—Common under stones.

Silphidæ.

Necrophorus humator, *F.*—In dead birds, etc., not uncommon.
N. ruspator, *Er.*—In dead birds, etc., common.
Silpha nigrita, *Creutz.*—Once taken.
S. rugosa, *L.*—Not common.
S. atrata, *L.*—Hill of Tarbathie, under stones, scarce.

Histeridæ.

Saprinus nitidulus, *Payk.*—Common.

Byrrhidæ.

Byrrhus dorsalis, *F.*—At Tarbathie, once taken.

Scarabæidæ.

Aphodius fimetarius, *L.*—Common.
A. merdarius, *F.*—Not common.
A. rufipes, *L.*—Banchory.
Geotrupes stercorarius, *L.*—Abundant.
Serica brunnea, *L.*—Common.
Trichius fasciatus, *L.*—Invercannie, near Banchory, scarce.

Elateridæ.

Athous hæmorrhoidalis, *F.*—Abundant among grass.
Corymbites æneus, *L.*—Common near Aberdeen.

Malacodermidæ.

Telephorus pellucidus, *F.*—Very common.

Cleridæ.

Thanasimus formicarius, *L.*—Banchory.

Cerambycidæ.

Rhagium indagator, *Gyll.*—Banchory.

R. bifasciatum, *F.*—Den of Murtle, common.

Strangalia quadrifasciata, *L.*—Invercannie Moor, scarce.

Acanthocinus ædilis, *L.*—Invercannie Moor, not common.

Chrysomelidæ.

Donacia versicolorea, *Brahm.* (= *bidens*, Ol.).—Invercannie Moor, on water-plants.

D. sericea, *L.*—Invercannie Moor, on water-plants.

D. discolor, *Panz.* (= *comari*, Suffr.).—Common at Charbeton of Nigg.

Chrysomela staphylea, *L.*—Scotston Moor, common.

Lochmæa suturalis, *Thoms.*—Banchory.

Adimonia tanaceti, *L.*—Murcar Links, not uncommon.

Cassida viridis, *F.*—Invercannie Moor, once taken.

Tenebrionidæ.

Blaps mucronata, *Latr.*—Common.

Tenebrio molitor, *L.*—Scarce.

Curculionidæ.

Otiorrhynchus blandus, *Gyll.*—Invercannie Moor.

O. picipes, *F.*

O. sulcatus, *F.*—Invercannie Moor.

Barynotus schönherri, *Zett.*—Common.

Sitones puncticollis, *Steph.*—At the mouth of Don, once.

Hypera punctata, *F.*—Hazlehead, once taken.

Hylobius abietis, *L.*—Invercannie Moor, common.

Ceuthorrhynchus pollinarius, *Forst.*—Common.

HYMENOPTERA.

Formicidæ.

Formica fusca, *Latr.*

Larridæ.

Tachytes pectinipes, *L.*—Banchory, scarce.

Nyssonidæ.

Mellinus arvensis, *L.*—Invercannie, not scarce.

Crabronidæ.

Crabro varius, *Lep.*—Banchory.

C. dimidiatus, *F.*—Loch of Skene and Invercannie.

C. cribrarius, *L.*—Braes of Don, common.

Vespidæ.

Vespa vulgaris, *L.*—Common.

V. germanica, *F.*—Hazlehead, occasionally.

V. rufa, *L.*—Common.

V. austriaca, *Panz.* (= *arborea*, Smith).—Once at Hazlehead in 1898.

V. sylvestris, *Scop.*—Not common.

V. norvegica, *F.*—Hazlehead and Banchory.

Eumenidæ.

Odynerus trimarginatus, *Ztt.*—Braes of Don, Countesswells.

Colletidæ.

Colletes succincta, *L.*—Invercannie, not scarce.

Andrenidæ.

Halictus rubicundus, *Chr.*—Nigg and Muchalls, common.

H. cylindricus, *F.*—Invercannie, common.

H. albipes, *Kirb.*—Common on flowers.

Andrena albicans, *Kirb.*—On flowers, not scarce.

A. rosæ, *Panz.*, race *trimmerana*, Kby.

A. fucata, *Sm.*—Nigg, not uncommon.

A. analis, *Panz.*—Banchory, etc., common.

Nomada succincta, *Panz.*—Banchory, one male.

[First record for Scotland. I have seen the specimen, which was named by Mr. Saunders.—W. E.]

N. alternata, *Kirb.*—Banchory, rather scarce.

N. ruficornis, *L.*—Banchory, rather scarce.

Apidæ.

Megachile circumcincta, *Lep.*—Braes of Don, Nigg, etc., common.

Psithyrus vestalis, *Fourc.*—Common.

P. quadricolor, *Lep.*—Not so common.

Bombus agrorum, *F.*—Common.

B. latreillellus, *Kirb.*, var. *distinguendus*, Mor. (= *fragrans*).—Hazlehead.

B. hortorum, *L.*—Muchalls, not uncommon.

var. Harrisellus, *Kirb.*—One named by Mr. Saunders.

B. pratorum, *L.*—Common.

B. lapponicus, *F.*—Hill of Nigg, etc., not common.

B. derhamellus, *Kirb.*—One female.

B. lapidarius, *L.*—Murcar Links, not uncommon.

B. terrestris, *L.*—Abundant.

var. lucorum, *Sm.*—Common.

Apis mellifica, *L.*—Hive Bee.

Tenthredinidæ.[1]

Tenthredo livida, *L.*—Scotston Moor, etc.

T. dispar, *Klug.*—Aberdeen Links.

T. mesomela, *L.*—Invercannie Moor, etc.

T. viridis, *L.*—Aberdeen Links.

T. velox, *F.*—Aberdeen Links.

Tenthredopsis tristis, *Sleph.*—Aberdeen Links.

Pachyprotasis rapæ, *L.*—Banchory.

Allantus arcuatus, *Forst.*—Muchalls, etc.

Dolerus fulviventris, *Scop.*—Invercannie.

D. gonager, *F.*—Invercannie.

D. elongatus, *Thoms.*—Aberdeen Links.

Eriocampa ovata, *L.*—Hill of Nigg.

Blennocampa fuscipennis, *Fall.*—Hill of Nigg.

Athalia rosæ, *L.*—Invercannie.

Nematus apicalis, *Htg.*—Aberdeen Links.

[1] Nomenclature of Cameron's "British Phytophagous Hymenoptera."

Cimbex sylvarum, *F.*—Invercannie, Banchory.
Trichiosoma vitellinæ, *L.*—Banchory.
Abia sericea, *Leach.*—Banchory.
Lophyrus pini, *L.*—New Hills, etc.
L. sertiferus, *Fourc.*—Banchory.

Siricidæ.

Sirex gigas, *L.*—Near Aberdeen.
S. juvencus, *L.*—Near Aberdeen.

HEMIPTERA-HETEROPTERA.

Tropicoris rufipes, *L.*—Invercannie, etc.
Miris calcaratus, *Fln.*—Banchory.
M. holsatus, *F.*—Banchory.
Rhopalotomus ater, *L.*—Invercannie.
Nabis flavomarginatus, *Scholz.*—Loch of Skene.
Gerris lacustris, *L.*—Maryculter.
Velia currens, *F.*—Muchalls, common.
Nepa cinerea, *L.*—Scotston Moor.
Notonecta glauca, *F.*—Scotston Moor, common.
Corixa sahlbergi, *Fieb.*—Scotston Moor, common.

ORTHOPTERA.

Forficula auricularia, *L.*—Everywhere.
Labia minor, *L.*—Near Aberdeen, not common.
Periplaneta orientalis, *L.*—Common in houses.
Phyllodromia germanica, *L.*—Not uncommon in houses.

ODONATA.

Libellulidæ.

Leucorrhinia dubia, *Lind.*—Invercannie Moor, scarce.
Sympetrum scoticum, *Don.*—On most moors, abundant.
Libellula quadrimaculata, *L.*—Invercannie and Banchory, common.

Gomphidæ.

Cordulegaster annulatus, *Latr.*—Very local; on Invercannie, common.

ÆSCHNIDÆ.

Æschna juncea, *L.*—Scotston Moor and Banchory, common.

AGRIONIDÆ.

Pyrrhosoma nymphula, *Sulz.*—Banchory and Whitestripes, common.

Ischnura elegans, *Lind.*—Scotston and Invercannie, common.

Enallagma cyathigerum, *Charp.*—Bishop Loch, common.

Lestes sponsa, *Hans.*—Bishop Loch, scarce, July.

[Lists of insects, chiefly relating to Aberdeenshire, are given in MacGillivray's "Natural History of Deeside," 1855, and in Trail's 'Entomology of Dee' ("Trans. Nat. Hist. Soc. of Aberdeen," 1878). A long list of Diptera, by Vice, appeared in the "Scottish Naturalist" for 1883, and a list of Lepidoptera, by Reid, was published in 1893. The Rev. E. N. Bloomfield tells me that *Helophilus lunulatus* should have been omitted from the list of Diptera in the present paper.—W. E.]

CHERNETIDEA OR FALSE SCORPIONS OF WEST LOTHIAN.

By ROBERT GODFREY, M.A.

OF our nine Scottish species of Chernetidea,—three of which are recorded for the first time in the present number of the "Annals,"—all but one, *Roncus cambridgii*, L. Koch, occur within the Forth area, and of these eight Forth species five have been taken in West Lothian. Small as this number may be, it is not surpassed, so far as present records show, by the list from any other Scottish county.

Chthonius rayi, L. Koch.—In June last I received from Mr. Wm. Evans an adult example of this species taken by him at Culross, in the hope that I might find it at Bo'ness, and within a few days of receiving it I was successful in finding the creature at Dykenook, Kinneil, on the south side of the Forth, almost directly opposite the spot where he had taken specimens in April. My specimen, taken 24th June, was among wet, loose earth, and very immature. The abdomen was black, and the cephalothorax white with a greenish

tinge, and the pincers and falces had a pink tinge. The falces were very strong for the size of the creature, and the straight pincers were kept widely extended as the creature moved. Its light colouring indicated that it had quite recently entered on a free life; but all my care—both on this and on a subsequent occasion—failed to discover the "nest" of the species, if indeed there be such, or any adult specimens.

Chthonius tetrachelatus, Preyss.—On August 17, 1901, Mr. Wm. Evans took half-a-dozen specimens under stones by the roadside at Kinneil.

Obisium muscorum, Leach.—This species is universally distributed over the county. It is specially abundant in all the woodlands about Bo'ness, occurring among moss and dead leaves and under stones. Along the valley of the Avon I have found it from the mouth up to Crawhill; and in the Almond valley I saw about twenty nests, on 21st April 1899, at Almondell. I have also found it at Abercorn and at Preston House, and have no doubt that it may be found everywhere in the county.

Common as the creature is, however, very little is known about its life-history, and I venture to give a few notes on this subject. As my opportunities for field-work have been restricted mainly to the summer months, my observations are necessarily incomplete, but they may form a convenient starting-point for further study. During the winter I am led to believe that this creature leads a free life, as the few nests I have found at that season have been empty. Towards the end of March, *Obisium muscorum* begins to lay, and she then forms a small white cocoon of a very close and tough texture on the under side of a stone, or on the face of a rock covered with sheltering herbage, or more rarely under a compact piece of moss growing on a tree-stump. This cocoon is covered with small pieces of sand and earth, in such a way that it harmonises well with its surroundings, and appears to the uninitiated as merely a patch of dirt. Into this cocoon or "nest," the female retires when about to lay her eggs, where she remains till her young are hatched and ready to forage for themselves. At the beginning of April, the eggs, twenty to thirty in number, are attached as a small white mass to the genital aperture, on the under side of the abdomen; but this white spot gradually expands till, after the middle of May, it envelops the whole abdomen, with the exception of the upper surface, and the creature is then embedded in the swollen mass of her own eggs, which project below, behind, and round the sides of the abdomen, and form a margin equal in breadth to the cross diameter of the abdomen itself. At the beginning of June the eggs are hatched, and the tiny white youngsters are seen at first attached to the adult. By the middle of June, however, they are ready to leave the nest and go forth on a free life.

A note on the adult and young from my notebook, 25th June 1901, may be of interest here. "Nests of *O. muscorum* were fairly common on a rocky patch by the wayside near Preston House, but they were for the most part empty and generally wasted, as if to indicate that they were no longer required. Eventually one with an opening in it proved to contain young. The little creatures, a dozen or so in number, were venturing forth from their retreat, and as they wandered among the tiny cracks and crevices of the stone, they went through the antics of the adult perfectly. In moving about they held their pincers well forward, and kept opening and shutting them; and suddenly, even when there was nothing to cause any suspicion, they would dart backwards in the manner so characteristic of this group of creatures, as if an enemy lurked in a part of the stone they had touched. They ran backwards rapidly, and far too, considering their size. They were very light in colour, with a greenish hue, most pronounced on the cephalothorax, and with a pinkish tinge on the pincers. The adult was not to be seen, but was probably out on a hunt for food. I found other nests, closed, which contained the adult and her young. When I opened up one of these nests, the young soon showed that they were ready for active life, as one after another came forth to enjoy its new freedom, and seemed to be intent on wandering away without any intention of returning. One brood that I counted consisted of twenty-four individuals."

At the beginning of July the false scorpions are again laying, but whether these are the same creatures as have already reared a brood or not I cannot say.

One other point about which I am still undecided is whether these nests are ever occupied by other than pregnant females.

Chernes phaleratus, Simon.—On 12th April 1901, on a rocky piece of ground near Northbank, Bo'ness, I found a false scorpion under a stone tightly embedded in the soil. A microscopical examination convinced me that it was new to Scotland, and I took it to my friend Mr. Wm. Evans. We examined it together without coming to any decision, but on a subsequent examination he determined it as *Chernes phaleratus*, Simon, an identification which has been confirmed by Rev. O. Pickard-Cambridge. On 30th April I found a second specimen on a piece of rock, about half a mile from the previous locality. On 9th May I procured three under one stone, and was rather surprised at there being a colony of ants under the same stone. On 13th May I found two, and on 14th May three more of the same species; and on 13th August I took another—making eleven in all—under one of the stones that had already yielded specimens. With the exception of the individual taken on 30th April all have occurred within a very small area of ground. All have been active; and, so far, I have failed to learn anything of their economy.

Chiridium museorum, Leach.—This minute chernetid, which has proved such a tantalising object to Scottish naturalists, and for which I have searched both long and carefully, came under my notice rather unexpectedly. On 20th June last I was sitting writing in my room at Bankhead, Bo'ness, when I noticed a little red speck alight on the book that was lying open before me. I saw that it was alive, and presently perceived that here at last was a book scorpion before me. It is a dark brownish-red creature, with a very pronounced groove down its back. It was fairly active, and in its movements resembled closely species I was already acquainted with. It walked with its claws held well forward, but altered their position or retracted them on the slightest suspicion of danger. Repeatedly I put my pencil in front of it, taking care, however, not to touch it, and it always showed its sensibility to the presence of the pencil point by retracting its pincers, and at the same time moving backwards; and when I followed it up without touching it, the little blind creature kept retreating before my pencil, quite conscious of its nearness, though I abstained from touching it. When I blew on it, it drew its pincers quite close to its head, and appeared then like a small speck of brownish dirt. After watching its habits for some time, I put it in spirit lest I should lose it.

PROGRESS OF BOTANY IN SCOTLAND.

By James W. H. Trail, A.M., M.D., F.L.S., F.R.S.

Much has been written on the achievements of the past century, especially on the marvellous progress in the control of physical and chemical forces, and on the material prosperity and the changed conditions of civilised communities due to them. Not less striking have been the changes in the mental environment, in part due to the influence of change in the physical conditions, but still more to the influence of science, which, refusing to accept mere tradition or authority, seeks to prove all things, and demands absolute loyalty to truth. Its aims and methods have penetrated more or less into all fields of knowledge, and have given new life to the dead bones of not a few. No one can calculate the stimulus given to human progress by the evolution theory, or how much civilised man already owes to the example and labours of Charles Darwin. But, turn-

ing to a limited field, it may be of use to consider the progress made in one branch of natural science in Scotland in the past, its present position, the directions in which progress in it is most required in Scotland, and the relations of the natural sciences to general education in the country.

The systematic study of botany had made considerable progress in Scotland before the close of the eighteenth century. The works of Sibbald show a keen interest in this as well as in other branches of natural history, and prove that he studied both in the field and in the writings of the naturalists of continental Europe. The formation of a botanic garden and of a chair of botany in Edinburgh made that city a centre of instruction in the science. But elsewhere also in Scotland it was being pursued by isolated students, such as Dr. David Skene of Aberdeen, a correspondent of Linnæus and an enthusiast in every branch of natural science. Manuscripts that fortunately have been preserved, and are now in the library of the University of Aberdeen, bear witness to his zeal, untiring energy, and care, and give reason to believe that had he not died young he would have added much to what was then known of the flora and fauna of Scotland.

Lightfoot's well-known "Flora Scotica," issued in 1778, and again in 1788, added greatly to existing records of the flora. It was based on assiduous researches by the author himself in 1772, during a journey "by land or sea from the south of *Annandale* to the borders of *Sutherland*," to "most of the *Hebrides*," "from *Argyleshire* to the county of *Mearns*," "and afterwards to England by way of *Edinburgh* and *Kelso*," in which he "had a constant eye to the following work, embraced every opportunity of scaling the highest mountains, climbing the most rugged rocks, treading the fallacious bogs, winding upon the shores of seas and lakes." His personal observations were largely supplemented by free access to the herbarium and notes of Professor Hope of Edinburgh, of Professor Parsons of Oxford (herbarium and notes made during residence as a student of medicine in Edinburgh), of Mr. Yalden of Edinburgh, of Rev. Mr. Stuart of Killin, Breadalbane, and of Rev. Dr. Burgess of Kirkmichael in Dumfriesshire. That he made excellent use of these sources

of information the book shows; yet he necessarily knew only a very limited part of Scotland, and most of the country remained untouched.

Few have done more to widen our knowledge of the native flora, especially of the mountains, than George Don of Forfar, whose discoveries contributed much to later volumes of Sowerby's "English Botany" in its first edition. A brief account of his life and labours was given by Mr. John Knox in the "Scottish Naturalist" in 1881; and this was followed in the same journal in 1884-85 by Mr. G. C. Druce who analysed clearly and fully "The botanical work of George Don of Forfar," and showed how unfair had been the criticisms passed upon it by Professor Walker-Arnott, and too generally accepted for a time by other botanists. There is reason to believe that Don made mistakes through issuing specimens grown in his garden at Forfar from seeds or plants that he believed he had brought into it from localities in Scotland, but that he had received from abroad; and it is therefore necessary to ask confirmation before accepting as natives of Scotland several of the species issued by him as such. Yet it is remarkable how many of "Don's reputed discoveries" have been confirmed by their rediscovery, often after many years, some of them in or near the localities named by him. Of this our present issue affords a remarkable example in the rediscovery this year of *Carex divisa* near Montrose, recorded by Mr. Barclay.

In the earlier years of last century many additions were made to Scottish records, as is evidenced by W. J. Hooker's "Flora Scotica," which appeared in 1821; and several local floras appeared, such as Hopkirk's "Flora Glottiana," Greville's "Flora Edinensis," Johnston's "Flora of Berwick-upon-Tweed," Patrick's "Indigenous Plants of Lanarkshire," Dickie's "Flora Abredonensis," Murray's unfortunately incomplete "Northern Flora," and Gordon's "Collectanea for the Flora of Moray." Of these some give descriptions of the plants, while others only give localities.

"The New Botanist's Guide to the Localities of the Rarer Plants of Britain," of which the volume (II.) relating to "Scotland and the adjacent Isles" was issued in 1837 by Mr. H. Cottrell Watson, is a very valuable enumeration of

the counties, with the localities usually named, from which each of the less common plants had been recorded on trustworthy evidence. Mr. Watson did more to extend our knowledge of the distribution of our flora than any other botanist, by his personal investigations in the field, by his careful and discriminating analysis of earlier records, by his very important publications, and by his personal influence, both direct by suggestion, advice and guidance to friends and correspondents, and indirect by the methods exemplified in his writings. The "Cybele Britannica," in four volumes, issued between 1847 and 1859, and followed in 1870 by its summary, "A Compendium of the Cybele Britannica or British Plants in their Geographical Relations," is a storehouse of information on the source and distribution of British flowering plants and vascular cryptogams. In these books the range of each plant in altitude in Britain, as well as in horizontal area, and its distribution beyond Britain, are given so far as ascertainable. "Topographical Botany" was issued in two volumes in 1873-74, and brought the distribution by counties (or by subdivisions of large counties such as Perth) up to the date of existing information. All his books were printed at his own expense, and were presented by him to friends and other botanists interested in the British flora, but were not issued to the general botanical public. Yet the stimulus exerted by them was very great, as they gave a clear view both of what was already known and of what remained to be done. They showed that the floras of certain districts still remained partially or even almost wholly unknown, and that even in the comparatively well-studied districts more careful work was required. In consequence, attention was directed to these defects, and good progress was made in amending them. Until his death in 1881 he continued to add to his records in preparation for a new edition of his last work, "Topographical Botany." In 1883 it was republished under the editorship of Mr. J. G. Baker and Rev. W. W. Newbould, with his additions incorporated, and was issued at a moderate price. Thus rendered more accessible, it has exercised an even wider influence, and much has been done to fill gaps still apparent in its records. The "Journal of Botany," the

"Scottish Naturalist," and its successor the "Annals of Scottish Natural History," the publications of the natural history societies of Berwick, Dumfries, Edinburgh, Glasgow, Stirling, Perth, Aberdeen, Peterhead, Inverness, and other towns, and of the Botanical Society of Edinburgh, must all be frequently referred to in order to realise how active has been the search, how successful the results, and how many workers have aided during the latter half of last century in the effort to render the records less imperfect.

A few local lists of the vascular plants of counties or more limited areas have also been issued since the appearance of the second edition of "Topographical Botany," as separate works, such as Smith's "Botany of Ayrshire," or as supplements to books dealing with the districts, as in Wood's "East Neuk o' Fife." The most important of these books is Scott-Elliott's "Flora of Dumfries" (along with Kirkcudbright and Wigtown). In it the relations between the plants and local insects are also touched on. These later floras do not contain descriptions of plants, but, with the above exception, merely give localities for the various plants mentioned.

In another direction almost greater activity has been shown, namely, in the critical examination of the species and their often numerous forms, and in the comparison of these with their Continental representatives. So many changes have been found necessary in the treatment and nomenclature of forms in the more variable genera, such as *Rosa*, *Rubus*, *Hieracium*, and *Salix*, that the determination of the older floras and lists can no longer be depended on, and must be revised, if not already so treated. Unfortunately, the word *species* has a very different value in different orders and genera. Even during the less critical treatment of such genera, and while species were by most botanists regarded as permanent and unchanging, Mr. Watson recognised and pointed out clearly the frequent uncertainty of their distinctions and their inequality in extent. The belief in gradual evolution has given a new meaning to these characteristics, and renders the study of individual and specific variability of great interest and value, especially when studied in relation to the environment

of the plants. Though these variations in Scottish plants have been critically studied in comparison with the Continental forms to ascertain their correct names, yet their distribution here is by no means accurately known, and the effects of local environment upon them have hardly been looked into.

The warm thanks of Scottish botanists are largely due to Messrs. Beeby, Ar. Bennett, Druce, H. and J. Groves, Hanbury, E. and W. Linton, Marshall, Rodgers, Shoolbred and Townsend, who, by personal investigations during visits to various parts of Scotland, or by assistance freely rendered to their Scottish colleagues in cases of doubtful identity, and by the publication of their own discoveries in Scotland, have added much to our knowledge of the flora, especially in the critical groups.

All the work yet recorded on the distribution of the flowering plants and vascular cryptogams is based on the divisions followed by Watson, that is, under counties or their subdivisions (named by him vice-counties), amounting in all to forty-one in Scotland. Except for the islands, these are not natural divisions, though to a certain extent equalised by the inclusion of two of the smallest counties in larger ones, by subdivision of the large counties, and by occasional inclusion of outlying portions with neighbouring counties. The instability of such boundaries has been shown by their readjustment a few years ago, causing alterations in some of his areas.

A scheme of distribution by river-basins, such as that proposed by the late Dr. Buchanan White, though not altogether free from difficulties, would be more natural, and should be correlated with the existing records, a work that will require both care and time. The most satisfactory system of all would be to show the distribution of each species on a map of convenient size. Thus one might see at once the abundance or rarity, the extended or limited area of occurrence, the restriction to coast, rivers, forests, or mountains, and the northern or southern, eastern or western type of each. An excellent example of such graphic representation is afforded in a series of maps to illustrate the 'Carices' of Holland in the "Nederlandsch Kruidkundig

Archief" issued in 1886 and 1887. The same is done, in a less precise yet a useful way, in a flora of Finland issued some years ago. It has not yet been attempted for the flora of Britain.

Turning now for a little to the lower cryptogams of Scotland, we find that they are included in the earlier floras along with the higher plants, but that, as might be anticipated, the smaller and rarer forms mostly escaped detection by the earlier botanists. "The Scottish Cryptogamic Flora," commenced in 1823, the "Flora Edinensis," and other works on algæ and other lower cryptogams entitle Dr. R. K. Greville to a very high rank among Scottish botanists. The mosses, liverworts, algæ, lichens, and fungi have been investigated by numerous students during the past century, records of whose labours will be found chiefly in the journals and publications already named and in "Grevillea"; and the "Annals and Magazine of Natural History" contain a long series of papers by the Rev. M. J. Berkeley on new British fungi, many of them collected by Scottish botanists. Such books as Braithwaite's "British Mosses," Pearson's "British Hepaticæ," and Stevenson's "Mycologia Scotica" show how much has been done to throw light on these groups of plants in Scotland; but they also show that the lower cryptogams have been carefully studied in comparatively few parts of the country, and that much has to be done before our knowledge of their local distribution can be looked on as satisfactory. How much remains to be done, even in the discovery of species not previously found in Scotland, is well shown by the numerous additions to the liverworts recently found by Mr. M'Vicar, and to the records of fungi in various publications since the "Mycologia Scotica" was issued in 1879, of marine algæ in the papers of Batters and Holmes, of Desmids in Roy's list published in this Journal in 1893-94, of *Characeæ* by H. and J. Groves in the "Journal of Botany," and of other fresh-water algæ by the Messrs. West. From these records, and from a comparison of the lists for Scotland with those of Continental Europe, *e.g.* with Rabenhorst's "Kryptogamen-Flora," it is evident that very much still remains to be done to render the botanical survey of the country thorough or

accurate, and to put the records into such a form as will most clearly and effectively convey their information.

The determination and recording of the species and varieties in the Scottish flora, with the study of the distribution over the country of the vascular plants, and, to a less extent, of the fungi and other lower cryptogams, have so largely taken up the efforts of Scottish field-botanists that comparatively little has been done in other parts of the science, though these have already made considerable progress elsewhere.

The influence of environments on the plants and the effects of changes in modifying the characters employed in distinguishing species, the associations of various species, their relations to the animals of the country as agents in pollination and in dispersal of seeds or other reproductive bodies, the injuries they are liable to suffer from animals that destroy or feed on them or cause abnormal growths (galls) on them, their relations to soils, their reactions to physical changes, especially the effects in the lower plants on the processes of reproduction, and other subjects of no less interest have been successfully studied in other countries, though most of them have scarcely been touched among us. All are in want of thorough investigation and of comparison of the results observed in Scotland with those recorded from elsewhere. The plant-associations of Scotland were being very assiduously studied by Mr. Robert Smith, whose early death has deprived Scotland of a botanist of much promise. Mr. Scott-Elliott's observations (recorded in the "Flora of Dumfries") on the insect-visitors to flowers in the Solway area are almost the only records for Scotland in a study that has already an extensive literature in other countries. The galls have formed the subject of papers in the "Scottish Naturalist," and in the publications of the natural history societies of Glasgow, Perth, and Aberdeen, but our knowledge of them is still very incomplete. Injuries to agricultural plants in Scotland were at times noticed by Miss Ormerod in her annual reports, but of plant-diseases in this land little is on record.

The early history of the flora of Scotland, in so far as it can be traced in peat-bogs, old beds of lakes, and other

deposits, has been investigated with excellent results by Mr. Clement Reid and others; yet their researches have necessarily been confined to a few localities, and there must be much yet to be done in this difficult pursuit.

The still more specialised study of the fossil plants of the earlier formations has been pursued with much success by Mr. Kidston and Professor Bower; but such study requires special equipment and facilities that restrict it to the few.

Investigations into the structure of the tissues and organs of our native plants are often required to complete those undertaken in the field, and in this respect there is much to be done before an accurate natural history of the plants of Scotland could be issued as the product of study within this country. Such a volume as Raunkiær's "De Danske Blomsterplanters Naturhistorie" raises the desire for a similar aid in the study of British plants.

But while there is very much to be done to bring our knowledge of the flora of Scotland abreast of the many-sided results achieved in certain countries of Europe, there is good reason to hope for more rapid progress in future, especially when we look to the place now given to the study of nature in education and to the equipment and facilities provided for such study in schools and universities.

The time is not long past when even the universities did not possess means for giving practical instruction in any part of biology, and when students were taught by lectures alone. Only in Edinburgh in 1800 was there a garden where persons interested in botany could see the living plants. Now there is a garden in each university town; and small gardens are being formed in connection with a good many schools in which instruction about plants is given. The universities have been efficiently equipped in recent years with laboratories and museums in which students can learn the methods and results of botanical study, and can obtain guidance and aid in new researches. Recently the Scottish Education Department has encouraged teachers in elementary schools to give instruction in nature-knowledge, and to make themselves efficient teachers by attending courses specially adapted to assist them in acquiring

the requisite knowledge and method. All intending to become teachers are now required to attend courses of instruction in botany and zoology. Most attend courses specially designed to aid them as teachers. In Aberdeen these classes are held during the summer session in the university; and a special aim is to urge on those attending them to base their lessons to their pupils on the common things of the district round the schools. That such instruction, by competent teachers, in the nature and structure of familiar plants and animals will have a valuable result in awakening the interest of children, and in training their senses and hands as instruments towards acquiring information, cannot be doubted; though we can scarcely venture to hope that all teachers will use the new methods successfully.

A very valuable aid to teachers in this work would be accurate notes and lists of the plants, animals, and other natural products and of the physical features of their respective districts. The preparation of such lists for the various parishes would be very helpful to them, and would greatly assist in the preparation of good lists for Scotland as a whole.

At present the secondary stage of education is largely dominated by the examinations for entrance to and bursaries in the universities. As these examinations allow no value for the training of the hands and senses, the secondary schools naturally make little provision for such training, and students pass from them often worse equipped on that side than they entered them; but in a few years probably this will be more or less remedied, so as to make the course of instruction from the elementary schools continuous through the secondary schools to the universities.

In conclusion, much yet remains to be done to advance the study of the Scottish flora; but the prospect is hopeful of an advance more rapid in future than it has been in the past. An advance should be made along many lines, most of which require for their successful pursuit work both in the field and at home. A knowledge of what has been accomplished in each elsewhere is most helpful in its study here, and adds much to its interest; while a comparison of the results obtained here with those recorded from other countries adds greatly to the value of the work.

Among such lines of study may be named as very desirable :—

1. Critical examination of the flora, and its correlation with Continental floras, of course subdivided into vascular plants, mosses, etc.
2. Topographical distribution as commenced by Mr. Watson, including the distribution by height and by habitats, as well as by horizontal areas.
3. Correlation of the distribution in his artificial areas with the natural divisions. Graphic or other clear and distinct methods for representing the distribution in a manner easily prepared and easily understood should be wrought out.
4. Natural associations of plants.
5. Relations of plants to soils, exposure, and other physical conditions.
6. Relations of plants to animals, as benefited (pollination, seed-dispersal, etc.), or injured by them.
7. Diseases of plants and abnormal growths, including galls, and their causes.
8. Folk-lore and popular uses,—rapidly disappearing in all parts of the country.
9. Nature-knowledge in education, including the preparation of accurate lists of the plants, animals, and other natural products of definite small areas, clearly understood by teachers (e.g., parishes), and also by habitats within those areas, and the formation of small school gardens and museums.

There are few with any taste for outdoor life who would not find interest and benefit in one or more of these or other lines of biological work, and who could not add to what is yet known of the flora and fauna of Scotland. In almost every line we lag behind what has been accomplished in other countries. May we not hope that this will not be allowed to continue?

ON THE FRUITING OF *LINNÆA BOREALIS* IN SCOTLAND.

By A. Macdonald, M.A.

Since this plant was placed on the British flora in 1795 quite an enthusiasm has gathered around it, and as new localities are discovered there reappears in the press almost as regularly as the notices of the coming of the Cuckoo, the heading "Discovery of a Rare Plant."

But the plant is not to be called exceptionally noteworthy in those districts where fir woods of some age abound; and it is too late now to call it a rare find, though its place in botany is such as to excuse frequent notifying of it. There is, moreover, still a rarity in connection with the prime favourite of the father of Natural Science, and that is, to find fruit upon it.

Those who have visited Scandinavia tell us of the minute fruit with its persistent sepals and two viscous bracts that serve as attachments to passing creatures and as the means by which the seed steals a free passage to a new and distant habitat.

In Scotland the fruit is decidedly infrequent, yet we begin to think that, like many another botanical rarity, this is more for want of eyes than for lack of actual occurrences.

It is almost certain that the numerous patches now known have been started from seed.

The position of the style at once declares that the Linnæa can only set seed after cross fertilization, and that this crossing must be effected by insects; but the dark central forest which is the abode of this plant is very unfavourable to the presence of the little dipterous friends which might accomplish this, and so the flower blushes unseen, or at least has but a remote chance of pollination. That this is the reason why we seldom find fruit, and not so much the absence of a suitable creature from our fauna, will appear from the following:—

We have a large favourite patch of Linnæa which we visit three or four times a year. It *was* situated near the centre of a wood, mainly of Scotch fir, till the winter of 1894,

when the great storm of 22nd December blew out a wide glade whose edge almost touches the area occupied by the colony. From that date there lay for several years a confused mass of roots, boles, and branches which formed on the south side an almost impassable barrier. When this was wholly cleared away, about four years ago, there began to grow up a number of wild flowers in the opening—Stone Brambles, Fox-gloves and others, among which Scabious was conspicuous, and animal life too became more numerous, so that the gloom and the silence gave place to the gleam of sunshine, the colour of flowers, and the hum of insects' wings.

Last year—the flowers about were not so numerous as they have been this season—we determined to find seed, if there was seed in the colony. With this object we crawled on hands and knees over the whole patch from centre to circumference in every direction, and at last were rewarded by the find of a single fruit, the twin pedicel, like so many pairs, sticking up a fruitless withered stump. It was something to get a fruit even such as it was, and we rejoiced and took it for an omen of good.

On the 20th of August 1901 the spot was visited, when the plants were found beautiful as ever but having very few inflorescences, not more than twenty on the whole area of ten square yards. Some of these had three flowers instead of the nicely balanced normal pair, and there were cases where only one of the little flower-stalks bore a flower; but the majority were well-formed symmetrical blooms.

The scarcity of flower was not much matter for wonder, for we have seen many years in which there were but few blossoms. Yet considering the favourable character of the present season it is possible that the letting in of the daylight had something to do with the meagre flowering in such a gloom-loving herb.

It was on this occasion that we noticed in the clearing, many open-air plants with numbers of smaller insects flitting about. As the Linnæa flowers were so near the verge of the wood numbers of flies, attracted by the faint vanilla scent whose sweetness had till now been wasted, found their way to the place and visited the flowers.

In the course of ninety minutes we saw many calls made, and went away in the hope that good results would follow. Unfortunately, before this observation, we had picked as many as six or eight of the flowers for the use of a botanical friend living in a district unblessed by the presence of the northern trailer.

Our last visit was made on the 2nd of September, and there are now five plants with perfect fruits and one at least with a single seed.

This seems pretty conclusive proof, which another year will, we trust, corroborate, that the depth of the wood with its bed of vegetable mould, though a suitable home for the Linnæa, is not a favourable place for the important work of reproduction.

It may be possible to prove this by experiment, though the attempts at cultivation that have been hitherto made have not as a rule produced even flowering plants, yet, doubtless, with care and study of the natural environment one may be able not only to obtain blooms, but also to reach the perfection of fruit.

REDISCOVERY OF *CAREX DIVISA*, HUDS., IN FORFARSHIRE.

By William Barclay.

About the middle of August Mr. Menzies, a fellow-member of the Perthshire Society of Natural Science, and an enthusiastic botanist, brought me some specimens of a Carex which he had gathered a few days previously in a marsh near Montrose, and which he was unable to identify. As I also could not satisfy myself as to the species, I sent the specimens to Mr. Arthur Bennett, Croydon, who very kindly examined them, and sent me the following report:—

"I can make nothing else of the specimens than *Carex divisa*, Huds., a very interesting re-find after many years have passed. I have jotted down a few notes from Hooker, Watson, and Hooker and Arnott.

"'*Carex divisa*, Huds. Marsh near Montrose, and sea-coast of Angusshire, chiefly in marshy places.'—G. Don, 'Fl.,' May, June; Hooker, 'Flora Scotica,' p. 262, 1821.

"'1219. *Carex divisa*, Huds.' In Hooker's 'Flora Scotica,' on the suspicious testimony of George Don, it is stated to occur in a marsh near Montrose and sea-coast of Angusshire, chiefly in marshy places.

"'This short sentence asserts the existence of three stations at least (a marsh plus marshy places), and indeed implies them to be more numerous. Yet neither Mr. Gardiner nor any other botanist appears to have verified or confirmed any one station in the county of Forfar. But as the kind of situation described is that in which *C. divisa* does usually grow, the author of the 'Flora Scotica' might be held excused for printing the locality unchallenged, at a time when he himself was slenderly acquainted with the botany of Scotland, and when the accuracy of George Don had not been subjected to those disparaging doubts which it has appeared since so much to warrant.'—H. C. Watson, 'Cybele Britannica,' vol. iii. p. 103, 1852.

"'*C. divisa*, Huds. Marshy places near the sea, principally in the east of England, and in Angusshire.'—Hooker and Arnott, 'The British Flora,' ed. viii. p. 206, 1860.

"After eighty years have passed George Don's record is proved to be correct. The specimens have evidently been arrested in growth, probably from drought, and are small and not well developed, but they are *C. divisa*, Huds. The late date of gathering is for *us* remarkable. I saw it quite dried up on 26th July in East Suffolk, only preserved by being among long grass, etc.

"'In England it occurs north to Lincoln! Yorkshire south-east, north-east, and south-west; Cheviotland (*i.e.* Northumberland, north of the river Coquet and Carter Fell.' Rev. J. Farquharson in 'Proc. of Berwickshire Club,' 1883-84).

"'It has been reported for Edinburghshire (Pentland Hills) by Edmonston.'"—Ar. Bennett, *in litt.*

The record in Hooker's "Flora Scotica" is not the earliest published notice of the occurrence of the plant in Forfarshire. In the elaborate "Account of the Native Plants in the County of Forfar," contributed by Don him-

self to Headrick's "General View of the Agriculture of the County of Angus or Forfarshire," which was published in 1813, there occurs on page 31 the following sentence:— "By the roadside, in coming from the North Water Bridge, he (*i.e.* the botanist) will find the *Carex divisa*, one of the rarest Carices." There is no reference to any other station however, and possibly only one was known to Don at the time. Gardiner, in the "Flora of Forfarshire," p. 212, 1848, says, only "wayside between Montrose and the North Water Bridge.—Mr. G. Don." Mr. Menzies states that there was a patch of it covering perhaps a yard of ground; but as he did not search the neighbourhood thoroughly, it may be in larger quantity. Next season the ground will be more carefully examined.

ZOOLOGICAL NOTES.

Marine Biological Association of the West of Scotland.—The following prizes are offered by Sir John Murray, the Honorary President of the Association, in memory of the late Fred. P. Pullar, who took much interest in the Millport Marine Station, and who lost his life in the unfortunate ice accident on Airthrey Loch, Bridge of Allan, on the 15th February 1901:—

1. *A prize of £50 for a paper on* "The Seasonal Distribution and Development of Pelagic Algæ in the Waters of the Clyde Sea Area."

2. *A prize of £50 for a paper on* "The Reproduction, Development, and Distribution in the Clyde Sea Area of the Genera Nyctiphanes and Boreophausia."

3. *A prize of £50 for a paper on* "The Formation and Distribution of Glauconite in the deposits of the Clyde Sea Area and the adjacent seas of Scotland."

These prizes are open to investigators from any part of the world who conduct observations in the several subjects at the Millport Marine Station, and who produce, at any time before 1st January 1905, papers which, in the opinion of a Committee of three scientific men, to be nominated by the Committee of the Association and by Sir John Murray, shall be deemed of sufficient value to merit publication.

Those proposing to work for any one of these prizes should make known their intention to the Secretary of the Association.

Notes on the Habits of the Hedgehog.—These most interesting animals abound in the nursery fields adjacent to my house, and

I have spent many pleasant evening hours during this summer in observing their habits. In May, before the young growths on the small trees in the nursery rows had much advanced, the Hedgehogs were easily seen. One evening I had eight of them in full view within twenty yards. Their extreme pugnacity does not seem to have been noted so far as I can find. On 15th May, I found a couple of males "snuffling" at each other, and then they began a monotonous mill-wheel walk with noses opposed. This circling around each other continued for three-quarters of an hour by my watch. I left them for about twenty minutes, and on my return a few minutes after ten o'clock they were gone. But I found them some sixty yards off, rolling over, and worrying each other as viciously as ever I saw dogs fighting. Each had hold of the other by the fore-paw, and they were shaking one another as a terrier does a rat. Both were blowing and puffing with the exertion. Sometimes one was uppermost, sometimes the other. An incautious approach on my part ended the fight, and they both scuttled into the bushes. They had been tearing at each other for eight minutes in my sight. That was the "best" fight I saw during the season. Apparently it was males only who fought. Hedgehogs are not at all exclusively nocturnal. In April I found them abroad, rooting about in the sunshine, on several occasions. On 25th April in particular, I saw one going about most of the afternoon while the sun was shining clearly. On the hot evenings also they come out long before sunset. For instance, on 20th July, after the hottest day of a hot season, the protected thermometer on that day having risen here to 91°, and a thunderstorm having begun that lasted for most part of the two subsequent days, many hedgehogs were out feeding by 6.30 P.M. Was it the temperature or the electric state of the air that set them moving? Most individuals are quite silent, and it seems to be only the discontented old males that indulge in "snuffling." In Lydekker's rather disappointing book on "British Mammals" this sound emitted by the hedgehog is described as "something between a grunt and a squeak." I think it might be more correctly described as a cross betwixt a cough and a snort. A vessel of milk placed for the cats has been regularly visited these last three summers by a hedgehog. If there is any milk left in the dish, it is lapped up clean by the hedgehog. Many a time it has been found doing this, and when a light is brought it still goes on licking the milk quite unconcernedly. Needless to say, it is never molested.—ROBERT SERVICE, Maxwelltown.

Hedgehog in Argyllshire.—So little seems to be definitely known about the Hedgehog (*Erinaceus europæus*) in Argyll (*vide* Messrs. Harvie-Brown and Buckley's "Vertebrate Fauna of Argyll and the Inner Hebrides") that it may be worth noting that I

saw and handled one on the grassy summit of the Ardbhan Craigs, Oban, on 30th June 1901.—Hugh Boyd Watt, Glasgow.

Badgers in Scotland.—It is a dispiriting thing to read in the July number of the "Annals" about the heartless slaughter of a pregnant Badger (*Meles taxus*) in Ayrshire. About fifteen years ago I turned down five in the neighbouring county of Wigtown, in hopes of re-establishing this harmless and interesting creature in a district whence it had long disappeared. Possibly this Ayrshire specimen was a wandering member of my colony. It is not the only Badger which has been murdered in Scotland this year. One was trapped in June on the banks of Loch Ossian, between Rannoch Moor and Ben Alder: the keeper found its mate in a cairn of stones not far off and shot it. The presence of these animals in this remote forest was not suspected. It is a pity that keepers persist in considering that part of their duty is to destroy every living creature that is not game.—Herbert Maxwell.

[We heartily endorse all that Sir Herbert Maxwell urges in favour of more intelligent treatment for the Badger. Unfortunately the education of the gamekeeper is making painfully slow progress. —Eds.]

Porpoise in Argyllshire Waters.—It is curious to find that the Porpoise (*Phocæna communis*) is not included in Messrs. Harvie-Brown and Buckley's "Vertebrate Fauna of Argyll and the Inner Hebrides." I saw it on different days off Kerrera, and also between Mull and Skye, during this summer.—Hugh Boyd Watt, Glasgow.

Greenland Falcon in Inverness-shire.—A fine immature specimen of *Falco candicans* was killed in the Kingussie district at the beginning of April, and sent in the flesh to Mr. Malloch of Perth.—H. A. Macpherson, Pitlochry.

Lesser Whitethroat nesting in West Ross-shire.—In the summer of 1896, my father, the late Sir Arthur Fowler, brought me an unknown nest, containing seven eggs, which he had found in the Strath here. These remained undetermined, until they came under the notice of Mr. Lionel Hinxman, who believed them to be those of the Lesser Whitethroat (*Sylvia curruca*), but advised me to submit them to Mr. Eagle Clarke for his opinion. Mr. Clarke confirmed Mr. Hinxman's identification, and informs me that the records of the breeding of this species in Scotland are rare and worthy of publication, especially as it has not been previously recorded as nesting so far north in Britain.—Marjorie T. Fowler, Inverbroom, Ross-shire.

The Breeding of the Great Spotted Woodpecker in the South of Scotland.—In the last number of the "Annals" the editors

added a footnote to the paragraph of Sir Archibald Buchan-Hepburn's, recording the appearance of the Great Spotted Woodpecker (*Dendrocopus major*) in May, in which they looked upon its occurrence as indicating an extension of its breeding range in Scotland, and quoting also the fact of the bird being seen in Dalmeny in June. I am glad to be able to give a definite instance of its breeding beyond the confines of Duns Castle woods. My informant does not wish his name to appear, but Mr. Eagle Clarke is also in possession of the facts, and I feel privileged in being allowed to make use of them. In the month of June it came to his knowledge that a bird, whose description he immediately recognised, was nesting in a secluded wood in Selkirkshire. He was taken to the spot, and was delighted to have the opportunity of watching the Great Spotted Woodpecker feeding its young. The nest was in a silver birch, and the hole was bored below one of these fan-shape fungus growths often met with in our woods. My informant lay some time among the ferns watching the birds, and noted them carrying away pellets of dirt in their bills, just as titmice do. There is good reason for supposing that this is not the first season the birds have nested in this wood, but it is satisfactory to be able to record the present instance.—Charles Campbell, Dalmeny Park.

Great Spotted Woodpecker breeding in Midlothian.—On the 24th of June last, a Great Spotted Woodpecker (*Dendrocopus major*), which I have seen, was captured in a wood on the banks of the Esk above Penicuik. It is a red-crowned young bird, and although fully fledged, cannot have been many days out of the nest. The bill is scarcely seven-eighths of an inch long, and the wing, from the carpal joint, about $5\frac{1}{8}$ inches. It was accompanied by another bird, evidently one of its parents, which flew off uttering anxious cries.—William Evans, Edinburgh.

Great Spotted Woodpecker nesting in Midlothian.—From information received from my brother, Dr. William Godfrey, Penicuik, I am enabled to record the nesting of the Great Spotted Woodpecker in Penicuik policies during the present summer. On 24th June Mr. Peter Robb, a young man who takes an interest in the birds of the district, was passing through Corntown and saw two woodpeckers running up the trees there. He threw his cap over one of them and captured it, and he kept it alive till the next afternoon. The bird was a young one, having some down still showing on its back; it had also the red crown characteristic of the nestling Great Spotted Woodpecker. The bird has been stuffed, and is now at Brunstane farm, in the possession of its captor. There can be no doubt that the bird in question and the one that escaped had been hatched in the Penicuik policies, and that they had quite recently left the nest. The exact nesting-tree has not yet been

discovered, but I have information indicating that the haunt is known.—Robert Godfrey, Bo'ness.

[Mr. W. Renton of Hawick informs us, since the above notes were put into print, that the Great Spotted Woodpecker breeds annually in the Wells and Minto woods.—Eds.]

Ring Dove nesting on the Ground.—The following notes will, I think, be of interest, as I have failed to find any mention of similar occurrences in any of the works I have consulted. The Grennan Wood is situated about seven miles from the Mull of Galloway, on the shores of Luce Bay, and has long been remarkable for the number of Ring Doves (*Columba palumbus*) frequenting it. The nearest wood to the north is about two miles. By various gales spread over the last twenty-five years about two-thirds of the original wood has been destroyed. The information in this note has been obtained from my nephew, Mr. M'Donald, of Logan, who states that the details given by his keeper can be absolutely relied on. The keeper, when he first went to this beat about five years ago, noticed nests on the ground among the bracken and other ferns, also sometimes under fallen branches. In this wood they are found only where the trees are wanting—about 8 to 10 per cent of the pigeons frequenting the wood build thus—the keeper coming across as many as twenty nests on the ground in one day, without specially looking for them. An odd nest or two have been found in other woods, generally under a fallen branch. Nests are also found all over the estate in whins, and sometimes among heather. On rare occasions a few nests have been met with in other woods, where trees have not been blown down. Mr. M'Donald writes me that a Wood Pigeon has this year built her nest on one of the beams in a shed close to the house; the shed is at present being used to rear pheasants. Unfortunately the bird deserted after completing her nest; she flew out several times on being disturbed, before finally leaving. On the 24th of August, Mr. M'Donald sent to Mr. Eagle Clarke a young well-feathered Ring Dove from a nest placed in a whin bush, twenty inches from the ground, and situated one and three-quarter miles from any wood.—Archibald Buchan-Hepburn, Smeaton-Hepburn, East Lothian.

Pintail in Caithness.—On 1st August an adult female Pintail (*Anas acuta*), full moult, was shot at Loch Heilan, near here. This is a rare bird in Caithness, and has not, to the writer's knowledge, been known to occur there at that time of year before.—T. E. Buckley, Castleton, Thurso.

The Spotted Crake in East Lothian.—A Spotted Crake (*Porzana maruetta*) (male) was shot near Dunbar on 15th August, and kindly forwarded to me by Mr. David Bruce the following day. Of fourteen previous occurrences in the Forth area, recorded in my note-book,

the earliest autumn one is 1st September (1885).—William Evans, Edinburgh.

Lesser Tern nesting at Barra.—The Lesser Tern (*Sterna minuta*) has nested at Barra for the first time, I believe, this year. Five pairs, or more, appeared at a small island off Barra on the 28th of June, and fresh eggs were found on the 4th of July.—W. L. Macgillivray, Barra.

Red-necked Phalarope in the Firth of Forth.—On 9th June last, while sailing a yacht from Kinghorn to Granton, I saw a pair of Red-necked Phalaropes (*Phalaropus hyperboreus*). When about one mile west of Inchkeith, my brother drew my attention to a pair of small birds sitting on the water on our starboard bow. They remained till we were within about thirty yards, and then rising, flew down wind across our bows in the direction of Inchkeith. Having seen the species at their breeding haunts in Shetland, I had no difficulty in recognising them as Red-necked Phalaropes. Though it appears rather late, I am inclined to think that they were a pair resting on their way to their northern breeding grounds.—Harold Raeburn, Edinburgh.

Porbeagle Shark in Clyde Waters.—On the 9th of July a Porbeagle Shark (*Lamna cornubica*), eleven feet in length, was caught in a salmon-net in Girvan Bay. This fish appears to be extremely rare in Clyde waters, and Mr. Thomas Scott tells me that he does not know of any previous record of its occurrence there.—Robert Duthie, Fishery Officer, Girvan.

Land and Fresh-water Mollusca in Main Argyll.—During a fortnight in Argyll in July I collected forty-five species of mollusca, seven of which are new to the county list. The new species are:—

Vertigo antivertigo.—One under a piece of wood in a marsh at Lochan Dubh, Oban, 16th July 1901.

Planorbis fontanus.—Lochan Dubh, Oban, on rotten leaves, 15th July 1901 and 16th July 1901.

Planorbis nautileus.—Lochan Dubh, common, in company with last; Loch Charn, one under a stone, 17th July 1901.

Planorbis albus.—Loch Tromlee, 6th July 1901; Lochan Dubh, Oban; loch above Glen Crutten, 18th July 1901.

Planorbis contortus.—Loch Tromlee, 6th July 1901. In this same loch I had previously found this species on 25th June 1900. Loch Charn, abundant, 17th July 1901.

Physa fontinalis.—Lochan Dubh, Oban, common, 16th July 1901. In 1900 also I found it common in Loch Leoid on 2nd July.

Sphærium corneum.—Loch Tromlee, 6th July 1901 (also 25th June 1900); Lochan Dubh, Oban, 16th July 1901.

I found two other species not given in the Distribution Tables, at the end of Adams' "Collector's Manual" (1896). These are

Vertigo pygmæa, of which I got two under wood at Lochan Dubh, 16th July 1901, and *Hyalinia excavata*, which I took in Glen Sheileach, in Glen Crutten, in Dunollie woods, and at Kilninver in 1901, and at Loch Awe Station in 1900. Both species had, however, been previously taken by Mr. Wm. Evans near Oban ("Annals," 1895, p. 153).—ROBERT GODFREY, Bo'ness.

Cionus blattaria in the Solway District.—A few years ago I chronicled the fact of *Cionus scrophularia* having discovered that *Buddlea globosa*, though an exotic from Chili, was botanically allied to its native food-plant. The colony has been very abundant on this plant of *Buddlea* ever since. This year I find they have been joined by a considerable number of *Cionus blattaria*, which, so far as my experience goes, is a very scarce species in this district. Indeed, if I remember rightly, the late Mr. Lennon only once found it in flood refuse.—W. D. R. DOUGLAS, Castle Douglas.

Acanthocinus ædilis, *Lin.*, at Bo'ness.—On 7th August, Mr. Dunn, manager in Kennedy's timber-yard, Bo'ness, brought me a live specimen of the Timberman Beetle (*Acanthocinus ædilis*) which had been imported among pit-props. I know of another occurrence of this same species in Bo'ness Dock in the autumn of 1900, and I suspect it is frequently introduced with foreign timber.—ROBERT GODFREY, Bo'ness.

[A specimen from Bo'ness was recorded in the "Scottish Naturalist" for 1891, p. 40.—EDS.]

Sphinx convolvuli in Kirkcudbrightshire.—On the 21st August, a box, containing three fine large caterpillars, was handed to me. On opening it, I saw with great surprise and pleasure that they could be nothing else than the larvæ of the Convolvulus Hawk Moth, a surmise that subsequent closer examination proved to be quite correct. Fig. 2 of Plate iii. in Humphrey's "British Moths" gives a good representation of the appearance of one of these larvæ. The same variety is figured by Kirby in his "European Butterflies and Moths," Plate xvii. Fig. 2*a*. The remaining couple were much brighter green, and had a more lively embellishment of spots and stripes. Either of them might have sat for the figure in 'Allen's Naturalist's Library,' "Moths," vol. iv. Plate cvi. Fig. 2, where, however, this fine species appear by the unfamiliar name of *Phlegethontius!* I gave one of the larvæ to Mr. Kenneth Morton, who happened to be on a visit to Dumfries at the time, another to Mr. Wm. Evans, and kept the third individual in my own possession. It fed very freely indeed on the Common Bindweed (*Calystegia sepium*), and went to earth on the 26th August.

There had been a whole batch of these caterpillars, for the person who brought those described to me said he had *killed about a score of others* on the bindweed on the hedge round his garden at Kirkle-

bride in Corsock, a place in the centre of the Stewartry, 548 feet above sea-level. An atrocity like that must go to the heart of every British entomologist. It cannot be adequately characterised in mere words.

Although my lamented friend, the late William Lennon, once took some larvæ of this species at Castledykes, in the suburbs of Dumfries, about the year 1862 (one, at least, of which he reared, and I believe it is included in the series of this species in his cabinet, now in the Museum of Science and Art, Edinburgh), this present occurrence is, I expect, only the next for Scotland. For myself, I have no doubt that this batch of larvæ found at Corsock was the produce of an immigrant female. Neither this species nor *A. atropos* is so constituted as to be able to maintain a permanent colony in Scotland, although, if they were sufficiently acclimatised to do it anywhere within our limits, it would be in this mild south-west.

So much for the larvæ of *S. convolvuli*. I have also to record a couple of battered imagos, sent me on the 19th and 22nd August respectively. These were found sleeping on the garden wall at Arbigland, a warm sunny spot on the seashore, close to Southerness Point. Here the Scented White Tobacco (*Nicotiana affinis*) flowers in great profusion in the borders, coming up, in many instances, year after year, from self-sown seed—a sufficient indication of the warmth of air and soil. This plant is said to be the prime attraction for the Convolvulus Moth, when any of these are in flight. No other native insect that I am aware of has sufficient length of tongue to reach the nectar at the bottom of its long tubular blossoms.—Robert Service, Maxwelltown.

Sphinx convolvuli, *L.*, in East Lothian, etc.—This grand moth, which, in this country, is clearly mainly an immigrant from abroad, has evidently visited us in considerable numbers this summer. One got on the railway embankment near Dunbar on 29th July was kindly sent to me by Mr. D. Bruce, and I have to thank Mr. George Muirhead, Speybank, Fochabers, for another caught near the Culbin Sands on 26th August. Mr. Eagle Clarke tells me that while staying at North Berwick in August, he was shown one which was captured in that neighbourhood during the summer. In the south-west of Scotland, two examples which I have seen were taken to Mr. R. Service; and he also had brought to him several larvæ, one of which he most kindly gave to me. It was of the green variety. Lastly, I have had two larvæ from Dunbar, namely, a full-grown brown one which was found by a surfaceman on the railway embankment about half a mile west of the town on 10th September, and forwarded to me by Mr. Bruce; and a bright green one which I had the satisfaction of finding myself on the 11th September upon *Convolvulus arvensis* in the same place where the other was got.—William Evans, Edinburgh.

Sphinx convolvuli in Elginshire.—A fine specimen of the Convolvulus Hawk Moth was sent me alive from Elgin on 13th August last. The moth is occasionally taken at Elgin.—HENRY H. BROWN, Cupar-Fife.

Anthrocera (*Zygæna*) **filipendulæ in Banffshire.**—While my son and I were examining some grassy banks, clothed with bracken, near Cullen, on 16th July last, we came upon a swarm of Six-spot Burnets. They were flying in dozens. On every thistle-head there were a few, and we counted six on some. The time was about noon. Next day there were fewer, and in a few days they disappeared. This moth has seldom been recorded in the North.—HENRY H. BROWN, Cupar-Fife.

Dragonflies in Argyll.—The following notes are merely intended as a contribution to the distribution of the species enumerated. Mr. Wm. Evans, Edinburgh, has identified the species for me.

Sympetrum scoticum.—Lochan Dubh, Oban, 16th July 1901.

Cordulegaster annulatus.—Blairghour, abundant, 3rd July 1900; Kilchrenan, a dozen, 6th July 1901; Loch Nant, 10th July 1901; Loch Charn, 17th July 1901; Glen Crutten, 18th July 1901.

Calopteryx virgo.— ♂, taken by my sister, Upper Sonachan, June 1901; ♂ and ♀ Loch Nant, 10th July 1901.

Lestes sponsa.—Common in a rush-bed at upper end of Loch Charn, 17th July 1901.

Pyrrhosoma nymphula.—Very abundant in Kilchrenan district, June 1900 and July 1901.

Ischnura elegans.—Hillsides above Sonachan, 6th July 1901; Kilchrenan district, common; Loch Tromlee, common, 6th July 1901; Loch Nant and neighbourhood, 10th July 1901; Lochan Dubh, Oban, 16th July 1901; Glen Crutten, 18th July 1901.

Enallagma cyathigerum.—The most abundant and the most generally distributed of all the dragonflies met with. Kilchrenan district, everywhere. Loch Leoid, 2nd July 1900; Loch Nant, 10th July 1901; Lochan Dubh, Oban, 16th July 1901; Glen Crutten, 18th July 1901; Kilninver and district, 17th July 1901.

[Besides these, I saw *Libellula quadrimaculata*, on Loch na Gealaich, 23rd June 1900, but failed to capture it].—ROBERT GODFREY, Bo'ness.

Calocaris macandreæ, *T. Bell*, **in the Firth of Forth.**—This Crustacean was discovered in the Firth of Clyde and off the Mull of Galloway by the late Capt. Macandrew, after whom the species is named, and was described by Prof. Bell in his work on British Stalk-eyed Crustacea, published in 1853. But though Capt. Macandrew was the first to obtain *Calocaris* sufficiently perfect for description, Mr. W. Thompson, of Belfast, had a year or two previously found the anterior pair of legs of a specimen in the

stomach of a fish; and these Prof. Bell, after Capt. Macandrew's discovery of the perfect animal, had no hesitation in ascribing to this species. Though *Calocaris macandreæ* is now known to occur in two or three places on the west coast, the only locality on the east coast from whence it has been recorded, so far as I remember, is the Moray Firth, where it was obtained by the late Thomas Edward of Banff, and where it is still occasionally found. To these various localities there has now to be added the Firth of Forth, the species having been recently discovered in this estuary by Mr. F. G. Pearcey of the Fishery Steamer "Garland." Living specimens were captured by the shrimp trawl at Station III., and others were found in the stomachs of some flat-fishes captured both at Station III. and Station V. The nature of the bottom at Stations III. and V. is more or less muddy and suits the fossorial habits of this Crustacean, and doubtless it is owing to these habits that it is not more frequently obtained. The fact that this interesting species has remained so long unobserved, seems to indicate that there may yet be other rarities awaiting those who may choose to give some time and trouble to the examination of the Forth fauna.—T. Scott, Aberdeen.

Dulichia monacantha, *Metzger*, **in the Firth of Forth.**—In the "Annals of Scottish Natural History" for January 1898, *Dulichia monacantha*, was recorded for the first time as a British species. More recently, in Part III. of the "Nineteenth Annual Report of the Fishery Board for Scotland," it has been reported as occuring in the neighbourhood of the Shetland Islands; and now its discovery in the Firth of Forth extends still further its distribution in the Scottish seas. In the Forth estuary, the species has been obtained both in dredged material and in the stomachs of fishes; and chiefly in the vicinity of Station VII., between the Bass Rock and Fidra. This makes the third species of this peculiar group of Amphipods that has been observed in the Firth of Forth; the names of the other two are *Dulichia porrecta* (Spence Bate) and *D. falcata* (Spence Bate).—T. Scott, Aberdeen.

Acontiophorus ornatum, *Brady and Robertson*, **in the Firth of Forth.**—A few specimens of this fine species of Copepod have recently been obtained in some material dredged in the vicinity of Inchkeith. It is a somewhat rare species, and has not before been recorded from the Forth estuary. But though not often recorded from the British seas it appears to have a wide distribution, for Dr. W. Giesbrecht, who gives an excellent habitus figure of it in his work on the Asterocheridæ, has obtained it in the Bay of Naples, and it has also been got from Trieste by Prof. Claus.—T. Scott, Aberdeen.

Chthonius tetrachelatus, *Preyss.*, **and other Chernetids in Scotland.**—Referring to my records of Scottish Chernetidea in

this magazine for January last (p. 53) I have now the pleasure of adding the following :—

Chthonius tetrachelatus (Preyss.).—On 26th April last I discovered two examples of this species under a piece of wood in an old orchard at Culross ; and on 17th August, I found half-a-dozen under stones on a bank at Kinneil near Bo'ness. It is an addition to the Scottish list.

Chthonius rayi, L. K.—Six specimens found by me on 27th April under pieces of wood on the banks of a muddy ditch at Kincardine-on-Forth. Mr. R. Godfrey has shown me what seems to be a young example of this form taken at Bo'ness on 24th June.

Chernes phaleratus, Sim.—About a dozen examples of a false scorpion which agrees well with the description of this species, were found by Mr. Godfrey under stones in a field near Bo'ness during April and May (see p. 216). The only previously recorded British locality for the species appears to be the New Forest.

Chiridium museorum, Leach.—An example of this unmistakable little species was got by Mr. Godfrey in a house in Bo'ness on 20th June (see p. 217). Mr. Macnaught Campbell informs me that he has a note of having found "*Chelifer museorum*" in a press in the Glasgow Museum, but he is not positive about the identification.

Specimens of the above, with the exception of the *Chiridium*, have been submitted to the Rev. O. P. Cambridge who confirms my identifications.—William Evans, Edinburgh.

BOTANICAL NOTES AND NEWS.

Sagina cæspitosa, *J. Lange.* — In the year 1847 Mr. J. Backhouse found in the courses of the mountain streams on Glas Maol, "in small solitary tufts," a Sagina that Professor Babington was inclined to refer to "*S. nivalis*, Fr.,"[1] to which he also places "*A. cæspitosa*, 'Fl. Dan.' tab. 2289." Mr. Backhouse himself seems to have considered the specimens to be *Saginia saxatilis*, var. *macrocarpa*, Reich.[2] Unfortunately Mr. Backhouse's specimens could not be found in his herbarium (Mr. J. Backhouse, 1893, *in litt.*). They may be in that of the late Professor Babington.

My object in writing this note is to ask botanists to re-gather this plant if possible, as I quite believe it was *S. cæspitosa*, Lange = *Spergula cæspitosa*, J. Vahl. The plant is usually referred to *S.*

[1] "Man. Brit. Bot.," p. 48, 1851.
[2] "Botanical Gazette," vol. iii., p. 49, 1851.

nivalis, Fr. *S. intermedia*, Fenzl, in "Rup. Fl. Samojed. cisural," p. 25, 1845, is closely allied to this and to *nivalis*.

Fries, in his "Nov. Fl. Suec." ('Mant.,' part 3, p. 31, 1842), makes *cæspitosa* the type of *nivalis*, and has a var. *β laxa*. Lange, in "Consp. Fl. Grœnl.," p. 22, 1880, gives the points of difference between *nivalis* and *cæspitosa* very fairly; and if not considered a sub-species of *nivalis*, it may be looked on as a variety.

It is recorded in many of the Arctic expeditions, but it is needless to give references until it is settled as a Scottish species.

There is another plant to which Mr. P. Ewing refers in a letter to Mr. Waller (26th August, 1886) as follows:—"I remember the plant quite well. I always maintained it was *nivalis*, but it was said to be *procumbens saxatilis*, and even a man of good hill experience said it was *Alsine rubella*.[1] All this was caused by its being found on ground that had been under water all winter, about 2100 feet up on Meal nan Tarmachan, near Killin." I have a small specimen "collected on ground where water had lain all winter, in Cam Chreag, near Killin, 15th September, 1886," by P. Ewing. "This," Professor J. Lange said, "I suspect to be a very young specimen of *Sagina nivalis*, Lindbl." And to the best of my belief Professor Lange was right.[2] Most of my specimens of *S. nivalis* are tufted as in the "Eng. Bot." figure; but some gathered by Mr. J. Cosmo Melvill on Ben Lawers, 28th July, 1891, are much more diffuse. See Mr. Watson's remarks in "Journal of Botany," 1863, p. 355, and Professor Babington's in same, 1864, p. 340.—Arthur Bennett.

The Records of Peucedanum palustre, *Moench.*, for Scotland.—Looking through Winch's herbarium at the Linnæan Society's rooms some weeks ago, I found a specimen from Withering's herbarium from the Lake Lancashire[3] station given in the "Botanist's Guide," p. 367, 1805. This caused me to look up all the recorded stations in England and Scotland.

In Scotland we find in Hooker's "Fl. Scotica," part 1, p. 88, 1821, the plant recorded under the name of *Selinum palustre;* from a "Ditch at Ardencaple wood (Dumbarton)." This was from Hopkirk's "Flora Glottiana," 1813. It is also recorded from Edinburgh from a "Marsh near Colinton" in "A Catalogue of the Indigenous Phanerogamic Plants growing in the Neighbourhood of Edinburgh," 1824, by James Woodforde. Hooker and Arnott in the "British Flora," ed. 8, p. 181, 1860, say, "Ardencaple on the Clyde." Hennedy in the "Clydesdale Flora," p. 75, 1878, remarks, "This I have not seen."

[1] It is well known that the original specimens of *S. nivalis* gathered in Scotland were mixed with, and taken for *A. rubella*, and I have specimens so mixed under a label of *S. nivalis*.

[2] So recorded in "Flora Perth," p. 86, 1898.

[3] "Naturalist," p. 267, 1901.

In "Top. Botany," eds. 1 and 2, Vice-County 76, Renfrew, is given within square brackets (*i.e.* as a probable error). I have not been able to trace Watson's authority for this view as I can find no mention of it in the Index to Vols. 1-5 (1851-1883) of the "Proceedings of the Nat. Hist. Soc. of Glasgow," or elsewhere. Perhaps some reader of the "Annals" can supply this information.

There is no reason why it should not occur in Scotland, as it is found in S.-W. Yorkshire certainly, and in Sweden up to Norland, in Norway both in north and south, and in Finland.

One of the districts that occurs to me as likely to be a station for it is Kenmore Holms in Kirkcudbrightshire, which, from the description of Mr. J. McAndrew (who has found *Carex elongata*, L., and *Calamagrostis lanceolata*, Roth., there) seems to be very like some of its Norfolk habitats. I hope that Mr. Watt will be able to examine the station given in Dumbarton next year.

It is certainly a species that should be kept in mind by Scotch botanists. I shall be glad to send dried specimens, or to examine any supposed specimens.—Arthur Bennett.

Scottish Pansies.—In 'Some British Violets, II.' ("Journal of Botany, 1901, pp. 220-227), Mr. Edmund G. Baker discusses and describes the forms of hilly or mountainous districts. He notes the following from Scotland:—*V. lutea*, Huds., var. *amœna*, subvar. nov. *insignis* (*l.c.*, p. 222), Craig na Caillich, above Finlarig, and Ben Lawers; *V. Sagoti*, Jordan, near Forfar, Ballater and Braemar, coll. G. C. Druce, det. Professor Freyn; *V. lepida*, Jordan, Spittal of Glen Shee, coll. J. G. Baker, 1860, det. Boreau, and perhaps near Fort George.

Matricaria discoidea, *DC.*—During August of this year I resided in the parish of Aberdour in the north-west corner of the Aberdeenshire seaboard; and I found the Rayless Chamomile so thoroughly established in Aberdour and neighbouring parishes that there can be no doubt of its having become a permanent settler, with the certainty of extending its range. From Rosehearty, in Pitsligo, where it first was observed as formerly stated, it has spread along every road for several miles, to Fraserburgh on the east, into Tyrie southwards almost to New Pitsligo, and to Gardenstone in the west, thus bringing it into the parish of Gamrie and county of Banff. It is now by far the commonest weed in and around Rosehearty, and its dispersal is easily traced from this centre inland, wherever any carting has occurred of sand or other materials. It grows now around almost every farm steading (often in great abundance) in the parishes of Pitsligo and Aberdour, and in great part of Tyrie, and is gradually spreading into Fraserburgh and Gamrie. From the steadings it is carried along the field roads, and seems likely soon to become a pest of agriculture. It has not yet reached a railway station, but when it does so it will probably be spread by traffic far and wide in a few years. In Ireland its dispersal has been extremely

rapid, as we learn from the newly-issued "Irish Topographical Botany." First observed in Dublin in 1894, it already extends into sixteen out of the forty divisions of Ireland, across the country from east to west, frequently in immense profusion, on roadsides and railways.—James W. H. Trail.

Orchis maculata, *L.*, *subsp.* **ericetorum**, *E. F. Linton*.—In the "Flora of Bournemouth," published last year, is the description (pp. 208-209) of this form as a new subspecies, which, Mr. Linton states, "Has been noted from Caithness and Sutherland to the south coast." In the "Journal of Botany," August 1901, p. 272, the Rev. E. S. Marshall says of it: "Evidently very common throughout North Scotland," and records it from East and West Sutherland, Caithness, and Orkney. As the "Flora of Bournemouth" is a work not accessible to all Scottish botanists the description of the form may be usefully extracted from it:—"More slender than the type; stem usually somewhat purplish above, leaves narrower, more or less recurved, even the lower cauline more or less acuminate, carinate, and folded; spike, 1 to 2 in., broadly pyramidal, at length oblong; bracts purplish; flowers pale, scentless, with rose-purple markings, ground commonly white or tinged with pink, but sometimes of deeper colour; outer line of markings nearly or quite complete; nectary slender, slightly enlarged or not at all upwards, throat narrow; lower lip suborbicular, rounded in outline, rather spreading; mid-lobe much smaller than the broad obliquely truncate or crenate lateral lobes, not exceeding them in length and usually shorter and somewhat recurved."

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—July-September 1901.

[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.

The Rarer Birds of the Solway Firth. By the Rev. H. A. Macpherson, M.A. *Zoologist* (4), vol. v. pp. 281-285 (August 1901).—After a brief introduction the subject is treated under the following headings (1) The absence, or exceptional presence, of North American Birds, (2) Birds from Eastern Europe, (3) Birds from Scandinavia, (4) Icelandic Forms, (5) North European Forms, and (6) Pelagic Birds.

Jack Snipe in August. By Chas. Young, *The Field*, 7th Sept. 1901, p. 432.—Specimen shot at Braelangwell, Invergordon, on 26th August.

Great Crested Grebe nesting in Scotland. By K. and R. Buchanan. *The Field*, 13th July 1901, p. 83.—A nest with four eggs found on the banks of the Brother Loch, near Newton Mearns, on 17th May last.

Notes on the Lepidoptera of the Breadalbane District of Perthshire. By H. Goss. *Ent. Mo. Mag.* (2), vol. xii. p. 227 (September 1901).—About thirty species are recorded.

Vanessa antiopa in Shetland. By James J. F. X. King. *Ent. Mo. Mag.* (2), vol. xii. p. 226 (September 1901).—Specimen seen, but not captured, on the sands of Burrafrith, North Unst, on 15th August.

A List of the Tortricidæ and Tineina of the Parish of Bonhill, Dumbartonshire. By J. R. Malloch. *Ent. Mo. Mag.* (2), vol. xii. pp. 185-188 (August 1901).—Concluded from p. 36 and devoted to the Tineina, of which one hundred and sixty-eight species are recorded.

BOTANY.

Plants of North Scotland, 1900. By Rev. E. S. Marshall, M.A., F.L.S. *Journ. Bot.* 1901, pp. 266-275.—Enumerates plants observed in East Ross, East Sutherland, West Sutherland, Caithness, and Orkney. Among them are numerous new records for vice-counties, as well as of hybrids not previously noted as British.

The Botany of the Ellon District. By James W. H. Trail, M.D., F.R.S. In *The Book of Ellon*, published at Ellon, 1901.—Contains notes on the more interesting plants.

Some British Violets, II. By Edmund G. Baker. *Journ. Bot.* 1901, pp. 220-227.—Treats of the forms and distribution in Britain of the Violets related to *V. lutea*, Hudson, and *V. saxatilis*, Schmidt.

Trifolium pratense, *var.* parviflorum. By I. K. Burkill, M.A., F.L.S. *Journ. Bot.* 1901, pp. 235-236.—Points out that the so-called variety is an abnormal state with small crumpled corolla and ovary foliaceus.

Antennaria dioica, *var.* hyperborea, Cand. By Frederic N. Williams, F.L.S. *Journ. Bot.* 1901, pp. 217-220, plate 423.—Discusses the characters and distribution of the variety in Britain, and also var. *congesta*, Cand., is described, and a specimen in Kew Herbarium, labelled "The Highlands," is referred to it.

Jungermannia saxicola, Schrad. By G. Stabler. *Journ. Bot.* 1901, p. 279.—Records identification of a specimen gathered in 1894 "near Braemar" as this species, previously known as British only from a gathering made by Dr. Greville in Shetland.

Scapania crassiretis, Bryhn, in Britain. By Symers M. Macvicar. *Journ. Bot.* 1901, p. 210.—On a wet rock, at 3200 feet, on Ben Heasgarnich, found by Mr. P. Ewing in July 1900.

List of Fungi gathered during the Excursions at the 26th Annual Conference of the Cryptogamic Society of Scotland, at Boat of Garten, Strathspey, September 1900. Issued as a pamphlet to members of the Society.—The list occupies five pages. *Entoloma crophilum*, Fr., new to Britain, was discovered by Dr. Plowright.

BOOK NOTICES.

Irish Topographical Botany. By Robert Lloyd Praeger, B.A., B.E., M.R.I.A. (Dublin, published at the Academy House, 19 Dawson Street, 1901. 10s. 6d.)

The "Cybele Hibernica," issued by David Moore and A. G. More in 1866, and re-issued in 1898 with many additions, "founded on the papers of the late A. G. More" and on the labours of the editors N. Colgan and R. W. Scully, and of numerous contributors, has been the authority on plant-distribution in Ireland; but, though a very important work in this respect, it has not supplied the information in detail for the counties, and it has not been possible to compare the flora of Ireland with that of Great Britain. To remedy this defect, Mr. Praeger, in 1895 resolved to prepare a Topographical Botany of Ireland comparable to Mr. H. C. Watson's "Topographical Botany" of England, Wales, and Scotland, to be a companion volume to "Cybele Hibernica."

To the work he has devoted his vacations during five years, and he has received "generous assistance from many fellow-botanists." When he undertook the work in 1895 the state of knowledge as regarded county-lists was, that of the 40 counties and vice-counties into which Ireland is divided for this survey, the lists for 11 included over 400 in each, for 7 they included from 200 to 400, and "of the remaining 22 divisions, 100 species per division would have been a high estimate of the average number of plant records available."

In the present work the average number of records for each of the 40 divisions is 628 species,—a proof of the zeal and success with which Mr. Praeger has carried out his self-imposed task. The flora, as enumerated here, reaches a total of "1019 species, or 1138 species and subspecies."

As compared with Scotland the flora shows a less proportion of northern and of eastern or Germanic types. On the other hand it includes species of the Cantabrian type, and one or two of the North American type not known from Great Britain.

A good explanatory introduction is followed by a bibliography of books and papers on the Irish flora, a table of distribution, and an enumeration of the several plants, with, for each, a list of the divisions in which it has been found, and against each division one or more localities with the name or initial of the finder in each.

Frequently, also, there is an indication of the rarity or abundance of a species in the divisions.

The work is enriched with several maps of Ireland, to show the divisions and localities, the progress of the field-work and the present state of botanical knowledge, the petrography and the orography. It is excellently printed.

The author has earned the thanks of botanists beyond as well as in Ireland for a great addition to what had been known of the distribution of the flora in Ireland.

Amphibia and Reptiles. By Hans Gadow, M.A., Ph.D., F.R.S., Strickland Curator and Lecturer on Advanced Morphology of Vertebrata in the University of Cambridge. (London : Macmillan & Co., Limited, 1901). Being vol. viii. of the Cambridge Natural History.

It is somewhat strange that we should have had to wait so long for the advent of a modern work in the English language on such important classes of the Vertebrata as the Amphibia and Reptilia. We have not, however, waited in vain, or to little purpose. The book under consideration has fallen to the lot of one who is not only an accomplished specialist, but to one who has a decided predilection for these so-called cold-blooded creatures. The result is that we have an author not only capable of dealing with the intricacies of anatomy and classification, but one who has also studied the life-histories and habits of a number of species—a most desirable combination.

In the preliminary chapters the characters of each class are carefully defined, its position and ancestral forms considered, a historical account of its classification furnished; and much interesting and valuable information afforded on physiological and anatomical points, and on geographical distribution and life-histories. In the case of the Amphibia, the remarkable facts bearing on their development, metamorphosis, etc., are fully dealt with.

The main portion of the book consists of a series of chapters dealing with *every* order and family of the Amphibia and Reptilia, recent and fossil. In these valuable contributions, the author has combined with the necessary technical details much matter of an interesting nature which will be greatly appreciated by naturalists generally. The subjects have been handled with great ability and marked success, and the book will rank with such standard works as Flower and Lydekker's "Mammals," Gunther's "Study of Fishes," and others. The work abounds in excellent illustrations, mostly original, and there are many maps inserted in the text to illustrate the distribution of the various families. A map, in colours, giving the physical features of the world affecting the geographical distribution of the Amphibia and Reptilia, forms the frontispiece to a most acceptable volume.

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END OF VOL. X.

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