

The Annals

OF

Scottish Natural History

A QUARTERLY MAGAZINE

WITH WHICH IS INCORPORATED

“The Scottish Naturalist”

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1892



EDINBURGH

DAVID DOUGLAS, CASTLE STREET

LONDON: R. H. PORTER, 18 PRINCES ST., CAVENDISH SQUARE



A1509

PREFACE

THE completion of the first year and volume of the ANNALS OF SCOTTISH NATURAL HISTORY affords the Editors the opportunity of expressing their thanks to their Contributors and Subscribers for the kind reception and support which have been accorded to the Magazine. It is their earnest wish to make the Annals worthily represent the Zoology and Botany of Scotland, and they confidently appeal to all interested in these sciences to continue to aid their efforts by the contribution of Papers and Notes; and by bringing the Magazine under the favourable notice of all Naturalists who are not subscribers. They would remind their friends that all profits will be employed in the direct interests of the Annals.

It is hoped that the attention of the Editors will be called to any omissions that may from time to time be detected in the section devoted to Current Literature.

There has been some difficulty in obtaining *short* Botanical notes during the year; but it is believed that the mere mention of the deficiency will bring about its remedy.

LIST OF PLATES

- I. *Anarrhichas minor*.
- II. Forms of *Echinus esculentus* and *Goniaster phrygianus*.
- III. *Salmo fario* from Islay.
- IV. *Salmo fario* from Stirlingshire.
- V. *Salmo fario* from Loch Enoch.
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No. 1]

1892

[JANUARY

EDITORIAL

IN this, the first number of "The Annals of Scottish Natural History," a brief statement regarding the important part it is hoped the new magazine will fulfil in furthering the progress of Natural History in Scotland, may not be considered inappropriate.

Limited as our pages must be to original matter relating to the Biology of Scotland, Recent and Fossil, it is evident that they cannot and should not be devoted to general questions relating to minute anatomy and physiology, for such more fitly find a place in Journals and Transactions of less restricted scope. Nor are monographs of a purely systematic nature, dealing with subjects not strictly Scottish, suitable for our Magazine. Yet, despite these restrictions, the field of work is both wide and varied, and there should, indeed, be no lack of Papers and Notes of value and interest to our readers, and ample room for "The Annals" in the serial literature of British Natural History.

In ZOOLOGY there is yet much—very much—to be ascertained regarding the innumerable species of the various Classes of the Invertebrata inhabiting Scotland, and their distribution.

Among the Mammalia—generally supposed to be well-known—we may remark that two species of Bats are included in the Scottish fauna on the strength of single specimens, and one of these was obtained as long ago as 1858. Some of the larger species of Carnivora are becoming very rare, and their occurrence in many districts is well worth placing on record. The visits of the less common Cetaceans and Pinnipeds are also fit subjects for communications to our pages. The life-history of several species of the Micro-Mammalia is still more or less enshrouded in mystery. Among the Birds and Fishes—classes possessed of remarkable powers of locomotion—the occurrence of rare wanderers always affords material for interesting records: while the details of the migratory movements and distribution of many species are desiderata. Much useful work remains to be done towards the elucidation of the life-history of the Fishes.

In BOTANY it is scarcely needful to remind those who have followed the records of the subject in Scotland during the past twenty years, that much has been done in that time towards filling up the many gaps in the census of distribution of both flowering plants and cryptogams. The "Scottish Naturalist," the "Journal of Botany," and the Transactions of the various scientific societies of Scotland, all afford most valuable materials for the completion of a *Topographical Botany* of Scotland. Yet even in this field much remains to be done, especially among the Cryptogams; nor is there reason to fear lest soon there will be no more regions in Scotland to explore, or able botanists to pursue the work with zeal and success.

Not less interesting to the worker, and often more so to the reader, are certain branches of botanical study that have in the past received less notice among us, but which we trust will receive the attention in Scotland that they deserve, and which is given to them on the continent of Europe.

The life-histories of even our commonest wild plants have scarcely been studied here, with respect to their habits

and behaviour under changed conditions, either in the wild state or when cultivated. That relations exist between insects and flowers is familiar to every one as a statement, and some may be more or less familiar with a part of the extensive literature on this subject; but how few such observations are on record from Scotland. A comparison of these relations as observed in Scotland with the records of naturalists in other countries could not fail to be interesting and instructive. The diseases of plants have been investigated by very few workers in Scotland, despite their practical importance, and the light they are certain to shed on the processes of disease in animals and in man. The Galls of Scotland have not by any means been exhausted even as regards their mere enumeration, and their distribution is very imperfectly known: while there is very much to be done in tracing their modes of formation and development.

The Cryptogams, especially the Thallophytes, will long afford material for investigation sufficient to absorb the powers and opportunities of many botanists. The life-histories of the Fungi and their relations to their environments, and to other living beings, can scarcely be said to be fully understood with regard to a single species. The popular names and folklore of plants in the various districts of Scotland deserve to be recorded; if this is not speedily done the opportunity will be lost under the advancing wave of elementary school education.

Communications on such subjects as the above will be welcome; and any information that we can give with regard to subjects of investigation, books, etc., will be most willingly supplied. Queries for information, or for discussion, will be inserted when sent by our readers with that view. There will be a space for brief notes of observations, methods of preparing material for study, and for other topics likely to prove of interest to Botanists.

Papers and notes by specialists will give information with regard to groups or species of plants that should be looked

for in Scotland as reputed to have occurred or as likely to occur in the country.

Of the FOSSIL FORMS, in both Zoology and Botany, many species remain to be discovered; many to be better understood through further investigation.

NEW BOOKS will be noticed or reviewed when they deal with the Natural History of Scotland, or are fitted to facilitate its study, or are necessary and useful to naturalists.

A short bibliography of CURRENT LITERATURE dealing with the Zoology and Botany of Scotland will be given. To render this as complete as possible the kind assistance of our readers is requested.

There now only remains the agreeable duty of offering hearty thanks for the kindly support and goodwill so freely shown by the naturalists of Scotland and England. Such a response is our best encouragement, and augurs well for the undertaking.

THE GREAT SPOTTED WOODPECKER (*PICUS MAJOR*, L.) IN SCOTLAND.

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

A TREATMENT of the phenomena connected with the disappearance of this species seems to us naturally to be divisible under several headings, viz. a consideration of the old and young pine forests of Speyside; the decrease and almost extinction of the squirrel, followed by its rapid resuscitation and enormous increase; and the correlation of these two sets of phenomena, and possibly of others in a minor degree.

This is a subject to which we have given some attention before.¹ But we are still of the opinion that each of the

¹ "The History of the Squirrel in Great Britain" (Macfarlane and Erskine, Edin., 1881). Reprint from *Proc. Roy. Phys. Soc. Edin.*, vol. v. 1880. With map of dispersal, etc. "On the Decrease of the Greater Spotted Woodpecker in Scotland" (*Zoologist*, 1880, pp. 85-89).

headings treated of is, and are, collectively, worthy of the attention of Scottish Naturalists, with a view to greater elaboration of details in each, and in all.

THE WOODPECKER.—Perhaps the oldest record of the presence of Woodpeckers in Scotland referred to quite another species, viz. the Green Woodpecker (*Gecinus viridis*), and at a period when oak forests flourished even to the north of the mainland. It has thus been recorded—and the record has become stale from frequent quotation, but must serve its turn again—by Sir Robert Gordon in “The History of the Earldom of Sutherland,” 1630, and in which he speaks of the “lairigh or knag (which is a foull lyk unto a paroket or parret, and makes place for her nest, with her beck in the oak trie.”)

Although specimens of the Green Woodpecker have not lately been recorded and added to our list of Scottish birds there is strong evidence to show that it does occasionally occur in autumn. One bright morning in August 1887, whilst standing at the front of Arden House, Dumbartonshire, I heard what could scarcely be aught else than the cry of the Green Woodpecker. On another occasion the cry was recognised by Mr. John Cordeaux, during a walk to the Tor and old Castle of Torwood, Stirlingshire, on 29th September 1889. The records given by Mr. Robert Gray in his “Birds of the West of Scotland” (pp. 189, 190), appear for the most part reliable.

Selby met with the Great Spotted Woodpecker on the banks of the river Spey, and amid the wild scenery of the Dee, in 1833, or at least recorded the fact in that year. And MacGillivray described birds obtained north of Loch Ness and from Braemar; but whilst speaking of the distribution, does not make it distinctly clear whether he refers to it in summer or winter or both, nor for that part does Selby. MacGillivray wrote in 1840, and the birds he describes were shot in January 1834 and October 1836. But he records it as “resident in the woods [of Dec]”; it occurs but very rarely in all parts of the district, from Banchory to Glen Lui. In Mar Forest and the Invercauld woods, it is less frequent than it was some years ago” (“The Nat. History of Deeside,” 1855, p. 395).

The presence of the Woodpecker is spoken of in the following terms by the authors of "The Lays of the Deer-Forest" (vol. ii. p. 258), with special reference to the Forest of Tarnaway—

"The Northern Woodpecker comes to breed in the spring, and remains until the decline of summer. Many of the old dead firs are pierced with its holes, of which it generally has two or three for escape, so that it is very difficult to surprise it on its nest. This beautiful bird is not, we believe, to be seen farther south than the pine-woods of the Spey. It is about the size of a thrush; its wings and body pied with black and white; the head a deep velvet sable, with a snow-white line above and a scarlet mark behind the eyes; the breast of a light colour, turning into crimson towards the tail."

Elsewhere, in the same volume, the authors speak of "the strange mysterious tap of the Northern Woodpecker" (*loc. cit.* p. 255).

The evidence given by Mr. Booth ("Rough Notes," vol. i.), who spent much time amongst the great old pine woods of Spey, and had the best opportunities of research when there, are worth reproducing. He says—

"The remains of the old timber in the valley of the Spey, and in many other parts of Inverness and the adjoining counties, indicate that Woodpeckers were formerly numerous in those districts. . . . On some of the largest and oldest trees I have counted from twenty to thirty holes bored right into the centre of the stem. According to the statements of my informants, it appears that these Woodpeckers commenced to decrease in numbers about 1845 or 1850. In many parts of the country only an occasional straggler was seen for nearly 30 years. I discovered, however, in passing through several of these localities in 1878 and 1879, that a few pairs had lately taken up their quarters in their long-deserted haunts. The cause of their disappearance in the first instance was perfectly unaccountable to all those with whom I conversed on the subject. . . . In the Highlands (though few nests now occupied have come under my observation) I noticed this bird breeding in Scotch fir and birch. Elm and oak appear most frequently resorted to in the more southern counties; but I have also met with broods in several varieties of fruit-trees, as well as willow and fir. The last nest I examined was in a remarkably high Scotch fir in one of the Sussex forests."

Mr. Booth then makes mention of the visitation by a large

flock extending from Dornoch to the south shore of the Dornoch Firth in Sept. 1868.¹

It is evident, therefore, from Mr. Booth's notes, and also from what is well known to naturalists, that mixed forests of oak and other hard woods and pine are at the present time the chosen haunt of the Great Spotted Woodpecker in England, and also in Continental countries. Nowhere have we ourselves found the Great Spotted Woodpecker, and closely allied forms *P. medius* and *leuconotus*, so abundant as in the ancient oak-woods around Gorgény St. Imry, in Transylvania, or so scarce as in the belt of pine at 3000 feet in the same country, or in the great pine forests of north-eastern Russia and Norway.

There still remain positive assertions of the presence of the Great Spotted Woodpecker as a breeding species, but our own personal opinion agrees with that of the majority, and with the relations of the oldest inhabitant, that it has long been extinct as a breeding species in the old pine woods.¹ Consensus of opinion holds that at least 50 years have elapsed since the bird became extinct as a resident in the pine woods of Speyside and Dulnain. But there are now (1891) many people living, who clearly and accurately remember them as common in certain districts. There is abundance of evidence, patent to the sense of sight, that their former abundance is as undoubted now as it was then: the numerous borings, nesting holes, or "bos" are visible in Speyside forests, as well as in other parts of the north of Scotland, such as Guisachan, in Inverness-shire, where, however, on account of the great fires, few are now to be seen.

Of late years there has been evidence of occasional reappearance of the birds in their old haunts, and of their lingering in them far on into their breeding season. Of their occurrence in autumn and winter in droves, we have many seasons' records. Indeed, all our own records since we began to pay attention to the Vertebrate Fauna of Moray, relate to autumnal migrations of the bird, except one, viz.—On the 15th May 1884, the writer's mother, when driving

¹ Confusion exists in the name and identity of the bird, the Creeper (*Certhia familiaris*) getting the name "Woodpecker" applied to it, usually by the younger generation. We have always been careful about this matter.

between Aberlour and Carron in Strathspey, described to us "a bird about the size of a blackbird which flew across the road near Carron Bridge, and which alighted on the bark of a tree, and began climbing up spirally." She further described it as "spotted with white," and as "having some red about the head," and as having been observed "not more than half the breadth of the road distant."

And it may be worth recording if only to show that some uncertainty still exists as to whether it is really extinct as a nesting species, that the Rev. W. Forsyth, Manse of Abernethy, wrote to Dr. Gordon of Birnie under date of 8th May 1885, as follows :—

"Woodpeckers are rare now in this locality. I remember when it was otherwise, and have watched them at work. The last that I saw were killed in the Castle Grant woods some forty years ago. But the Great Spotted Woodpecker is not yet extinct. They have been seen occasionally in this neighbourhood, within the last few years, and they have been known to build on the Nethy in the old fir woods within the last two years. There is little doubt they are to be found there still."

Further investigation of this, however, has failed to elicit more exact details, to date. The specimens referred to as occurring in the woods of Castle Grant are also alluded to both by Dr. Gordon and by Mr. Robt. Gray.

The most noted haunts of the bird, and localities always quoted by the natives of Strathspey, were Carnacruinch—once wooded to the summit with old pine—in Rothiemurchus, and the old wood of The Crannich, in Duthil; Castle Grant woods, near Grantown; Tarnaway on the Findhorn; and Abernethy generally; but it must have been widely spread over all the old wooded tracts of Spey and Findhorn, as well as north of the Caledonian Canal. We are not able to trace the complete area of its former distribution in Scotland, but it appears doubtful if it occupied in historic time the forests of Scotland south of "Dee" and "Moray."

There is a current tradition or belief amongst persons now living in Rothiemurchus and Strathspey, that this disappearance of the Woodpecker was sudden; and some of the older people who recollect the birds will even go so far as to fix the year at 1850 or 1851; whilst a few even say

“disappeared in a single night.” The last statement we may dismiss as natural exaggeration, caused by an appeal to memory only, of a remarkable and sudden occurrence. Of the more modified concurrence of opinion, stating their disappearance to have taken place comparatively suddenly and about the year 1850, or 1851, there are more witnesses, and we do not feel inclined altogether to dismiss it summarily.

Regarding the more usual and wider statement that the Woodpecker disappeared about forty to fifty years ago, we can, I think, certainly accept it as fairly accurate, and say as between 1841 and 1851: dates which prove of sufficient significance, if compared with the dates of destruction of old wood, at least in Inverness-shire, of which we say more later on, and which also offer a very fair concurrence with the popular opinions given above. We have a statement of a much later date for the Woodpecker actually breeding, within twenty years back, relating to the nesting in the bole of a birch tree, but as yet we have no corroboration, and prefer for the present to withhold details, except that we believe that the statement emanated from the same source as that upon which the Rev. A. Forsyth built his belief.

Of the trees usually occupied by the birds, these have for the most part been found to be, if old, yet of moderate size, the larger ones being too hopeless for the birds to attempt.

This coincides with Lord Tweedmouth's experience, when so many old “white” trees stood within a mile of Guisachan House, previous to 1855: and we may add also, it is borne out by our own observations on Speyside. Sometimes, however, even a horizontally attached branch or limb may be used, as in the case of “The Burnt Firs,” at Plodda, near Guisachan, represented in Kilgour's sketch in a volume of original sketches in the possession of Lord Tweedmouth.

Just as statements differ as to the exact dates of the disappearance of the bird, so do opinions differ as to the causes of their decrease and disappearance; and the primary purpose of this paper is to take into consideration the whole pros and cons of the subject, and to endeavour to cast as much light upon the matter as the materials at our disposal enable us to do. The almost universal popular belief that the squirrel is the primary cause, has however to be received

with caution, until others are sought for, as we presently shall proceed to do.

THE FORESTS.—It is not necessary in this place to go into full proof of the wide extent of pine and oak-woods which at one time covered great portions of Scotland, as much has already been recorded in numerous volumes. Suffice it to say as regards Scotland generally, that even at the present day evidence remains of pine and oak in almost all the old peat mosses, and even beyond the limits of the present dry land, submerged remains of forest ground still appear within view, in many parts of Scotland, north, south, east, and west, notably in the Moray Firth, in shallow water, between Findhorn and Burghead in Elgin. Evidence still remains also, high up the slopes of our mountains, here and there, notably in Argyll and Moray: as for instance on Ben Cruachan, and high up the haunches of Ben Muichdhu, Cairngorm, and Glen Guisach; reaching far up Glen Derry of Dee, and Tromie and Feshie of Moray. Evidence, we say, still remains in living giant pines, which are still numerous in the sheltered valleys of Moray, some measuring 16 feet in girth, five feet from the ground. Such are "Porter's Pine" in Abernethy, and "The Queen of the Forest," also in Abernethy, and a pine by the roadside, of the same name as the last, in the old Crannich Wood of Duthil; and many more. The old wood still occupies literally thousands of acres along Speyside, Dulnain, and Findhorn. Remains now are fewer in Guisachan, Inverness-shire, and Glen Affaric, but at this latter locality, it is believed, are the largest existing specimens of individual trees in Scotland, some of which are still in vigorous old age.¹

Of the gradual decrease at times, and the rapid destruction at others, of the greater part of these extensive forest-tracts, the history is well known, though no perfect

¹ By the kindness of Lord Tweedmouth we have had the great pleasure of inspecting a handsome folio volume of drawings, by Kilgour and Mr. Wilson, of Guisachan, Glen Affaric, and the old pines of the forests there. We give the measurements of two taken from Lord Tweedmouth's notes.

The "Mammoth," blown down in February 1889, measured—

Girth at 1 foot from the ground	19 ft.
„ 3 feet „ „	17 ft. 4 in.
„ 6 „ „ „	22 ft.

It stood near Plodda on the banks of Garvagh.

chronological account of it has been drawn up—from the decay and formation of our vast peat-mosses, visible in its later stages in still hard roots and trunks. In historic times, as we are informed in Menteith's "Forester's Guide," p. li.—

"For upwards of nineteen miles from beyond Tyndrum to Tyanne on the King's House, through the upper or eastern portion of Glenorchy, where decayed roots of trees, many of them of large size, appear on each side of the road . . . and in banks of the rivers and spreading over all the valleys, hills, moors, and mosses of Scotland. . . . Much of these extensive forests were cut down from various views, chiefly to prevent their affording shelter and rallying points to those who maintained the independence of the country. Also, the pasturing of sheep and want of enclosures where they formerly existed, prevented their reproduction."

Large woods were also cut down and burned by the Danes; and, by the orders of King Robert the Bruce, near Inveraray in later times; and on Speyside and elsewhere, ruthless destruction went on by the York Building Company's operations, until the failure of that undertaking put a stop to it.¹ Besides these causes, fire accidental or premeditated undoubtedly had its share, as there is abundance of evidence to show.

At Guisachan and Strath Affaric we have the direct testimony of one Rory Macdonald, who was an old smuggler, and who was alive in 1880, but is since deceased, that when smuggling was so largely carried on between 1840 and 1860, the smugglers made free use of all the decayed and bored trees, at which the proprietors winked, provided they

"Magog"—Girth at ground 16 feet.

3 feet from ground	14 ft. 9 in.
6 " "	14 ft. 7 in.
9 " "	15 ft. 3 in.
12 " "	16 ft. 8 in.
15 " "	17 ft.

Cubic contents of the 15 ft. = 210 ft. 11 in.

We have seen also in this collection drawings of "The Burnt Firs," near Garvagh Bridge, in a limb of which are the borings of Woodpeckers; and the "Ospreys' Fir," with the nest on the top. The larger and finer specimens of pine trees are found on the south side of the strath.

¹ By far the best account in detail of the proceedings of the York Company, we believe, will be found in "The York Building Company; a Chapter in Scotch History," by David Murray, M.A., F.S.A. Scot. Glasgow: James Maclehose and Sons, 1883.

left the sound trees alone.¹ In the first volume of the 1st Series of the "Prize Essays and Transactions of the Highland Society," p. 185, it is mentioned that, at that date, 1799, remains of the old forests were "not unfrequent in the upper parts of Argyllshire, and also in the North Highlands, as at Braemar and the head of the River Dee." But on Deeside 80,000 trees are stated to have been swept down, in the neighbourhood of the Linns of Dee. ("The Braemar Highlands," p. 15, by Elizabeth Taylor, Edin., 1873.) The Stuarts give evidence in their "Lays of the Deer Forest" (*loc. cit.* p. 221) of vast stretches of forest growth of firs and oaks in Lochaber and Glen Treig, and in Strathfarrar, "where twelve miles of pine, birch, and oak were burned to *improve* the sheep pasture,"—and in Tarnaway of "aboriginal pines . . . oaks . . . and hollies . . . which latter were not exceeded, perhaps not equalled in Great Britain" (*loc. cit.* p. 257). But we must get on to more recent times. Even at the less remote date of 1864, shortly after the present line of the "Highland Railway" was opened, a large extent of the central plain of the Rothiemurchus Forest underwent complete denudation of its timber-growth, leaving to this day the black and charred stumps of many goodly pines. These were cut to supply demand, and the ground has since been burned, to prepare it, it is hoped, for replanting. Some of the other large areas have been more mercifully, and we think more wisely treated, annual income being secured by annual thinning out; thus at the same time preserving the wooded appearance and beauty of the landscape, and providing for the future crop by native seed, shed by the remaining trees. Such a system is followed throughout the whole area still occupied by old pine-forest on the extensive Speyside estates of the Countess of Seafield, and extending through Glenmore belonging to the Duke of Richmond and Gordon, and to the old wood of The Crannich at Carr-bridge, not to speak of other areas on Findhorn, and others north of the line of the Great Glen.

Of the re-afforesting by younger growth, the history is

¹ This proves *one cause*—by fire alone,—just at a time when the disappearance of the bird is said to have taken place. The said Rory Macdonald gave evidence also that the birds were common previous to 1851. (Compare the dates with those already given.)

also fully known, if not fully told, and within the easy reach of all who are specially interested, and it may be said to have commenced on Speyside towards the end of the last century, the example having been shown by the Duke of Athole in the valley of the Garry, and followed by the proprietors upon Speyside shortly afterwards; and in the beginning of the present century. At the present time the whole valley and minor hill-slopes of Spey may be said to have become re-habilitated in a mantle of pine-wood of various ages. On the Countess of Seafield's properties alone over 40,000,000 of trees have been planted quite in recent years; while, at the same time, many thousands of acres of the older growths have been scientifically conserved; and they are now engaged as of old, in self-regeneration. And there seems little fear at the present day, that any repetition of the old wastefulness of our forests will be permitted.

We have very rapidly, very imperfectly, and without the least attempt to go into detail, thus sketched the history of our pine-woods. Those who are interested will find a great store of unarranged materials in many of our old Chronicles, in the works of Hector Boece, in the histories of the country, in the records of the York Building Company, dating as far back as history takes us, and tradition gives us any indications.

Shortly then we wish to recapitulate, and to point out that even down to the recent date of 1864, the old forests of native pine underwent wholesale destruction; and previous to that date, the restoration of forests by younger wood had commenced on other areas—beginning at the end of the last century, about 1770, on Speyside, and continuing down to the present time, until nearly the whole valley has been again re clothed. And, at the present time, we have shown that whilst large areas of the old pines still exist, especially in Speyside, in the forests of Glenfeshie, Rothiemurchus, and Duthil, Abernethy and Glenmore, Darnaway, Castle Grant, and Altyre, these are also for the most part being conserved. To this we wish to add: old and decaying pines are still being, year by year removed to make way for light and air to the younger generations, and afford relief to those still remaining in vigorous old age. This, it is needless

to point out, is annually reducing the amount of the oldest growth, but the procedure is only consistent with good forestry and the "survival of the fittest." By burning also, as already pointed out, nearly all the old decayed timber around Guisachan was destroyed.

The main points brought out hitherto are first, that vast and very general destruction, or burning of old trees, took place between 1840 and 1860. Lord Tweedmouth relates that "in 1855 there were hundreds and hundreds of white trunks of firs burnt and drying within a mile of Guisachan House" (see previous article *op. cit.* p. 86). Now, in 1891, he tells us "there may be a dozen left between Plodda Fall and Garvagh Bridge." And second, that the Woodpecker, formerly abundant, decreased about the same time, and even somewhat suddenly disappeared from its previous summer haunts. We have now to consider the most popularly believed cause of the bird's disappearance—most popularly entertained, by those now living, who can remember the abundance of the Woodpecker, and at the same time, the almost equally phenomenal and sudden increase of the squirrel. This belief is also entertained by foresters, and head wood-managers, a class of men, who in Scotland generally are known to be men of reading, education, and veracity.

THE SQUIRREL.—We cannot afford space here to do more than simply point out in a very few words the ascertained decline, resuscitation, and increase of this animal in the valley of Spey alone; prevising that, as elsewhere treated of in considerable detail,

"The Squirrel is found to have lingered longest where the forest remained longest, and to have revived most rapidly, or spread most rapidly after restoration where forest trees had been planted. . . . Where trees have lingered amidst the Highland glens, they lingered too; and where trees have led them of late years they have reached considerable altitudes," *vide* "The Squirrel in Scotland," p. 165 of reprint.

Nowhere in Scotland are the above remarks more applicable than in the valley of the Spey. About the end of the 18th century a succession of severe winters, culminating in that of 1795, contributed, almost undoubtedly, to the extinction of the Squirrel in many parts of Scotland; and that it did not

become extinct in Speyside seems, almost as certainly, to have been because it was saved just in time by the planting of young trees, affording fresh food and protection. Recent storms—there is abundant evidence to show—had, and still have, direct effect upon our Squirrels, causing them to migrate to warmer or better-wooded areas, where it is possible for them to do so.

Returning now to our old pine forests, which to a large extent replaced another growth of oak and hazel, we can realise with some degree of accuracy that hazel nuts and acorns became rarer and rarer, and also that insect larvæ diminished in the number of species, just as the various species of timber became fewer, and were almost entirely replaced by pine. And we can further realise also, that just as these food-supplies became scarcer and scarcer both for bird and mammal, so would the "struggle for existence" become greater and greater. It must be remembered nearly all the plantations are composed of pine trees only, or of pine and larch. Therefore the food of our Scottish Woodpeckers was thus restricted—or nearly so—to the larvæ of insects, and the insects abounding in pine woods, to the exclusion of others whose food plants and foliage include many hard woods, as well.

There are undoubtedly many who ascribe the disappearance of the Woodpecker entirely to the Squirrel's oophilous, carnivorous, and, we may add, insectivorous propensities. So universal is this belief in Strathspey, and elsewhere north of the Great Caledonian Glen, that it cannot be passed over in silence or treated as imaginary. It is beyond denial that the Squirrel does eat eggs, and rob nests, because he has been seen to do so often; and we know also that he occasionally regales himself upon the larvæ of ants—the food of the Woodpecker—whose hills are so abundant in the pine-woods of Spey. We are afraid there can be no doubt that he occasionally, at all events, regales himself even upon a callow brood of young. In fact, a bad character is now attached to the Squirrel, and the causes of complaint are many. His misdeeds are in every one's mouth, and his name is a by-word in Strathspey. Foresters cry him down (and hecatombs of Squirrels' bones strew the forest in consequence) and

gamekeepers add too well-founded grounds of complaint against him. In fact, the Squirrel rapidly became an aggressive and progressive species, but the Woodpecker yielded before the change of forest circumstances, and became retrograde and finally either died out as a nesting species, or suddenly, as some affirm, disappeared *en masse* and fled the country about the year 1850, making however an endeavour to return again in the summers of 1878 and 1879.

Now it has been stated and reiterated, times without number, that Squirrels can and do enter into the holes made by the Great Spotted Woodpecker; and this, stated and adhered to by many thoroughly respectable authorities, amongst whom we may again mention those whom we before quoted in our previous article, "Zool." Mar. 1880, pp. 86 and 87. Mr. J. Grant Thompson, the Countess of Seafield's head wood-manager, added, "the fact is perfectly certain," and, with settled emphasis, "I have seen them do it myself." On the other hand, such is by some denied as possible, and they even stoutly doubt if the hole made by a Green Woodpecker (*G. viridis*) would admit a Squirrel. At one time we were inclined to favour this view, but facts are stubborn things, when merely opposed to theories. Take a sharp wire, run it through a Squirrel's body and both shoulder-blades: press down the flesh thus impaled upon the wire: measure the length of the wire concealed in the flesh and bone, and compare with the diameter of an ordinary Great Spotted Woodpecker's nesting hole, and observe the results.¹

At the present day many of the old nesting holes of the Woodpeckers in the pine trees are occupied by wasps and bees. A specimen cut off a rotten decayed pine-branch showing numerous "borings" and "tappings" of the birds, was procured for me from the forest of Rothiemurchus in the end of the summer of 1891.

¹ That the firm belief exists—it has been suggested—"is possibly owing," says our correspondent, "to a misreading, misidentification or confusion arising out of a passage by Pennant in his 'Caledonian Zoology.'" Pennant says:—"Pine martin. This species is found in pine forests, and takes possession of the holes made by the Woodpecker," and he also says—"Squirrels scarce in Scotland, a few in the woods of Strathspey." Confusion no doubt existed, even then, possibly, in the minds of Pennant's informants; but Pennant surely should have known that martens could not enter and take possession of the holes made by Woodpeckers.

THE STARLING.—How much the former increase of the Starling, subsequent decrease, and again vast increase, may have affected the Woodpecker, directly or indirectly, is a subject for further investigation. It certainly has been the means of lessening the numbers of the Great Spotted Woodpeckers in certain districts in England. An assertive species like the Starling often may figure forth, when approaching in successive waves of dispersal, as a power for good or evil ; but at present I cannot say we have any reliable data to go by ; indeed, at the present day, there are few Starlings at all in the midst of the old Woodpecker tracts. But these successive waves of Starlings—about which there appears to be little doubt—are of themselves worthy of tracing out, and cannot fail to yield results.

At present, at all events, we stand at the following points of our inquiry :—

The facts and dates (approximate) of the decrease and disappearance of the Woodpecker from areas indubitably occupied by them commonly previous to 1850.

The facts and dates of the decline, increase, and enormous recuperation of the Squirrel, to a great extent coinciding with the decline of the bird.

The facts and dates of the former abundance, decline, destruction from various causes of old forests, principal amongst which appears to have been fire ; and these dates coinciding on the one hand with the young planting, going on down Speyside, and on the other with the decrease of the Woodpecker.

The facts, figures, and dates connected with the young plantations on Speyside, the attaining of the same to a certain age, coincident with the resuscitation of the native Squirrels of Speyside, not to say also with the introductions of Squirrels in various parts of Scotland, from Dalkeith in the south, to Beaufort Castle in the north (see "The Squirrel in Scotland").

ON THE OCCURRENCE OF WILSON'S PETREL
(*OCEANITES OCEANICA*, KUHL) IN JURA.

By HENRY EVANS, F.Z.S.

A SPECIMEN of Wilson's Petrel was found alive by the keeper's children at Inner Jura, on the western side of the Island, on the 1st of October last. The bird had become entangled in a net used to keep poultry out of a kitchen garden, and was brought to me in a perfectly fresh condition. Fortunately I was there at the time or it would have been lost. There is no doubt as to the species; the colour of the wings, the length of the tarsus (one and a half inches), and the yellow patches on the webs of the feet, make the identity of the bird certain. The net in which the Petrel was captured is about fifty yards from the sea. Unfortunately the sex of the specimen was not noted, for I did not examine the bird carefully until after it had been skinned by the keeper. The weather was fine at the time of its capture, but there can be little doubt its appearance is to be associated with the heavy gale of the 26th of September.

JURA FOREST, 26th November 1891.

[In the North Atlantic this bird is very common on the American side; but appears to be a more or less irregular visitor to the shores of Europe. Although it has been noted on several occasions for England, and once, at least, for Ireland, yet this is the first known instance of the occurrence of Wilson's Petrel in Scotland.—W. E. C.]

FRESHWATER FISHES OF THE SOLWAY AREA.

By ROBERT SERVICE.

I HAVE been prompted to prepare the following outline Catalogue of the Freshwater Fishes of the Solway Area by a remark made in the course of a most interesting paper on

the "Fishes of Loch Lomond and its Tributaries," by Mr. A. Brown, in the July issue of the *Scottish Naturalist*. The remark to which I refer is that Mr. Brown "believes we may search Scotland in vain for a similar concourse of species." In one of the water systems of our area—the River Annan, its loch-feeders and tributaries—the number of species Mr. Brown gives for Loch Lomond and tributaries is exceeded, and it is equalled by the Nith and Dee systems. Of Mr. Brown's nineteen Loch Lomond species, the River Annan system holds all except *Coregonus clupeoides*, *Tinca vulgaris*, and *Gastrosteus spinulosus*. That leaves us with sixteen species, but to these fall to be added *Coregonus vandesius*, the Vendace; *Leuciscus cephalus*, the Chub; *Abramis brama*, the Bream; and *Thymallus vulgaris*, the Grayling. These species total up to twenty, but there is no reason why credit should not be taken for some few additional species which in their respective seasons migrate to the fresh water, viz. *Clupea alosa*, the Shad; *Osmerus eperlanus*, the Smelt; *Mugil septentrionalis*, the Lesser Gray Mullet; and *Accipenser sturio*, the Sturgeon.

The Solway Area is that division of the south-west of Scotland stretching from the Esk to Lochryan, as defined by Dr. Buchanan White ("Scot. Nat.," 1872, vol. i. p. 161). As a definite faunistic area it is almost faultless, the only objection I ever heard advanced being that the Esk watershed is altogether "too Tweed-like" in character. But it would be difficult to exclude the Esk valley without making other alterations that would only lead to further objections. The principal river systems are the Esk, Annan, Nith, and Urr, flowing into the Solway Firth; and the Dec, Fleet, and Cree flowing into the Irish Channel. It might be as well to explain that local faunists here look on the Solway Firth as all the water inside a line drawn from Balmae Head in Kerrick to St. Bees in Cumberland. The Solway Area is partitioned off from the rest of Scotland by an extremely natural boundary, consisting of a range of hills which runs right round from the head of Eskdale to the north of Wigtonshire, where it terminates in the well-known Rhinns. The principal river systems take their rise on the southern slopes of the hills that environ the area of "Solway."

Politically the faunal area described includes the entire county of Dumfries, and the two counties of Kirkcudbright and Wigton—the two last named together forming the modern Province of Galloway. With the exception of the Esk and Nith, the river systems are connected with numerous lochs, some of them of considerable size. There are comparatively few places of high angling repute, but many a capital spot is known only to a favoured few, while others again are strictly preserved for private use.

As stated at the outset, the following Catalogue is intended as a mere outline of the subject, and is only a condensed compilation of what I have gleaned casually in matters which hitherto I have not made a special study. But enough is given to show that as compared with other Scottish districts, "Solway" is peculiarly rich in species, and there is little doubt there are one or two additional species to be found yet.

***Perca fluviatilis*, Linn.**—THE PERCH.—Abundant throughout the entire area in almost every loch and in all the rivers. Copland of Collieston is said to have introduced Perch into Loch Ken and adjacent waters in 1750 ("Statistical Acc." p. 193, 1845).

[***Cottus gobio*, L.**—THE MILLER'S THUMB.—Ought to occur, and doubtless does so, but I have never seen it, nor do I know of any reference to its occurrence here.]

***Gobius minutus*, Gm.**—LITTLE GOBY.—I have found this species in merse pools of clear fresh water, both on the coast and up the river banks, but it probably requires to be reached by the tide occasionally.

***Mugil septentrionalis*, Günth.**—NORTHERN GREY MULLET.—A good many Grey Mulletts are annually caught at the mouth of the Dee. The species is also caught inside the entrance to most of the other rivers. Those I have examined have all belonged to this species, but Mr. J. J. Armistead, the well-known pisciculturist, informs me he has seen specimens he considers to be *Mugil capito* (Cuv.)

***Gastrosteus aculeatus*, Linn.**—STICKLEBACK.—Everywhere common in suitable localities. In June 1888 I found specimens of this fish spawning amongst seaweeds in a rock pool off the Castle Point at the mouth of the Urr. The pool was only a short distance above low-water mark, and no fresh water except rain could ever enter it. I have not gone into the

question of the so-called varieties or sub-species of this variable species, and have therefore nothing to say about them.

Gastrosteus pungitius, *Linn.*—TEN-SPINED STICKLEBACK.—Quite as widely distributed as the preceding species, but not nearly so numerous in individuals.

[**Gastrosteus spinachia**, *Linn.*—FIFTEEN-SPINED STICKLEBACK.—Some years ago I saw a specimen of this fish taken from fresh water in a Spirling net at the mouth of the Nith. It had probably been left behind on the ebb of the tide.]

Pleuronectes flesus, *Linn.*—THE FLOUNDER.—Very common in all the tidal parts of the rivers, but going up also many miles higher than the tide ever reaches.

Cyprinus carpio, *Linn.*—THE CARP.—In former times this species was kept in the fish ponds attached to the great houses, and it was still to be found in some of these ponds in recent years, and may be so yet.

[**Carassius auratus** (*Linn.*)—GOLD FISH.—It can scarcely be said of this species that it is naturalised, nevertheless it breeds and thrives amazingly in a pond of warm water at the Dumfries Ironworks. There are one or two other places, where, under similar conditions, it has thriven well. Fishes taken from such places and transferred to water of natural temperature rarely live more than a month or two.]

[**Leuciscus idus** (*Linn.*)—THE IDE.—Is merely mentioned to state that Dr. Walker's supposed discovery of this species at the mouth of the Nith ("Stewart's Natural History," i. p. 382, 1817) has never been confirmed.]

Leuciscus rutilus (*Linn.*)—THE ROACH.—Occurs in the Annan system, being especially common in the lochs near Lochmaben. Also in the small river Lochar, and in a small loch in Colvend.

Leuciscus cephalus (*Linn.*)—THE CHUB (Locally "Skelly").—A well-known inhabitant of the Annan waters.

Leuciscus phoxinus (*Linn.*)—THE MINNOW (Locally "Biliter").—Universally distributed.

Tinca vulgaris, *Cuv.*—THE TENCH.—I know this fish as a local species from one spot only—a small loch in Upper Nithsdale. The late Dr. Grierson of Thornhill once showed me skins in his museum from some other locality here, but I unfortunately omitted to take a note of the place at the time, and the information cannot now be obtained.

Abramis brama, *Linn.*—THE BREAM.—Common in the Lochmaben lochs and in some parts of the Annan.

Nemachilus barbatulus (*Linn.*)—THE LOACH (Locally “Beardie”).
—Common and generally distributed.

Clupea alosa, *Linn.* — THE ALLIS SHAD (Locally “Rock Herring”).—Pretty common about the mouths of the rivers in June.

Salmo salar, *Linn.*—THE SALMON.—In value and importance Salmon far outweigh all our other fish interests put together. But the constant flow of law cases arising out of disputes and claims and law-breaking in the Salmon fisheries is a real public scandal, and unsatisfactory to everybody except the lawyers. The late Frank Buckland would have found a very large number of people here to agree with him, if in his famous statement that “more lies have been told about the pike than about any other fish in the world” he had substituted “Salmon” for “pike!”

Some of the modes of Salmon fishing practised in the Solway, such as by the haaf net and shoulder net, are peculiar to the district, and have been in use from time immemorial. The old mode of pursuit on horseback as described in “Redgauntlet” is obsolete, although a few old persons still remember, and are fond of relating stories of, the time when it was in daily operation. “Burning the water” still occurs, but only as a rather rare and very lawless proceeding in some lonely out-of-the-way place.

Solway fishermen always speak of Salmon as “Fish,” and almost invariably with a peculiar deferential tone of voice. Thus I asked one on a certain occasion what luck he had this morning? His answer was “A’ had twae stanes o’ fleuks, a skate, about a dizzen o’ herrin, some codlins, and *three Fish!*”

I must not omit to remark that Shaw’s almost classic researches on the life-history of the Salmon, which threw so much light on an obscure subject, were made in the upper waters of the Nith.

Salmo fario, *Linn.*—THE TROUT.—It is most interesting to study out the various types and varieties of Trout to be met with, but the matter need not be entered into in the present connection. Suffice it to say that almost every little stream has its own peculiar variety. A very fine variety, distinguished by pink flesh and large spots, is peculiar to Loch Skene, an isolated mountain loch at an elevation of about 1000 feet at the head of Moffat dale. The Trout of the streams running into Loch Ken are also distinguished by large spots and superior weight, fish up to 10 and 12 lbs. being caught occasionally. The Trout of Lochs Kindar and Lochinvar are extremely like (if they are not identical with) true *S. levenensis*. Trout of similar character are found in Loch Skerrow and also in the small loch at

Jordieland near Kirkcudbright. Tailless Trout are caught occasionally in Loch Enock, and this curious aberration has also occurred in the Nith.

Salmo levenensis, *Walk.*—LOCH LEVEN TROUT.—Has been extensively introduced of late years, and specimens are now caught in most of the rivers with tolerable frequency.

Salmo trutta, *Flem.*—SEA TROUT.—Abundant, coming up the rivers in successive “runs,” which are supposed to be dependent on the state of the weather. The great bulk of the “Hirlings” which, beginning to run in July, continuing to come up in swarms all the autumn months, form so large and fine a proportion of the angler’s takes in the Solway rivers, are the young of the Sea Trout. But “Hirlings” are also the younger stages of other races of Salmonidæ, varying to a most wonderful extent in character and types.

Salmo eriox, *Linn.*—THE BULL TROUT.—Whether this is a distinct species or hybrid, or sterile form, seems to be a vexed question at present. “Bull Trouts” of various types are captured occasionally in the Nith and Annan and more plentifully in the Dee.

[**Salmo ferox**, *Jard. & Selb.*—GREAT LAKE TROUT.—Very large Trout are now and again caught in Loch Ken and Loch Cree and in some of the smaller lochs, the descriptions of which read very like *S. ferox*. I have never personally examined any of these big Trout. Whether we have the true *ferox* must be left to the future for decision.]

Salmo alpinus, *Linn.*—THE CHARR.—Found abundantly in Loch Grannoch, and not quite so numerous in Loch Dungeon. My friend Mr. T. R. Bruce, while resident at Slogarie, put a quantity of Loch Grannoch Charr into Lochenbreck some years ago, but it is believed the experiment was not successful. Charr of a type which differs widely from the others are found in Loch Doon, but as that loch belongs to the Ayrshire watershed, we must be content with the mention of the fact. There is an interesting notice of the Grannoch Charr in one of the appendices to Symson’s “Galloway” (1684) which runs as follows:—“A Cuddin is a little fish as big as a large trout, short, but thick-bodied; its belly a pure red colour; its taste very sweet; and is only found in a lake called Lake Grenoch, in a very wild moorish place where they abound.”

Osmerus eperlanus, *Linn.*—THE SMELT.—(Locally “Spirling” and sometimes “Rash” or “Rush-fish” in allusion to the rush-like smell.) Abundant in the Firth, ascending the tidal parts of the Nith, Annan, Urr, and Cree in the winter and spring

months. They are seldom captured nowadays in the rivers proper, owing to the restrictions exacted by the salmon lessees and others, but a tolerably regular fishing for them is carried on in the estuaries. Small meshed nets are not in use in the rivers, owing to the reason mentioned, hence the Spirlings are only caught when the loops of the salmon nets are drawn tight preparatory to the last portion of the nets being lifted from the water. When the Spirlings are present their peculiar scent is quickly detected on the salmon nets.

Coregonus vandesius, *Rich.*—THE VENDACE.—At one time this species was thought to be confined solely to the Lochmaben lochs, but it is now known to occur across the borders in Windermere and Bassenthwaite. Of late years it was believed to be getting scarce, but a few months ago a draught was taken in the Castle Loch and the Vendace turned out in numbers as of old. It has often been stated that this species is so delicate that it will not bear transport, but this is a mistake, as with care it has been transferred to other waters. But any introductions of this sort have been ultimately quite unsuccessful in naturalising the fish elsewhere. It is popularly supposed that from some reason or other the Vendace breeds only in the Mill Loch, whence the young fry find their way to the Broomhill and Castle Lochs. An odd fish now and then finds its way down to the Annan, but they do not thrive there and soon die. Formerly, two clubs known respectively as the Vendace Club, and St. Magdalene's Vendace Club held each an annual meeting at the lochs, in July or August, when the net was drawn for Vendace, and the fish taken were prepared for the fish dinner which followed in the evening. The St. Magdalene Club was on somewhat democratic lines, and occasionally as many as 2000 people assembled at the annual fishing, and various athletic sports were engaged in after the netting was over for the day. Both clubs have been defunct for many years, and the Vendace have been left to look after their own interests.

Thymallus vulgaris, *Nilss.*—THE GRAYLING.—The late Mr. Shaw of Drumlanrig put 2000 Grayling ova into a stream in the Drumlanrig policies leading into the Nith in the spring of 1857. The following year breeding fish were introduced into the same river by Lord John Scott. Now the species swarms in all suitable localities. A few have been taken in the upper waters of the Annan, but none in the lower reaches. I am unaware when or by whom they were introduced there.

Esox lucius, *Linn.*—THE PIKE (Locally "Gedd").—In most of the rivers and in nearly every loch. The district has always been

famous for big Pike, and I have a long list of large ones that have been recorded from time to time. First and foremost is the monster taken in Loch Ken towards the end of last century by John Murray, gamekeeper to John, Viscount Kenmure. It is said to have weighed 72 lbs., and, as the old sportsman carried it along for presentation to his master, its head rested on his shoulders, while the tail swept the ground. The skeleton of the head is still preserved in a case in Kenmure Castle, where I have seen it, along with another head of a pike which is very small by comparison, and weighed only 27 lbs. Other local records are—One $32\frac{1}{2}$ lbs. taken 23d April 1813 in the Castle Loch, Lochmaben, by one of the French prisoners of war: one 45 lbs. April 1830, at Hightae; one, 43 lbs., 10 June 1835, Castle Loch; one, 35 lbs., 1834, in Loch Ken, by a boy named Kenna; one, $18\frac{1}{4}$ lbs., 12th May 1857, Lochrutton, by the late Mr. Boyd; one, 20 lbs., 24th August 1858, Auchencrief. Of late years the principal captures have been; one in Auchenstroan Loch, 32 lbs., got by breaking the ice, January 1881; two in May 1887 in the Castle Loch, weighing respectively 32 and 35 lbs.; one in Carlinwark Loch, 18th June 1889, 20 lbs.; one in Loch Ken, June 1890, 30 lbs.; and one of 30 lbs. out of a mere farm pond in Kirkpatrick Durham in June 1891.

Anguilla vulgaris, *Flem.*; *A. latirostris*, *Risso.*—COMMON EEL.—Whether these are distinct species or not may be doubted. Both types are everywhere numerous.

Accipenser sturio, *Linn.*—THE STURGEON.—Almost every year one or more are captured in the estuaries. They are, however, very rare within the actual limits of the rivers. A small one of three feet in length was seen at the Suspension Bridge in the Nith in June 1890.

Petromyzon marinus, *Linn.*—THE SEA LAMPREY (locally “Ramper Eel”).—Comes up the rivers to spawn, and is fairly common.

Petromyzon fluviatilis, *Linn.*—THE RIVER LAMPREY (locally “Ramper Eel”).—Much more abundant than the last.

Note.—THE AMERICAN CHARR (*Salmo fontinalis*, Mitch.) has been put into some of the Stewartry rivers, and also in Loch Doon. The American Black Bass was introduced into the Upper Annan by Mr. Smith of Craigielands. Specimens of both these species have been caught since their introduction, but sufficient time has not elapsed to pronounce their naturalisation a success.

ON *ANARRHICHAS MINOR*, OLAFSEN, AND ITS
OCCURRENCE ON THE ABERDEENSHIRE
COAST.

By MORRIS YOUNG, F.E.S., Curator of the Free Museum, Paisley ;
and WILLIAM EAGLE CLARKE, F.L.S.

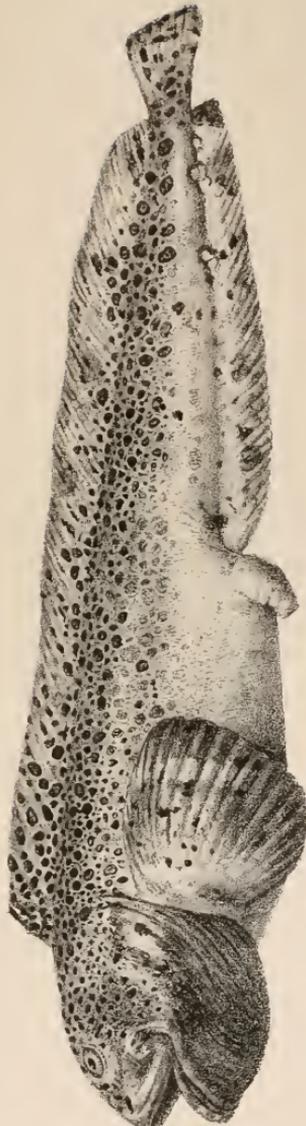
PLATE I.

THE specimen figured was captured in a trawl off Aberdeen on or about the 17th of October last, and was sent to the Glasgow market for sale. Here it came under the notice of Mr. Robert Beith, who purchased and presented it to the Paisley Museum, where it is now on exhibition as a mounted specimen.

The fish was a female and contained about a cupful of ova. It weighed 26 pounds and was 49 inches in length. The fin-ray formula is as follows:—D. 74 ; C. 16 ; A. 45 ; P. 20. Canine teeth: five in the outer and inner rows of the upper jaw ; and seven in the outer and inner rows of the under jaw. There are now eight, but have been ten, teeth on the Vomer. The teeth generally are weaker than those in other specimens of *Anarrhichas lupus* in the Paisley Museum. When in the flesh the general colour of the fish was light tan, and the spots black. The transverse bands characteristic of *A. lupus* are absent, for the slightly darker shading here and there on the sides can scarcely be considered to represent them. I have searched the works of Yarrell and Day, and other books on Ichthyology, without finding any description of such a form of the British Wolf-fish ; and I think it is a distinct species for the following reasons:—

1. The spots are so large, dark, and conspicuous, while in *A. lupus* they are not at all so.
2. There are no signs of the distinct bands characteristic of *A. lupus*.
3. The teeth are generally weaker, and the canines do not project nearly so much as in *A. lupus*.
4. The head is much more strongly formed than in the specimens of *A. lupus* I have seen.
5. The head is connected to the body in a much more graceful manner than in *A. lupus*.

M. Y.



$\frac{1}{9}$

R. Mirtleart lith

ANARRHICHAS MINOR, *Olaf's.*

Mirtleart, Bros. imp.



In the year 1875 Professor Steenstrup, who has made the genus *Anarrhichas* a special study, contributed¹ an important and, it may be added, much-needed paper on the subject, in which he recognises three species as inhabiting the Atlantic Ocean, namely:—

- A. lupus, L.** (= *A. strigosus*, Gm., and *A. vomerinus*, Agass.)—Thus diagnosed: dusky or ashy, with from nine to twelve darker transverse bars, and small spots irregularly dispersed; teeth very strong, the vomerine series being much longer than the palatine series; fin rays—D. 75, A. 45. Range—Shores of the Atlantic Ocean, and Arctic Europe and Greenland.
- A. minor, Olafs.** (= *A. pantherina*, Zouiew; *A. maculatus*, Bloch; *A. eggerti*, Stp.; *American variety of A. lupus*, Günther, "Cat. Fishes," iii. p. 209).—Dark ashy; the whole body, especially the back, covered with large round dark spots; transverse bars are wanting; teeth not so strong as in *A. lupus*, the palatine series and the vomerine series about the same length; fin rays—D. 77, A. 45. Range—Shores of Iceland, Western Greenland, Finnmark, North Russia.²
- A. latifrons, Steenstrup.**—Not a well-known fish. Colours probably uniform, and perhaps marked with ill-defined spots; teeth, less strong and much smaller and more attenuated than in either of the former species, the palatine series of teeth narrower posteriorly and much longer than the vomerine; fin rays—D. 79, A. 45. Range—Shores of Iceland and Western Greenland.

In addition to the characters alluded to in the above diagnoses, Professor Steenstrup bases his conclusions relating to these species upon important cranial peculiarities which he describes and figures.

It is not quite clear in what light Professor Steenstrup regards *A. denticulatus*, Krøyer, from Western Greenland; of which there is a specimen in the British Museum ("Brit. Mus. Cat. Fishes," iii. p. 211). Dr. Günther, in his useful "Study of Fishes" (1880), unfortunately does not

¹ NOGET OM SLEGTEN *Sjølulv* (*Anarrhichas*) OG DEN NORDISKE ARTER AF, Professor Japetus Steenstrup. (Videnskabelige Meddelelser fra den naturhistoriske Forening i Kjöbenhavn, 1876, pp. 159-202, Tab. iii.)

² Prof. Steenstrup ("Vid. Medd." 1878, pp. 109-113) identifies *A. leopardus*, Agass. ("Spix. Pisc. Bras.," p. 92, 1829), with *A. minor*, which implies an extension of the range of this species as far south as Brazil.

afford us any information regarding this evidently rare form. It is important to note, however, that he recognises three species of *Anarrhichas* for the Atlantic, though he only alludes to *A. lupus* by name.

Dr. Day in his "British and Irish Fishes" (1880-1884, i. pp. 195-197) evidently ignores this work of Professor Steenstrup's. He was certainly cognisant of it, because he refers to it in his synonymy of *A. lupus*, but not otherwise. This is both surprising and disappointing, because, even if our author was not prepared to accept the conclusions arrived at by Professor Steenstrup, he at least ought to have described the forms or varieties of *A. lupus* covered by his bibliographical references. But though he includes among the synonyms of our common Wolf-fish such suggestive appellations as *A. pantherinus* and *A. maculatus*, yet he tells us absolutely nothing about the form to which these names actually refer.

Regarding the identity of the interesting Scottish specimen under consideration, it is to be noted that in all the essential particulars furnished by Mr. Young's description the fish agrees in quite a marked manner with *A. minor*. Thus the large dark spots, the absence of transverse bars, and the comparatively smaller teeth, all point unmistakably to that species. But to these characters, which chiefly relate to the external appearance of the specimen, I am able to add others. Mr. Young has kindly sent me an excellent impress, in gutta-percha, of the palatal series of teeth—which, along with the cranial characters, furnish the most important evidence of identity. This impress decides, it is thought, the specific identification of the fish, since it clearly shows the palatine and vomerine series of teeth to be as nearly as possible of equal length, agreeing with Professor Steenstrup's description and figure of the dentition of *A. minor*. I may also add that I counted the impress of ten and eleven teeth in the respective palatine series. Mr. Young's remarks on the more massive appearance of the head, as compared with that of the Common Wolf-fish, are also of importance. Here, again, we have a characteristic feature of *A. minor*, in which the cranium is broader than in *A. lupus* by reason of the frontal bones being more expanded. I

ought to remark that Mr. Young has not, I believe, seen Professor Steenstrup's paper, and thus his critical remarks upon the specimen under his charge are the more valuable.

In conclusion, I consider that only one deduction, as to specific identity, can be drawn from the significant combination of characters possessed by this Scottish Wolf-fish, namely, that it is the *Anarrhichas minor* of Eggert Olafsen ("Reise i Island," 1772, p. 592)—a new and interesting addition to the British fauna.

The Plate is an accurate reproduction in lithography of a photograph taken of the fish when in the flesh.

W. E. C.

NOTE ON AN ABNORMALLY DEVELOPED THORNBAC (*RAIA CLAVATA*, L.)

By R. H. TRAQUAIR, M.D., F.R.S.

Keeper of the Natural History Collections, Museum of Science and
Art, Edinburgh.

A FEW weeks ago Mr. Charles Muirhead presented to the Museum of Science and Art a specimen of a Ray caught thirty miles east of the Isle of May, which seemed to him to be somewhat peculiar in its appearance. The form, colouring, dermal armature, and dentition of this Ray (see Fig. 1) show clearly that it is a Thornbac (*Raia clavata*, L.), though the large thorns are not so abundant on it as we often see them on other and more especially on larger specimens. The fish is a female; its entire length is $22\frac{1}{4}$ inches, its greatest width 15 inches. In front and on each side of the snout there is an angular notch which is deeper on the left than on the right side, and consequently the anterior aspect of the fish appears as if divided into three points, one median and two lateral.

Of course it is evident at the first glance that this malformation is conditioned by the non-adherence to the sides of the head of the anterior extremities of the pectoral fins, which consequently project freely on either side of the snout. A similar case, also in a Thornbac, is figured by Day, "British

Fishes," vol ii. Pl. CLXXI. Fig. 2 ; and the extraordinary monstrosity in the same species figured in the third edition of Yarrell's "British Fishes," vol. ii. p. 584, seems to be of the same nature, though in addition the pectoral fins are deformed in their shape. This condition in a Ray offers a certain amount of analogy to those well-known instances of Turbots and Flounders, in which the anterior extremity of the *dorsal*

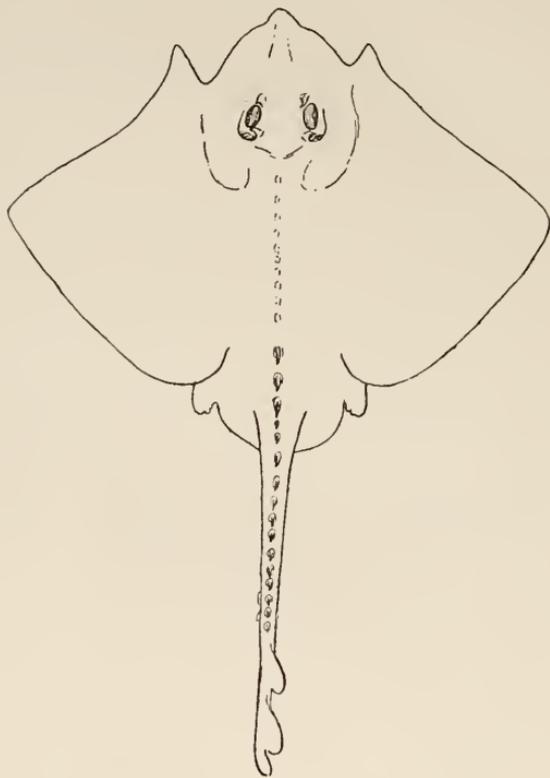


FIG. I.

fin also projects forward as a free pointed process instead of being tied down to the top of the head. In these Pleuronectids, however, this state of the dorsal fin is always determined by an arrestment, to a greater or lesser degree, of the movement of the upper eye from the blind to the ocular side of the head, but it is difficult to conceive of any cause which might underly the non-adherence of the extremities of the pectorals in these abnormal Thornbacks.

LIST OF THE TYPE AND FIGURED SPECIMENS
IN THE “ POWRIE COLLECTION ” OF FOSSILS.

By R. H. TRAQUAIR, M.D., F.R.S.,

Keeper of the Natural History Collections, Museum of Science and Art,
Edinburgh.

THOSE who are interested in Scottish Geology and Palæontology will likewise be interested to learn that the important collection of fossils formed by Mr. Powrie of Reswallie has recently been acquired by the Edinburgh Museum of Science and Art.

This collection, principally illustrative of the palæontology of the Forfarshire Old Red Sandstone, may be termed a historical one. At the time of completion of Agassiz's great works, very little was known about the fossils of Forfarshire, and it was not till years afterwards that the researches of local collectors, notably Mr. Powrie, Rev. H. Mitchell, Rev. H. Brewster, and Mr. M'Nicol, showed that the Old Red of this county possessed a fauna of interest and importance beyond what had been previously supposed.

The special importance of the Forfarshire collection brought together by Mr. Powrie lies in its containing so many specimens which have been described and figured in the works of Page, Egerton, H. Woodward, Ray Lankester, and of Mr. Powrie himself. For he has worked not merely with his hammer as a collector, but also with his pen as an original contributor to scientific knowledge. Mr. Powrie also, many years ago, purchased a large portion of the collection of the late Mr. Patrick Duff of Elgin, and thus added to his cabinet a series of fossils from another region of Scotland, namely the country lying along the southern shore of the Moray Firth. Among these is a small but interesting selection of the fragmentary fish-remains from the Upper Old Red of Scat Craig, which contains many of the original specimens figured by Mr. Duff in his “ Geology of Morayshire ” (Elgin, 1842), as well as by Agassiz in his “ Poissons Fossiles du vieux grès rouge.” Here we find, in addition, the original example of Mantell's *Telerpeton Elginense* from the reptiliferous sandstone of Lossiemouth. All geologists remember that

this was long considered as a reptile of the Old Red Sandstone period, though the affinities of the ever increasing series of reptilian remains which have been since discovered in these beds have in recent times determined their age to be, in all probability, Triassic.

One carboniferous fossil, or rather pair of fossils, in the Powrie collection is also worthy of notice, namely two of the original specimens of *Eurypterus Scouleri*, from Kirkton near Bathgate, figured by Hibbert in 1835 in his celebrated "Memoir on the Burdiehouse Limestone." I am not aware of any specimens of this remarkable creature having been found since Hibbert's time.

As all working Naturalists, whether they busy themselves with things recent or fossil, are aware of the importance of knowing the whereabouts of original specimens of which descriptions or figures have been published, I have thought that a list of those contained in the "Powrie Collection," all of which are Scottish fossils, might form an appropriate contribution to the first number of the "Annals of Scottish Natural History."

In all cases the first name given is that which was applied to the specimen in the work in which it was described or figured. Corrections or rectifications of nomenclature come afterwards.

I. SPECIMENS CONSTITUTING ORIGINAL TYPES UPON WHICH SPECIES HAVE BEEN FOUNDED.

SILURIAN.

Merostomata—

Stylonurus Logani, *H. Woodward*.—Imperfect specimen from Logan Water, Lesmahagow. *H. Woodward* in "Geol. Mag." vol. i. (1864), p. 197, Plate X. Fig. 1. The counterpart of this specimen, belonging to the Museum of Practical Geology, is figured in "British Fossil Merostomata," Plate XXIV. Fig. 1.

OLD RED SANDSTONE.

Merostomata—

Eurypterus Brewsteri, *H. Woodward*.—Carapace from Kelly Den, near Arbroath, described and figured by *H. Woodward*, "Geol. Mag." vol. i. (1864), p. 200, Plate X. Fig. 3, and in "Brit. Foss. Merost.," p. 151, Plate XXVIII. Fig. 4.

Pterygotus minor, *H. Woodward*.—Entire specimen from Farnell, described and figured by H. Woodward, "Geol. Mag." vol. i. (1864), p. 199, Plate X. Fig. 2, and in "Brit. Foss. Merost." p. 35, Plate I. Fig. 4.

Stylonurus Powriei, *Page*.—A nearly perfect specimen from Pitscandly, first named and figured by D. Page in "Advanced Text-book of Geology," 2d Ed. 1859, p. 181, Fig. 3. Described and figured by H. Woodward in "Qu. Journ. Geol. Soc." vol. xxi. (1865), p. 482, Plate XIII. Fig. 1, and in "Brit. Foss. Merost." p. 122, Plate XXI. Fig. 1.

Stylonurus ensiformis, *H. Woodward*.—Detached tail spine, described and figured by H. Woodward, "Geol. Mag." vol. i. (1864), pp. 198-199, woodcut, and in "Brit. Foss. Merost." p. 126, Plate XXI. Fig. 5. Turin Hill.

Stylonurus Scoticus, *H. Woodward*.—A large and nearly entire specimen from Montroman Muir, described and figured by H. Woodward in "Qu. Journ. Geol. Soc." vol. xxi. (1865), pp. 484-486, Plate XIII. Fig. 2, and in "Brit. Foss. Merost." p. 126, Plate XXIII.

Myriopoda—

Archidesmus M'Nicolii, *Peach*.—One of the two type specimens described and figured by B. N. Peach, "Proc. Roy. Phys. Soc. Edin." vol. vii. (1882), p. 182, Plate II. Fig. 26.

Pisces—

Diplacanthus gracilis, *Egerton* (= *Ischnacanthus gracilis*, Powrie).—Counterpart of original type specimen, a nearly entire fish, figured and described by Egerton in "Dec. Geol. Surv." vol. x. (1861), p. 69, Plate IX. Farnell.

Climatius uncinatus, *Powrie*.—A complete fish, described and figured by Powrie, "Qu. Journ. Geol. Soc." vol. xx. (1864), p. 422; also in "Trans. Edin. Geol. Soc." vol. i. (1870), p. 296, Plate XIV. Fig. 11.

Euthacanthus Maenicoli, *Powrie*.—Entire specimen, described and figured by Powrie, "Qu. Journ. Geol. Soc." vol. xx. (1864), p. 425, Plate XX. Fig. 2. Also in "Trans. Edin. Geol. Soc." vol. i. (1870), Plate XI. Fig. 3. Turin Hill.

Euthacanthus gracilis, *Powrie*.—Imperfect specimen described and figured by Powrie, *op. cit.* p. 291, Plate XI. Fig. 4.

Euthacanthus elegans, *Powrie*.—Badly preserved specimen from Farnell, described and figured by Powrie, *ibid.* p. 292, Plate XII. Fig. 5.

Euthacanthus grandis, *Powrie*.—Type specimens, an imperfect fish and a detached tail, described by Powrie, "Trans. Edin. Geol.

Soc." vol. i. (1870), p. 292. Enlarged scales figured, *ibid.* Plate XII. Fig. 6. Turin Hill.

Euthacanthus curtus, *Powrie*.—Imperfect fish, from Farnell, described and figured by Powrie, *ibid.* p. 293, Plate XII. Fig. 7.

NOTE.—Messrs. Smith Woodward and Sherborn, in their "Catalogue of British Fossil Vertebrata," p. 65, have placed this species in *Diplacanthus* with a query. A second specimen in the collection from Turin Hill shows, however, that there were more than one pair of intermediate ventral spines, so I have kept it here for the present, although its general contour is somewhat unlike that of the other members of the genus.

Parexus falcatus, *Powrie*.—Complete fish from Turin Hill, described and figured by Powrie, *ibid.* p. 294, Plate XIII. Figs. 9, 9a.

Pteraspis Mitchelli, *Powrie*.—Cephalic shield from Bridge of Allan, figured in restored outline by Mr. Powrie in the "Geologist" for 1863, p. 68, *woodcut*, and named by him *Pteraspis Mitchelli* in the same journal for 1864, p. 172. Figured and described also by Lankester, "Brit. Cephalasp." Pal. Soc. p. 33, Plate V. Figs. 6 and 10.

Eucephalaspis Powriei, *Lankester* (= *Cephalaspis Powriei*).—Described by Lankester, *op. cit.* pp. 47-48.

A. Entire specimen, from Leysmill near Arbroath, beautifully preserved, Lankester, *op. cit.* Plate X. Fig. 1.

B. Detached cranial shield. Lankester, *op. cit.* Plate IX. Fig. 5.

Eucephalaspis asper, *Lankester* (probably = adult form of *Cephalaspis Pagei*).—Imperfect specimen from Turin Hill, described and figured by Lankester, *op. cit.* p. 50, Plate X. Fig. 5.

Eucephalaspis Pagei, *Lankester* (= *Cephalaspis Pagei*).—Described by Lankester, *op. cit.* pp. 49-50.

A. Nearly entire specimen, Lankester, *op. cit.* Plate X. Fig. 3.

B. do. do. do. Fig. 4.

C. do. do. do. Plate XI. Fig. 4.

All are from Turin Hill Quarries.

Cephalopterus Pagei, *Powrie*.—Original specimen, described and figured by Powrie in "Trans. Geol. Soc. Edin." vol. i. (1870), p. 298, Plate XIV. Fig. 16. Turin Hill.

Placothorax paradoxus, *Agassiz* (= fragments of pectoral limbs of *Bothriolepis major*, Ag. sp.)—The two type specimens described and figured by Agassiz, "Poiss. Foss. v. grès rouge," p. 134, tab. 30 a, Figs. 20-23. They were previously figured by P. Duff, "Geol. Moray," Plate VII. Figs. 3-4, as "fragments of

dorsal spines of a fish which has been referred to the genus *Cestracion*.” From Scat Craig.

Holoptychius giganteus, *Agassiz*.—Two scales from Scat Craig figured by Agassiz, “Poiss. Foss. v. grès rouge,” Atlas tab. 24, Figs. 3 and 8. Duff’s figure “Geol. Moray,” Plate VII. Fig. 10, is probably taken from the same specimen as Agassiz’s Fig. 8.

Dendrodus latus, *Duff* (= *D. biporcatus*, Owen = *Holoptychius giganteus*, Ag.)—Detached laniary tooth, with portion of internal dentary bone attached, figured by P. Duff, *op. cit.*, Plate VI. Fig. 4; also by Agassiz, “Poiss. Foss. v. grès rouge,” tab. 28, Figs. 1, 2.

Dendrodus incurvus, *Duff* (= *Holoptychius nobilissimus*, Ag.)—A mandibular internal dentary bone with laniary tooth attached, figured by P. Duff in “Geol. Moray,” Plate VI. Fig. 11. Figured also by Agassiz under the name of *Cricodus incurvus*, “Poiss. Foss. v. grès rouge,” p. 88, tab. 28, Figs. 4 and 5. Scat Craig.

NOTE.—Agassiz’s genus *Cricodus* has been referred to the Rhizodontidæ by myself¹ and by Mr. Smith Woodward² on account of Pander’s identification of it with his *Polyplacodus*, which assuredly belongs to that family, and also because the transverse section of a tooth figured by Agassiz as *Cricodus* without specific name, “Poiss. Foss.” vol. ii., part i., tab. H, Figs. 11, 12, is apparently of Rhizodont character. But Agassiz in the text, *ibid.* p. 156, states that the tooth from which this section was taken had its large pulp cavity filled with a black matrix; likewise that it was a fragment broken at both ends, which “provenait d’une dent enorme car il avait la grosseur d’un doigt.” It is therefore almost certain that this Rhizodont tooth, which he says is from Scotland without naming any precise locality, is of carboniferous age, especially seeing that a few pages further back (*ibid.* p. 105), he states that *Cricodus* occurs both in Devonian and in carboniferous rocks. It is certainly very different from the tooth figured by Duff as *Dendrodus incurvus*, which Agassiz afterwards refigured in his “Fossil Fishes of the Old Red Sandstone” as *Cricodus incurvus*, and apparently adopted as the type of the genus, seeing that he named no other species. For, on examining this original specimen of *incurvus*, I found, somewhat to my surprise, that it was in reality a Dendrodont or Holoptychian tooth, apparently belonging to Owen’s species *D. sigmoideus*, and this I have long been convinced is synonymous with *Holoptychius nobilissimus* of Agassiz. The name *Cricodus*

¹ “Geol. Mag.” (3) vol. v. 1888, p. 515.

² “Catalogue of the Fossil Fishes in the British Museum,” part ii. 1890.

must therefore drop, as no genus can be founded on the fragment of which a section is figured in Agassiz's larger work.

Cosmaecanthus Malcolmsoni, *Agassiz*.—"Poiss. Foss. v. grès rouge," p. 121, tab. 33, Fig. 28. Previously figured by P. Duff, *op. cit.* Plate VII. Fig. 5, as a "dorsal spine." Scat Craig.

NOTE.—The nature of this fragment is still doubtful; it does not seem to be a selachian spine as supposed by Duff and Agassiz. By Pander it was interpreted as the outer penultimate marginal plate of the lower part of the arm of an *Asterolepid*, but its sculpture is different from that on the arms of *Bothriolepis major*, the common *Asterolepid* of the Scat Craig deposit.

CARBONIFEROUS.

Merostomata—

Eurypterus Scouleri, *Hibbert*.—Two of the original specimens from Kirkton near Bathgate, figured by Hibbert, "Trans. Roy. Soc. Edin." vol. xiii. (1836), Plate XII. Figs. 1 and 2.

A. Carapace;—Hibbert, *op. cit.* Plate XII. Figs. 1 and 2 upper part. H. Woodward, "Brit. Foss. Merost." p. 136, Plate XXV., and woodcut Fig. 41.

B. Eight most posterior body segments in apposition;—Hibbert, *op. cit.* Plate XII. Figs. 1 and 2, lower part. H. Woodward, *op. cit.* p. 136, Plate XXVI.

TRIAS.

Reptilia—

Telerpeton Elginense, *Mantell*.—"Qu. Journ. Geol. Soc." vol. viii. 1852, pp. 100-105, Plate IV. An imperfect skeleton from the neighbourhood of Lossiemouth.

RHAETIC.

Pisces—

Hybodus Lawsonii, *Duff*.—Three of the type specimens from Linksfield, figured by P. Duff, *op. cit.* Plate IV.

A. Plate IV. Fig. 1, Dorsal spine.

B. Figs. 5 and 6, Teeth.

II. SPECIMENS WHICH HAVE BEEN FIGURED, BUT WHICH ARE NOT THE ORIGINAL TYPES OF SPECIES.

OLD RED SANDSTONE.

Merostomata—

Pterygotus Anglicus, *Agassiz*.—Specimen showing the ventral surface of the body and tail with the metastoma and part of

the left maxillipede ; described and figured by H. Woodward, “ British Fossil Merostomata,” p. 34, Plate I. Fig. 1. From Turin Hill.

Pterygotus Anglieus, *Agassiz*.—Detached head showing the position of the eyes, described and figured by H. Woodward, *op. cit.* p. 36, Plate I. Fig. 2. Turin Hill.

Pterygotus Anglieus, *Agassiz*.—Small entire specimen from Turin Hill. H. Woodward, *op. cit.* pp. 34, 35, Plate II. Fig. 1.

Pterygotus Anglieus, *Agassiz*.—Detached penultimate joint of swimming foot. H. Woodward, *op. cit.* pp. 38, 39, Plate V. Turin Hill.

Pterygotus Anglieus, *Agassiz*.—Large telson or terminal joint. H. Woodward, *op. cit.* p. 42, Plate VI.

Myriopoda—

Kampeccaris Forfarensis, *Page*.—Specimen figured by B. N. Peach, “ Proc. Roy. Phys. Soc. Edin.” vol. vii. (1882), Plate II. Fig. 1d. Canterland, Kincardineshire.

Pisces—

“ **Dorsal Spine of Onchus**.”—P. Duff, *op. cit.* Plate VII. Fig. 7. This is the base or inserted portion of an undetermined selachian spine. Scat Craig.

Acanthodes Mitchelli, *Egerton* (= *Mesacanthus Mitchelli*, Traq.)—Powrie, “ Trans. Geol. Soc. Edin.” vol. i. (1870), Plate X. Fig. 1. Turin Hill.

Diplacanthus gracilis, *Egerton* (= *Ischnacanthus gracilis*, Powrie).—Powrie, “ Trans. Geol. Soc. Edin.” vol. i. (1870), Plate X. Fig. 2. Turin Hill.

“ **Apparently a Diploacanthus**.”—P. Duff, *op. cit.* Plate XI. Fig. 3. This is a specimen of *Diplacanthus striatus* (Ag.), from Tynet Burn.

Climatius reticulatus, *Agassiz*.—Specimen figured by Powrie, “ Trans. Edin. Geol. Soc.” vol. i. (1870), Plate XIII. Fig. 10.

Parexus incurvus (= *Parexus recurvus*, *Agassiz*).—A beautifully preserved fish from Turin Hill, figured by Powrie, “ Trans. Geol. Soc. Edin.” Plate XII. Fig. 8.

NOTE.—The specific name given to this fish by *Agassiz* was *recurvus*, but a mistake has crept in of writing it *incurvus*, which is participated in even by Mr. Smith Woodward in his “ Catalogue of the Fossil Fishes in the British Museum,” part ii., 1891, p. 34.

Scales of Pteraspis, from Bridge of Allan, figured by Lankester, “ Brit. Cephalasp.” Plate V. Fig. 1.

Pteraspis Mitchelli?—"A very large but obscure specimen," from Bridge of Allan, figured by Lankester, *op. cit.* Plate V. Fig. 11.

Cephalaspis sp.—Portion of a head showing the orbits as seen from below, figured by Lankester, *op. cit.* Plate X. Fig. 2.

Caudal fin of Cephalaspis, from Turin Hill, figured by Lankester, *op. cit.* Plate XI. Fig. 3.

"**Plate on the head of *Holoptychius nobilissimus*."**—P. Duff, *op. cit.* Plate VII. Fig. 1. This is the anterior median plate of the head of *Bothriolepis major* (Ag.)

Pterichthys oblongus.—P. Duff, *op. cit.* Plate VIII. Fig. 2. The subject of this figure is a specimen of *Pterichthys Milleri*, Ag., and a considerable amount of "restoration" enters into the representation of the carapace. From Tynet Burn.

Pterichthys cornutus.—P. Duff, *op. cit.* Plate X. Fig. 2. This is a small specimen of *Pterichthys productus*, Ag. from Tynet Burn.

"**Fragment of the lower jaw of a fish.**"—P. Duff, *op. cit.* Plate VI. Fig. 1. This is a portion of a Holoptychian mandible, probably of *H. giganteus*, Ag. Scat Craig.

"**Lower jaw of a smaller individual.**"—P. Duff, *op. cit.* Plate VI. Fig. 2. This is the greater part of a small Holoptychian mandible. Scat Craig.

"**Jaw of fish with teeth remaining in their places.**"—P. Duff, *op. cit.* Plate VI. Fig. 3. Detached internal dentary bone of *Holoptychius* of which Mr. Duff says: "In hazarding a conjecture I would refer this jaw to the genus *Glyptolepis*." Scat Craig.

Dendrodus biporcatus, Owen (= *Holoptychius giganteus*, Ag.)—Detached laniary tooth from Scat Craig, figured by P. Duff, *op. cit.* Plate VI. Fig. 5.

Dendrodus compressus, Owen (= *Dendrodus biporcatus*, Owen = *Holoptychius giganteus*, Ag.)—Detached laniary tooth from Scat Craig, figured by P. Duff, *op. cit.* Plate VI. Fig. 7.

Dendrodus sigmoideus, Owen (= *Holoptychius nobilissimus*, Ag.)—Two detached laniary teeth from Scat Craig figured by P. Duff, *op. cit.* Plate VI. Figs. 8 and 10.

Dendrodus sigmoideus, Owen (= *Holoptychius nobilissimus*, Ag.)—Detached laniary tooth from Scat Craig figured by Agassiz, "Poiss. Foss. v. grès rouge," Tab. 28, Fig. 3.

TRIAS.

Reptilia—

Stagonolepis.—Portion of the caudal region, figured by Huxley, “Crocodilian Remains of Elgin Sandstones,” Plate III.

RHAETIC.

Pisces—

“**Fragment of dorsal spine destitute of fluting.**”—P. Duff, *op. cit.* Plate IV. Fig. 4. An undetermined bone, not a selachian spine, though it is referred by Duff to *Hybodus Lawsonii*.

“**Scale of fish not determined.**”—P. Duff, *op. cit.* Plate IV. Fig. 7. This does not seem to be a scale but an internal bone.

A LIST OF THE MACRO-LEPIDOPTERA OF BALERNO, MIDLOTHIAN.

By E. W. CARLIER, M.D., B.Sc.

THE locality to which the following list refers may be divided into three distinct portions:—

1. THE ROAD, leading from Balerno to the common, is bordered by hedges of hawthorn and beech, with here and there a stone wall; behind these are cultivated lands, pastures, or small woods of common forest trees.

2. THE COMMON, now much reduced by drainage, formerly covered a large area; the few remaining acres consist of peat bog, very damp and full of holes, but possessing a varied vegetation. This bog, which is cut in two by a grassy path running east and west, is bounded on the south by Bavelaw Burn, on the east by the main road and Bavelaw Wood, on the west by a broken hawthorn hedge, beyond which is arable land, and on the north by a farm road bordered by a belt of lime and beech trees.

3. BAVELAW WOOD, which is little more than a plantation of Scotch firs and beech trees, with a sprinkling of young mountain ash, situated to the east of the main road, is raised a foot or two above the level of the common, which does not prevent it from being very damp and boggy. It

reaches to Bavelaw Burn on the south, is surrounded by fields on the east and north, and overlooks the common towards the setting sun.

The area is therefore by no means a large one, but actually teems with many forms of insect life.

This list is compiled mainly from my own notes, which extend over a period of nine years, and contains only those species that I have been fortunate enough either to catch myself or to see captured by my friends. It is therefore necessarily incomplete, but contains some few species which, as far as I can ascertain, have not hitherto been recorded as occurring in the locality. Unfortunately my visits have been almost entirely confined to Saturday afternoon rambles, and therefore those species which fly only by night will not be found in any great number in it.

One night, and one only, was I able to devote to sugaring in the wood. It did not prove a success, only yielding some dozen *Monoglypha*; but by searching the trunks of trees and beating up the undergrowth I have, however, managed to take a few specimens of some night-flying species.

My friend Mr. W. Evans, F.R.S.E., etc., to whom I am indebted for great assistance, has kindly consented to supplement my list from his own notes, which are voluminous and extend over a much longer period. The notes on additional species supplied by Mr. Evans will appear as an appendix at the end of my list, followed by others also supplied by him from the diary of Mr. Andrew Wilson, Dentist, Edinburgh. Some of Mr. Wilson's captures, which were made between 1852 and 1858, were probably taken outside, though close to, my limits.

Dr. Northcote has also kindly supplied me with a list of captures from the same locality which I have incorporated with my own. I have also drawn attention to the species mentioned by Lowe and Logan—marking them L. & L.—both in their "List of the Lepidopterous Insects of Midlothian," and the additions thereto recorded in vol. i. pp. 3, 4, and 259 of the "Proceedings of the Royal Physical Society of Edinburgh."

The arrangement and nomenclature followed in this list is that of Mr. Richard South, F.E.S.

My thanks are due to Mr. Robert Crichton for his kindness in allowing me to wander unmolested in Bavelaw Wood.

RHOPALOCERA

Pieris brassicæ, *L.*—Fairly abundant along the road, becoming less numerous as the cottage gardens are left behind. I have only taken one specimen in the wood on the 19th June 1891. L. & L.

Pieris rapæ, *L.*—Common in the fields bordering the road from May onwards. L. & L.

Pieris napi, *L.*—Common near Balerno, especially on railway embankments. A few caught on the road. L. & L. One taken by Mr. Wilson in wood, 26th April 1854.

Vanessa urticæ, *L.*—By no means uncommon along the road, but not found in the bog, though a few specimens have been taken by me in the wood. L. & L.

Vanessa cardui, *L.*—Met with in fair numbers both along the road and in the wood. L. & L.

Cœnonympha typhon, *Rott.* ; *Davus*, *Fb.*—I have only seen two of these rather scarce insects during the whole of my wanderings in this locality. One I took myself at the north corner of the bog, on the 23rd July 1885, and the other was taken two years later on the road between the wood and the moss by my friend Dr. W. Beveridge. Taken also by Mr. Wilson: one on the banks of Balerno burn, 26th June 1853; one near Bavelaw Wood among grass, 10th July 1853; two among grass on bog, 20th July 1855; one in the same place, 13th July 1856; and a number on 12th July 1858. It is mentioned also by L. & L. in the "Proc. Roy. Phys. Soc." vol. i. p. 3.

Cœnonympha pamphilus, *L.*—Very common in June, especially along the west side of the common. L. & L.

Polyommatus phlœas, *L.*—Occasionally met with in June on the farm road just beyond the western limit of the bog. L. & L.

Lycæna icarus, *Rott.* ; *alexis*, *Hb.*—In the same locality with the last species, but rather less frequently. L. & L.

HETEROCERA

Nemeophila plantaginis, *L.*—One specimen taken on the moor, 20th July 1885. Flying abundantly in the sun along the north side of common, 23rd June 1888, since which time I have not taken a single specimen. This insect has also been taken on



- the moor by Mr. W. Evans, Mr. Wilson, Dr. Northcote, and Dr. Beveridge. Mentioned by L. & L. in "Proc. Roy. Phys. Soc." vol. i. p. 4.
- Spilosoma fuliginosa*, *L.*—I have only taken a few specimens of this insect, one of which, captured on the 16th June 1888, had a perfect though diminutive left upper wing. Mr. W. Evans has also taken them in the bog. L. & L.
- Spilosoma menthastri*, *Esp.*—Occasionally found on the road. L. & L.
- Hepialus vellea*, *Hb.*—I have taken only one specimen of this insect on the bog, 19th July 1890, but have no doubt that at dusk it would be abundant. Mr. Wilson mentions it as common in Bavelaw Wood, 14th July 1885. It is mentioned by L. & L., "Proc. Roy. Phys. Soc." vol. i. p. 3.
- Hepialus lupulinus*, *L.*—A few specimens in June only along the road. L. & L.
- Bombyx rubi*, *L.*—Larvæ of this insect were taken close to the bog by Dr. Northcote. Mr. Wilson took 50 larvæ on bramble, etc., at Balerno Burn, 15th Aug. 1852, and again on 16th Sept. 1855.
- Saturnia pavonia*, *L.*; *carpini*, *Schiff.*—This is a very common insect both on the bog and in the wood during May. The larvæ are abundant in July. It has also been taken there both by Mr. Evans and Dr. Northcote. L. & L.
- Leucania impura*, *Hb.*—Taken by Dr. Northcote. L. & L.
- Leucania pallens*, *L.*—Taken by Dr. Northcote. L. & L.
- Tapinostola fulva*, *Hb.*—Taken by Dr. Northcote at the side of the bog. Mr. Wilson says it is common in Balerno Moor and Moss. 4th Sept. 1853. L. & L.
- Xylophasia monoglypha*, *Hufn.*; *polyodon*, *L.*—Very common in the wood in June and July, coming freely to sugar. It has also been taken there by Mr. Evans and Dr. Northcote. L. & L.
- Mamestra brassicæ*, *L.*—Occasionally found asleep on the trunks of trees in the wood during July. L. & L.
- Apamea basilinea*, *Fb.*—Taken by Dr. Northcote. L. & L.
- Miana fasciuncula*, *Haw.*—Taken near the bog by myself, Dr. Northcote, and Mr. Evans. L. & L.
- Celæna haworthii*, *Curt.*—Dr. Northcote caught them in abundance on the bog in August, where they have also been captured by Mr. Evans and Mr. Wilson. L. & L.
- Agrotis corticea*, *Hb.*—This insect is sometimes found on the trees in the wood. L. & L.

- Agrotis strigula*, *Thub.*; *porphyrea*, *Hb.*—This is a very common insect on the bog, where it has also been taken by Mr. Wilson, Mr. Evans, and Dr. Northcote. It is the *chersotis* of L. & L.
- Noctua glareosa*, *Esp.*—Common in the wood on the stems of the fir trees in September. It is the *hebraica* of L. & L.
- Noctua e-nigrum*, *L.*—Found occasionally in the wood by myself and Dr. Northcote. L. & L.
- Panolis piniperda*, *Panz.*—During April and May of 1888 this insect was so common on the fir trees of the wood that Dr. Northcote and myself captured over 100 specimens, varying in tint from bright orange red to greenish brown or black. Lately it has been less abundant. It has also been taken by Mr. Wilson, Mr. Evans, and is mentioned by L. & L., "Proc. Roy. Phys. Soc." vol. i. p. 3.
- Pachnobia rubricosa*, *Fb.*—Occasionally met with in the wood asleep on the fir-tree trunks. I have three specimens, one taken 21st April 1888, another 28th April 1888, and a third 5th April 1890. Dr. Northcote has found one or two in the wood. Mr. Evans has also taken one specimen on a tree in the wood on the right-hand side of the road near Marchbank above Balerno, 26th May 1883.
- Tæniocampa gothica*, *L.*—Fairly common on the pine trees of Bavelaw Wood. It has been taken also by Mr. Evans and Dr. Northcote. L. & L.
- Tæniocampa stabilis*, *View.*—Taken by Dr. Northcote in the wood. L. & L.
- Calymnia trapezina*, *L.*—Taken by Dr. Northcote. L. & L.
- Polia chi*, *L.*—Very abundant at times, dark varieties being now and again met with both on the road and in the wood. It has been plentifully taken by Mr. Evans in the wood. L. & L.
- Hadena dentina*, *Esp.*—I took some dozen specimens of this insect from the fir trunks in Bavelaw Wood on 7th July 1888. L. & L.
- Plusia iota*, *L.*—This insect is scarce, only two specimens having been taken by me in the wood, 27th July 1888. L. & L.
- Plusia gamma*, *L.*—Very common everywhere in July. L. & L.
- Anarta cordigera*, *Thub.*—I have only been fortunate enough to capture one specimen of this very pretty little insect, which rose from the heather on the north side of the road that bisects the bog. May 1887.
- Phytometra viridaria*, *Clerck*; *laccata*, *Scop.*; *ænea*, *Hb.*—Of this pretty little moth I only succeeded in catching one

- specimen, though several were seen darting about in the sunshine near the road that bisects the bog. July 1887.
- Rumia luteolata*, *L.*; *cratægata*, *L.*—Very common all along the road at dusk in June. It has been taken both by Mr. Evans and Dr. Northcote. *L. & L.*
- Metrocampa margaritaria*, *L.*—Readily beaten from lime trees that border the road during July, occurring also in Bavelaw Wood. It has been captured by Mr. Wilson, Mr. Evans, and Dr. Northcote. *L. & L.*
- Ellopiä prosapiaria*, *L.*; *fasciaria*, *Schiff.*—This insect may be commonly found early in July just emerged from the pupa, either on the ground at the roots of the pine trees in the wood, or on the bark of these about half a foot above the grass. Caught also by Mr. Evans, Mr. Wilson, and Dr. Northcote. *L. & L.*
- Selenia bilunaria*, *Esp.*; *illunaria*, *Hb.*—Frequently occurring under the hawthorn hedges lining the road, especially near Balerno. Recorded by Mr. Wilson from Bavelaw Moor, 29th May 1853. *L. & L.*
- Odontopera bidentata*, *Clerck.*—A very common insect in Bavelaw Wood, usually hidden behind the rugosities of the bark of Scotch fir trees; many specimens show a melanotic tendency. Recorded both by Mr. Evans and Mr. Wilson. *L. & L.*
- Cabera pusaria*, *L.*—I have taken this insect in July from lime trees on the left side of the road, just beyond Balerno, and Mr. Evans has taken it in Bavelaw Wood in June 1884. *L. & L.*
- Halia vauaria*, *L.*; *wavaria*, *Fb.*—Taken by Dr. Northcote and once by Mr. Evans.
- Numeria pulveraria*, *L.*—Rare, but occasionally found in the bog in May 1887.
- Scodiona belgiaria*, *Hb.*—I have only taken a single specimen of this insect, a male, that had fallen into the small burn which crosses the bog, July 1887. Mr. Evans captured a female on Currie Moor in July 1880, and a single specimen, var. *favilla-cearia*, fell to the lot of Mr. Wilson on the 13th July 1856.
- Ematurga atomaria*, *L.*—This very common insect has been taken in abundance on the bog during May and June by myself, Dr. Northcote, Mr. Evans, and Mr. Wilson. It is doubtless the *Eupisteria carbonaria* of *L. & L.*
- Bupalus piniaria*, *L.*—Very common in the wood in June, as many as 20 or 30 females having been found at one time clinging to grass stems within the area of a yard or two. Taken also by Mr. Evans, Mr. Wilson, and Dr. Northcote. *L. & L.*

- Oporabia dilutata*, *Bork.*—Very abundant in the wood and all along the road in October. Also taken by Mr. Evans. L. & L.
- Larentia didymata*, *L.*—Abundant in July, many dark specimens occurring in the wood. Taken also by Mr. Evans. L. & L.
- Larentia multistrigaria*, *Haw.*—I have taken two specimens only from the wood, 21st April and 25th April 1888. It has been captured by both Mr. Evans and Mr. Wilson. L. & L.
- Larentia cæsiata*, *Lang.*—This insect is very plentiful in the wood, where it rests on the fir-tree trunks during July. It has also been taken by Mr. Evans, Mr. Wilson, and Dr. Northcote. L. & L.
- Larentia viridaria*, *Fb.*; *pectinitaria*, *Fues.*; *miaria*, *Bork. Sta.*—Very common in the wood during July, the specimens varying much in intensity of colour. Taken also by Dr. Northcote, Mr. Evans, and Mr. Wilson. L. & L.
- Emmelesia albulata*, *Schiff.*—Taken both by Dr. Northcote and myself in the marsh along Balerno Burn near the reservoirs in June. Abundantly by Mr. Evans in Harelaw Wood, by roadside above Balerno, May and June 1882, and by Mr. Wilson. L. & L.
- Emmelesia decolorata*, *Hb.*—Taken in June with *E. albulata* in considerable numbers, and also at north-west corner of bog. L. & L.
- Eupithecia helveticaria*, *Bdv.*—I took some six specimens of this insect on the bog in June 1888, where it has also been captured by Dr. Northcote. Mr. Wilson found the larvæ on juniper by Balerno Burn, 5th September 1858. Mentioned by L. & L. in "Proc. Roy. Phys. Soc." vol. i. p. 259.
- Eupithecia absinthiata*, *Clerck.*—Taken now and again in the wood by myself and Dr. Northcote.
- Eupithecia exiguata*, *Hb.*—A few specimens only in the wood. Mr. Wilson has it *E. exiguaria* var. Bavelaw Wood, 13th July 1856. L. & L.
- Thera simulata*, *Hb.*—Occurs in the wood in fair abundance during May and again in July. Dr. Northcote has also taken it there, as did Mr. Wilson, 26th July 1853 and 2nd July 1854. L. & L.
- Thera variata*, *Schiff.*; var. *obeliscata*, *Hb.*—Occasionally found in the wood by myself, Dr. Northcote, and Mr. Evans. Mentioned by L. & L., "Proc. Roy. Phys. Soc." vol. i. p. 259.
- Melanthia ocellata*, *L.*—Fairly common in the wood during June. Also taken by Mr. Evans, Mr. Wilson, and Dr. Northcote. L. & L.

- Melanippe tristata*, *L.*—Common in June among the tall ferns that line the base of the hedge, bordering the south side of the farm road for half a mile beyond the western limit of the bog. It has also been taken by Dr. Northcote, and along the bank of Balerno burn by Mr. Wilson, 29th May 1853. L. & L.
- Melanippe sociata*, *Bork.* ; *subtristata*, *Haw.*—Very common in the low undergrowth of the wood during June. Also taken there by Dr. Northcote. It is the *M. alchemillaria* of L. & L.
- Melanippe montanata*, *Bork.*—Very common in the wood and along the road during June, where it has also been found by Dr. Northcote and Mr. Evans. L. & L.
- Coremia designata*, *Hufn.* ; *propugnata*, *Fb.*—Found in the wood in June, but not very common. Mentioned by L. & L., "Proc. Roy. Phys. Soc." vol. i. p. 259.
- Cidaria truncata*, *Hufn.* ; *russata*, *Bork.*—Very common in the wood, where it has also been taken by Mr. Evans. L. & L.
- Cidaria immanata*, *Haw.*—By no means a rare insect in the wood, where it has also been taken by Mr. Evans. L. & L.
- Cidaria suffumata*, *Hb.*—Very common indeed in the wood during April and May. It has also been taken by Mr. Wilson, Mr. Evans, and Dr. Northcote. L. & L.
- Cidaria testata*, *L.*—Found in the wood during July. It is the *Harpalyce achatinaria* of Lowe and Logan, and has also been taken by Mr. Evans and Mr. Wilson.
- Cidaria populata*, *L.*—Occurs also in the wood during July, where it has been taken both by Mr. Evans and myself. L. & L.
- Cidaria fulvata*, *Forst.*—Taken by me along the road near Balerno in July. Also by Mr. Evans. L. & L.

Additional Species from Mr. Evans' Notes.

- Hydrœcia nictitans*, *Bork.*—Roadside above Balerno, Sept. 1884, and abundantly by Threepmuir pond (west end) on the same day. Also taken by Mr. Wilson. L. & L.
- Xylophasia rurea*, *Fb.*—Roadside near Balerno in July 1889. L. & L.
- Miana areuosa*, *Haw.*—A few taken in Harlaw Wood 22nd July 1884. L. & L.
- Noctua festiva*, *Hb.*—Taken on the moor a little east of Bavelaw Wood in July 1889, and at sugar by Mr. Wilson in Bavelaw Wood, 14th July 1855. L. & L.
- Dianthœcia cucubali*, *Fues.*—Three dozen larvæ taken from flowers

of the ragged robin (*Lychnis flos-cuculi*) on Balerno Bog, 4th August 1884. Taken also by Mr. Wilson. L. & L.

Dasypolia templi, *Thnb.*—A female specimen captured in Bavelaw Wood on the 21st April 1888 ("Scottish Naturalist," 1891, p. 40).

Hadena pisi, *L.*—Larvæ of this insect were taken on Balerno Moor in 1880 and hatched in May 1881. Also taken by Mr. Wilson. L. & L.

Cheimatobia brumata, *L.*—Very abundant both by the road and the moor, 14th November 1891. L. & L.

Emmelesia minorata, *Tr.*; *ericetata*, *Curt.*—A few specimens taken on Balerno Moor on the 4th and 11th August 1884. Also by Mr. Wilson. L. & L.

Eupithecia satyrata, *Hb.*—Larvæ of this species common on the flowers of scabious on Balerno Moor, 4th Aug. 1884 and 11th Aug. 1885. Mr. Wilson found the larvæ of var. *callunaria*, *Stgr.*, common on scabious on Bavelaw Moor 14th Sept. 1856, and again on 5th Sept. 1858.

Eupithecia indigata, *Hb.*—Abundant in Harlaw Wood on the 26th May 1883. Taken by Mr. Wilson in Bavelaw Wood, 1st June 1856. L. & L.

Eupithecia nanata, *Hb.*—Common on Balerno Moor 23rd June 1889. Taken also by Mr. Wilson. L. & L.

Thera firmata, *Hb.*—Taken in Bavelaw Wood, 17th Sept. 1881. L. & L.

Hypsipetes sordidata, *Fb.*; *elutata*, *Hb.*—Taken near Balerno on 11th Aug. 1884. L. & L.

Melanippe fluctuata, *L.*—Taken at Balerno. L. & L.

Additional Species from Mr. Wilson's Notes.

Argynnis selene, *Schiff.*—One specimen taken on a flower in marsh at the side of Balerno Burn, 28th June 1853. Mentioned by L. & L., "Proc. Roy. Phys. Soc." vol. i. p. 3.

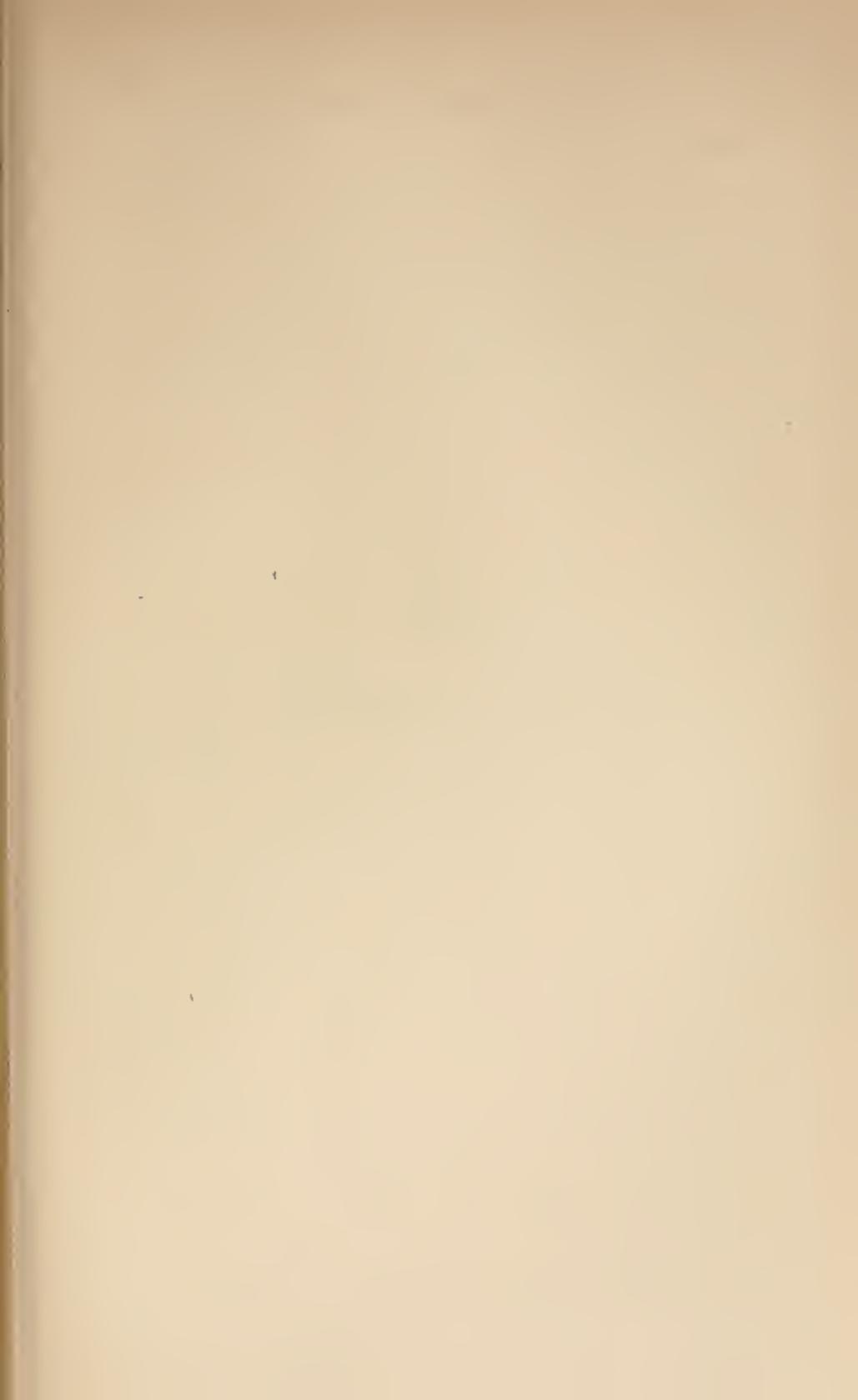
Demas coryli, *L.*—One specimen taken from a fir tree in Bavelaw Wood, 28th June 1856. Mentioned by L. & L., "Proc. Roy. Phys. Soc." vol. i. p. 259.

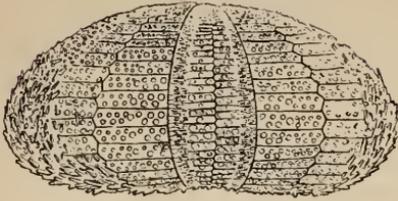
Acronycta rumicis, *L.*—Twelve larvæ taken on bramble at Balerno Burn, 16th Sept. 1855, hatched June 1856. L. & L.

Apamea gemina, *Hb.*—Two were taken at sugar in Bavelaw Wood, 14th July 1855. L. & L.

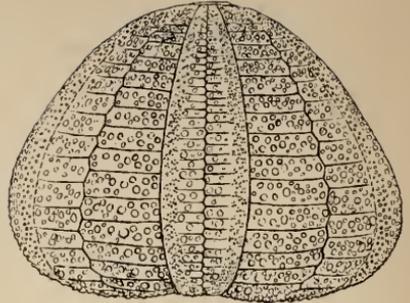
Agrotis suffusa, *Hb.*—One was taken at sugar in Bavelaw Wood, 11th Sept. 1858. L. & L.

- Noctua brunnea*, *Fb.*—One larva of this insect was taken on Bavelaw Moor, 28th Oct. 1855. L. & L.
- Phlogophora meticulosa*, *L.*—One specimen was found on a tree in Bavelaw Wood, 13th June 1858, and another came to sugar there on 11th Sept. 1858. L. & L.
- Hadena adusta*, *Esp.*—One larva taken from heather by Balerno Burn, one imago at sugar in Bavelaw Wood, 14th July 1855, and two at night on Bavelaw Moor 23rd June 1855. L. & L.
- Plusia festuæ*, *L.*—One specimen taken at Balerno Burn from grass, 28th June 1853. L. & L.
- Anarta myrtilli*, *L.*—One specimen taken on Bavelaw Moor, 20th May 1854. L. & L.
- Euclidia mi*, *Clerck.*—One specimen captured on the banks of Balerno Burn, 24th May 1853. L. & L.
- Cabera exanthemata*, *Scop.*—Four imagines taken at birches by Balerno Burn, 28th June 1853; another at the same place, 2nd July 1854; and 5 larvæ on rough willow in the same spot, 16th Sept. 1855. Mentioned by Lowe and Logan, "Proc. Roy. Phys. Soc." vol. i. p. 3.
- Macaria liturata*, *Clerck.*—One specimen captured in Bavelaw Wood on the 8th and another on the 16th July 1852. L. & L.
- Oporabia filigrammaria*, *H.-S.*—A single specimen taken on Bavelaw Moor, 16th Sept 1855. L. & L.
- Emmelesia alchemillata*, *L.*—The larvæ were common on hemp-nettle seeds at Bavelaw, 14th Sept. 1856. Mr. Wilson calls this *E. Hydraria*. L. & L.
- Eupithecia pygmæata*, *Hb.*—One imago captured near rushes at Balerno Burn, 2nd July 1854, and another at hedge of Harelaw farm, 12th July 1858. Mr. Wilson speaks of this insect as *E. palustraria*. L. & L.
- Hypsipetes trifasciata*, *Bork.*; *impluviata*, *Hb.*—One pupa was found in moss near alders above Balerno on 15th Feb 1857, and hatched 21st April of the same year. L. & L.
- Coremia munitata*, *Hb.*—Taken near Bavelaw Burn, 16th Sept. 1855. L. & L.
- Cidaria dotata*, *L.*; *pyraliata*, *Fb.*—Two specimens were taken in Bavelaw Wood on 26th July 1853. L. & L.
- Eubolia plumbaria*, *Fb.*; *palumbaria*, *Bork.*—One specimen taken at Balerno Burn, 2nd July 1854. L. & L.
- Tanagra atrata*, *L.*; *cherophyllata*, *L.*—One specimen from a hedge at Bavelaw. L. & L.

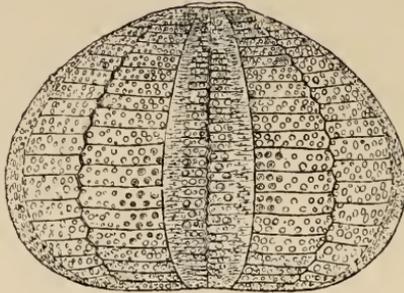




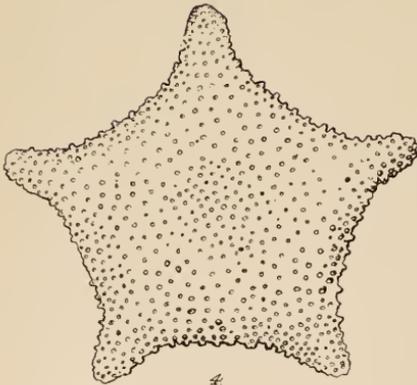
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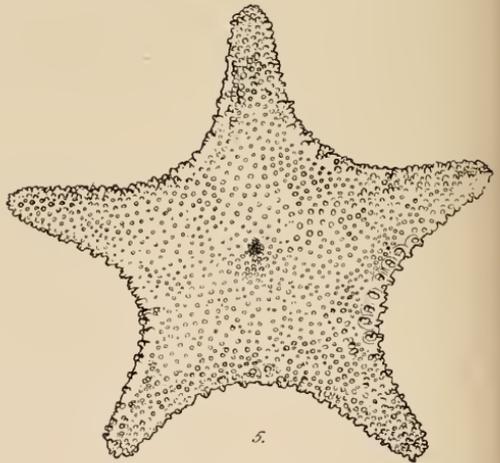
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FORMS OF ECHINUS ESCULENTUS, Linn.
 AND GONIASTER PHRYGIANUS (Parelinus)

NOTES ON SOME SCOTTISH ECHINODERMATA.

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

PLATE II.

I. On a Depressed Form of *Echinus esculentus*, *Linn.*

A MORE than usually depressed form of *Echinus esculentus* was obtained in the Firth of Forth in June last (1891), which it may be of interest to notice. There is, as is well known to students of the Echinodermata, considerable variation in the form of this species, but the variety now under consideration is the most depressed of the numerous specimens I have observed among the captures made during several years' trawling on the east coast of Scotland. In form it approaches very closely to *Strongylocentrotus drobachiensis*, Müller,—a species which we have obtained on one or two occasions in the vicinity of Inchkeith, a little east of the south end of the island,¹—but is to be distinguished at once by the possession of three pairs of pores in the row instead of four or five pairs as in *Strongylocentrotus*. This variety is represented $\frac{2}{3}$ the natural size on Plate II. Fig. 1, and measures 4.65 inches in diameter, and 2.3 inches in height. Fig. 2 represents another variety of the same species with somewhat flattened sides, which was obtained off Musselburgh at from five to six fathoms. Fig. 3 gives us a specimen of the usual form, both natural size. These latter figures show by comparison more clearly the unusual form of the variety under consideration: they, also, are represented $\frac{2}{3}$ of their natural size.

II. On *Goniaster phrygianus* (*Parclius*) = *Goniaster equestris*,
Agassiz.

During the last few years I have obtained two specimens of a *Goniaster* from the Firth of Forth which closely resemble each other in form, but which differ considerably from specimens of *Goniaster phrygianus* taken in the Moray

¹ *Strongylocentrotus drobachiensis* is common in the Cromarty Firth, and we almost invariably obtain a number of specimens of this species every time we trawl between Cromarty and Invergordon.

Firth, where, in the deep water (30 to 50 fathoms) the species is moderately common, being of frequent occurrence among the refuse of the trawl net. Plate II. Fig. 4 represents one of the Firth of Forth specimens, while Fig. 5 is one of the Moray Firth specimens; respectively $\frac{1}{4}$ and $\frac{1}{6}$ their natural size. In the Forth specimen, as shown by the figure, the space between the arms is shallow, and the arms are very short. In the Moray Firth specimen, on the other hand, the space between the arms is deeply concave, and the arms comparatively long. I have examined a considerable number of the Moray Firth specimens and find that, though the length of the arms and the concavity of the space between them varies to some extent, none of those examined possessed the short arms, or the shallow, and nearly straight, interspaces that distinguished the two specimens from the Firth of Forth.

One of the Forth specimens was obtained a few miles east of May Island by a trawler, and is the one represented by Fig. 4. The other was obtained by myself from deep water some distance west of the May Island, and is now in the Museum of Science and Art, Edinburgh.

III. On *Brissopsis lyrifera* (*L. Agassiz*).

I have on several occasions during the last three years obtained specimens of *Brissopsis lyrifera* in the vicinity of May Island, Firth of Forth. Though by no means a rare species on some parts of the Scotch coasts it does not appear to have been known to occur in the Forth estuary or its vicinity previous to my discovery of it in 1888. It was first obtained about two miles north-westward of the May, and since then further specimens have been captured both in the locality referred to and also at Trawling Station ix., a few miles south-eastward of that Island. The following records of this species from the latter locality are from the "Eighth and Ninth Annual Reports of the Fishery Board for Scotland":—6th June 1889, three specimens; 17th August 1889, one specimen; 13th May 1890, one specimen; 5th August 1890, one specimen. A few others have been obtained this year (1891). In Mr. W. E. Hoyle's "Revised List of the British Echinoidea" in the "*Proceedings of the Royal Physical Society of Edinburgh*" for 1889-90, "Aberdeenshire and the Moray Firth" and

"Off Montrose 42 fms.," are the only localities for this species on the east coast of Scotland.

This species does not appear to be common on our east coast, but on the west it is sometimes obtained in great abundance. In the early part of 1887 I was on board a trawler working over 20 fathoms water off Craigmore, near Rothesay, when the trawl net on being hauled up was found to contain a large quantity of fine mud, amongst which there were a great number of *Brissopsis*. I counted more than sixty whole specimens, besides which there were many others more or less damaged. This large capture of *Brissopsis* has been however far exceeded by one recorded by Mr. W. Anderson Smith in the Fishery Board's "Ninth Annual Report" (1891), part iii. p. 298. I cannot do better than quote Mr. Anderson Smith's description of his interesting capture. He says,—“Besides the ordinary echinoderms we had a most remarkable haul of what we formerly considered a rare form of heart urchin, *Brissopsis lyrifera*, completely choking our net, which hung like a huge bag of potatoes and could not be lifted. We calculated the quantity of these urchins as representing not less than three tons weight.”

That it should occur in such enormous numbers on the west coast and only one or a very few at a time on the east coast, where the physical conditions appear to be equally favourable for its existence, is rather singular, and is not easily explained. Beam-trawling has been more vigorously prosecuted on the east coast than on the west and may have something to do with the difference alluded to, but the true explanation will have, I think, to be sought for elsewhere.

ON THE FLORA OF SHETLAND.

By WILLIAM H. BEEBY, F.L.S.

IN continuation of already recorded researches¹ into the Flora of this county, I paid my sixth visit to the Islands last summer, spending there over three weeks, which included

¹ “Scottish Naturalist,” 1887-1891.

the beginning of July and part of August. Ollaberry was made the centre of operations, the intention being to work some of the interesting parts of the Northmaven peninsula, which I was unable to reach on my previous short visit to the same place, owing to their distance from headquarters. However, the exceptionally bad weather of last summer stood in the way, and consequently some of the more distant localities still remain untouched. A good deal of work was done among the crags on the north side of Roeness Voe, and although they afforded much likely ground, little of special interest was gathered except among the Hawkweeds. In this genus *Hieracium Farrense*, Hanbury proved an interesting addition to the Shetland list; while at North Roe a second locality was found for *H. zetlandicum*.

While dealing with these endemic species, it may not be out of place to refer to the growing tendency, on the part of some botanists, to make too much of the *degree* of difference exhibited by plants, while practically ignoring the *kind* of difference, which, it is maintained here, is really the important factor. Thus, the most transient states of plants due to the direct action of their environment are often far more distinct in appearance from their normal forms than are some varieties from their types; but the first-named return at once to their normal state on being removed from their special surroundings, while the latter remain permanently distinct from their types even when grown under circumstances most disadvantageous to the continuation of the particular variation. That these two kinds of variation exist in plants is certain; and the separation of them seems to be the very basis on which all investigations of the Phanerogamia must be made, if it is hoped that this branch of botany is to throw any further light on Evolution. Since these two kinds of variation are now sometimes treated as one, and since theories are based on, or illustrated by, this heterogeneous aggregate, no apology is needed for these remarks. To give a varietal name to a species of *Batrachium* when it produces its floating leaves, or when a trilobed leaf becomes suborbicular in floating, is but one step short of giving the plant another varietal name when it flowers, and yet another when it fruits! Each individual plant, in certain species, has inherent

to it the capacity to produce two kinds of leaves; the particular environment merely determines which particular one of the two kinds shall be produced. This capacity for adaptability reaches its climax in Britain in some of our amphibious plants, such as *Batrachium* and *Potamogeton*. In the *Hieracia*, though present, it is developed to a comparatively small extent only.

In connection with the foregoing observations it may now be pointed out that some of the more critical *Hieracia*, although differing in comparatively slight ways from other known types, are not the result of this last-named kind of variation. Mr. F. J. Hanbury, for example, has cultivated these plants for years, and has now, I believe, some two hundred British forms growing in his garden. He finds, when transplanted to this new environment, so different from their native surroundings, that, although now growing under practically identical conditions, they do not tend either to converge towards each other, or to revert to other known types. Hence their variation is of another order, and they (the British endemic forms), only differ from some of the most marked endemic forms of other islands in *degree*, and not in *kind*, of variation, which is precisely what might be expected. Whether they be classed as species or varieties is a question chiefly of convenience; no amount of lumping, however, will make the groups in critical genera correspond to the isolated "species" in genera which are now stationary, and in which the tendency to vary is quiescent. No doubt a very distinct endemic species from some distant island cuts a very imposing figure; but it may be questioned whether its value does not decrease in a degree corresponding to the increase in its distinctness. It may be here suggested that some oceanic islands, with their strongly-marked endemic forms, have perhaps, to a considerable extent, taught their lesson already; and that more is likely to be learnt from the critical genera (the wild analogues of variable florists' flowers) of one's own country, with their numerous intermediates and almost certainly present endemic forms, than by describing those more distinct ones which we cannot study in connection with their nearest relations, partly because they may already be too far evolved to have any, and also because they are

too far removed from us to enable us to study them closely in that relation, even if it exist.

But to return to Shetland; unless some other island is mentioned, the records below refer always to Northmaven, the peninsula which constitutes the northern parish of Mainland. The following abbreviation is used:—

† = Not recorded for the county in "Top. Bot.," ed. 2, or in Bennett's "Additional Records," unless with some form of query.

(*Lepidium sativum*, *L.*; and *Malcolmia maritima*, *R. Br.*—Casuals on waste ground near the Knabb, Lerwick.)

Polygala vulgaris, *L.*—As the plant previously recorded was not altogether satisfactory, I may mention that this species occurs, fine and typical, on grassy banks by the Gluss Burn, near Ollaberry.

† *Rubus Idæus*, *L.*—In a sheltered hollow in the ravine of the Eela-water Burn.

† *Matricaria maritima*, *L.*—On the stony shore at North Roe. I am disposed to regard this plant as distinct from *M. inodora*, at all events as a sub-species. It is so regarded in the last edition of the "Catalogue of Scandinavian Plants," while Nyman classes it as a distinct species.

† *Lapsana communis*, *L.*—In some plenty on the undercliff on the western shore of Sullom Voe, near Lunnister.

Hieracium.—I am indebted to Mr. F. J. Hanbury for examining my series of Shetland Hawkweeds. I have not ventured to record any species not named or passed by him.

H. Schmidtii, *Tausch.*—Dr. Lindeberg refers the Bergs of Skelberry plant to var. *crinigerum* (Fries.) He also refers the plant provisionally alluded to as "*H. lasiophyllum*" ("Scot. Nat.," Jan. 1890), to the same variety.

† *H. oreades*, *Fries.*—Rocks at the foot of Cliva Hill, near Brae, Delting.

† *H. Farrense*, *Hanb.*—In two places on the north side of Roeness Voe, opposite Heylor, among crags, alt. 400 and 450 feet. The occurrence in Shetland of this local species is very interesting.

† *H. zetlandicum*, *Beeby* (in "Journ. Bot.," August 1891). Banks and low hills on the east side of Sand Voe; low hills east of North Roe, towards the Ness of Burravoe. In plenty in both localities, which are about a mile apart. Further observations show that in my original description I have rather over-estimated

the small size of this species ; although much more commonly found as described, it is rather larger and bears more flowers when growing under the shelter of rocks. When in fruit it has a very distinct appearance, somewhat calling to mind *Serratula tinctoria* when in the same condition.

- † **H. protractum**, *Lindeb.*—Abundant about the east side and north end of the Loch of Cliff, Unst (No. 610). Dall of Lumbister and Mid Yell Voe, Yell (No. 611). Rocks north of Mavisgrind, Northmaven. Rocks at the foot of Cliva Hill, near Brae, Delting. The two first-mentioned gatherings have been submitted to Dr. Lindeberg, who confirms the name. This Norwegian Hawkweed is the most widely diffused species in Shetland, where it occurs in five distinct stations in three different islands. It is not known to occur elsewhere in Britain.
- † **H. Friesii**, *Hartm.* (**H. gothicum**, *Backh.*)—About the north end of the Loch of Cliff, Unst. Banks by the Gluss Burn, near Ollaberry ; grassy places near the sea, Hamar Voe ; ravine of the Eela-water Burn ; the last three stations in Northmaven.
- † **H. erocatum**, *Fries.*—Low hills at North Roe. In three places on the north shore of Roeness Voe.
- † **H. auratum**, *Fries.*—In many places on the north shore of Roeness Voe, among rocks. Sparingly on the south side of Roeness Voe, with some curious shade-grown forms. Rocks near Mavisgrind. Dr. Lindeberg confirms the naming of one of the Roeness Voe gatherings.
- (**H. dovrense**, *Fries.*—This record (“*Scot. Nat.*,” Jan. 1889), must be withdrawn ; the plant proves to be a form of *H. Friesii*, *Hartm.*)
- † **H. truncatum**, *Lindeb.*—Rocks at the foot of Cliva Hill, near Brae, Delting ; referred to this species by Mr. Hanbury, who thinks, however, that possibly it may not be quite identical with Lindeberg’s type. This plant has been previously found on the mainland of Scotland.
- † **Ruppia spiralis**, *Hartm.*—Pools just north of Fugla Ness, and salt marshes at Haggrister Bight, Sullom Voe. In both stations the plant was infested by the rare fungus *Tetramyxa parasitica*, for the name of which I am indebted to Prof. Trail.
- Scirpus multicaulis**, *Smith.*—Punds Loch ; a second locality for the county.
- Deschampsia discolor**, *R. & S.*—Abundant by a small loch on the north-east side of Roeness Hill.

CONTRIBUTIONS TOWARDS A FLORA OF THE OUTER HEBRIDES.

By ARTHUR BENNETT, F.L.S.

A WISH to see the western isles of Scotland thoroughly explored for their botanical productions has induced me these five years past to endeavour to interest any one who I knew was likely to help on the work; and by the kindness of Messrs. Duncan, King, Somerville, and Cotton I have been enabled to see a good series of plants from the Outer Hebrides. From looking to their distribution elsewhere I have been led to think that the number of species that inhabit these islands would, and will, be largely added to. The supposed falling off in species from east to west in Scotland¹ I believe to be very much overstated. When the Outer and Inner Hebrides are thoroughly searched, I quite think the number of plants not yet found there will be very much reduced.

These notes must be taken as expressing the wish that others will endeavour to carefully search any of the islands, as opportunity occurs. And we want these western floras complete before we can judge of the past and present floras on safe grounds.

For the use of future workers I give a list of such books and papers as I have consulted.

- J. H. Balfour** and **C. C. Babington**.—"Trans. Bot. Soc. Edin.," 1844, pp. 133-154.
M'Culloch's "Western Islands"; a few species are mentioned in this.
T. Pennant's "Tour in Scotland and Voyage to the Hebrides," 1774-1776, with figures of plants.
W. Macgillivray in "Edinburgh Journal of Natural and Geographical Science," 1830, p. 91; and in "Edin. Phil. Journal," 1842, p. 47.
Dr. Stirton, in "Scot. Naturalist," 1886, p. 182.
R. M. Barrington, "Notes on the Flora of St. Kilda," in "Journal of Botany," 1886, pp. 213-216.
Arthur Bennett, in "Scot. Naturalist," 1887, pp. 56-66; 1888, pp. 247-261; 1889, pp. 111-112.

¹ **S. Grieve**, "Trans. Bot. Soc. of Edinburgh," 1887, pp. 487-490.

- Arthur Bennett, in "Trans. Nat. Hist. Soc. of Glasgow," 1889, pp. 37-41.
- A. Somerville, in "Trans. Nat. Hist. Soc. of Glasgow," 1889, pp. 183-188.
- Arthur Bennett, in "Scot. Naturalist," 1890, p. 273; 1891, pp. 188-189.
- Mr. A. H. Gibson at the July (1891) meeting of the Edinburgh Bot. Soc., read a paper on "The Phanerogamic Flora of St. Kilda," published in October 1891.

What I here propose to do is to give those species added to the flora of the islands since Messrs. Balfour and Babington's list; and others, that have been only reputed.

- Ranunculus Drouetii*, *Godr.*—East side of S. Uist, *A. Somerville*.
- Ranunculus trichophyllus*, *Chaix.*; var. *demersus*, *N. E. Brown.*—S. Uist, *A. Somerville*. Type in Barra, *A. Somerville*.
- Ranunculus Baudotii*, *Godr.*—East side of S. Uist, *A. Somerville*.
- Ranunculus repens*, *L.*; forma *alpina*, *Rostrup.*—St. Kilda, *Barrington*.
- Ranunculus bulbosus*, *L.*—Scarp, *W. S. Duncan*.
- Ranunculus Ficaria*, *L.*—Mingulay, *J. Finlayson*. St. Kilda, *Barrington*.
- Nuphar luteum*, *Sm.*—Lakes in N. Uist, but extremely rare, *Macgillivray*. Not yet confirmed.
- Fumaria confusa*, *Jord.*—S. Uist, *A. Somerville*. Scarp, *W. S. Duncan*.
- Fumaria officinalis*, *L.*—Barra, *A. Somerville*.
- Nasturtium officinale*, *L.*—Barra, *A. Somerville*. Bernera, *W. S. Duncan*.
- Arabis sagittata*, *D. C. (hirsuta).*—Harris, on Ben Capval, *W. S. Duncan*. Bernera, *W. S. Duncan*.
- Erophila vulgaris*, *D. C.*—Harris, *W. S. Duncan*.
- Cochlearia danica*, *L.*—Bernera, *W. S. Duncan*. Barra, *A. Somerville*. St. Kilda, *Barrington*.
- Cochlearia officinalis*, *L.*; var. *alpina*, *Bab.*—St. Kilda, *Barrington*.
- Cochlearia anglica*, *L.*—Mingulay, *J. Finlayson*.
- Subularia aquatica*, *L.*—Harris, *W. S. Duncan*, in Macgillivray's station.
- Raphanus maritimus*, *Sm.*—Abundant, *Macgillivray*; not yet confirmed.

- Draba incana*, *L.*—Upon the granitic vein of Capval, in Harris, *Macgillivray*; not yet confirmed.
- Viola Curtisii*, *Forster.*—Barra. S. Uist, *A. Somerville.*
- Polygala serpyllacea*, *Weihe.*—Barra, *A. Somerville.* St. Kilda, *Barrington.*
- Polygala (eu-) vulgaris*, *L.*—S. Uist, *A. Somerville.*
- Cerastium alpinum*, *L.*—*Macgillivray*; not confirmed.
- Cerastium tetrandrum*, *Curtis.*—Scarp, *W. S. Duncan.* St. Kilda, *Barrington.*
- Sagina apetala*, *L.*—Barra, *A. Somerville.*
- Spergula arvensis*, *L.*; *sativa*, *Boem.*—Barra, S. Uist, *A. Somerville.*
- Lepigonum salinum*, *Fr. (genuinum).*—Barra, S. Uist, *A. Somerville.*
- Hypericum elodes*, *Huds.*—Barra, *A. Somerville.*
- Geranium dissectum*, *L.*—S. Uist, *A. Somerville.*
- Ilex aquifolium*, *L.*—Put in brackets by Watson; but Mr. Duncan found it on steep rocks with *Rubi*, *Lonicera*, etc., undoubtedly wild in Harris.
- Trifolium medium*, *L.*—Barra, *A. Somerville.*
- † *Trifolium hybridum*, *L.*—S. Uist, *A. Somerville.*
- Trifolium procumbens*, *L.*—*Macgillivray*; not confirmed.
- Trifolium dubium*, *Sibth.*—Barra, *A. Somerville.*
- Vicia sylvatica*, *L.*—Obbe in Harris, *W. S. Duncan.* Recorded by *Macgillivray*, from Glen of Rodell in Harris.
- Vicia lathyroides*, *L.*—Recorded by *Macgillivray*; not confirmed.
- Lathyrus montanus*, *Beruh.*—N. Harris, *W. S. Duncan.*
- Rubus Idæus*, *L.*—S. Uist, *A. Somerville.*
- Rubus incurvatus*, *Bab.*—Obbe, Harris, *W. S. Duncan*; determined by Mr. J. G. Baker.
- Rubus polyanthemos*, *Lindb.*—S. Uist, *A. Somerville.*
- Agrimonia Eupatoria*, *L.*—S. Uist, *A. Somerville.*
- Rosa spinosissima*, *L.*—Barra, *A. Somerville.*
- Rosa Sabina*, *Woods.*—*Dr. Walker*; according to a note by Turner in Herb., Kew.
- Rosa mollis*, *Sm.*—Harris, *W. S. Duncan.* S. Uist, *A. Somerville.*
- Rosa canina*, *L. (lutetiana, Leman).*—Harris, *W. S. Duncan.*
- Rosa canina*, *L. (dumalis, Bechst.)*—Harris, *W. S. Duncan*; *f. glaucophylla*, Barra, *A. Somerville.*

- Saxifraga oppositifolia*, *L.*—St. Kilda, *Barrington*. Husival More, Harris, *W. S. Duncan*.
- Saxifraga nivalis*, *L.*—*Macgillivray*; never confirmed.
- Drosera obovata*, *M. et K.*—Scarp, *W. S. Duncan*.
- Lythrum Salicaria*, *L.*—S. Uist, *A. Somerville*.
- Peplis Portula*, *L.*—*Duncan*, cat.
- Epilobium alpinum*, *L.*; var. ? *anagallidifolium* (*Lam.*)—Harris, *W. S. Duncan*.
- Epilobium obscurum*, *Schreb.*—Scarp, *W. S. Duncan*. ? *tetragonum*, S. Uist, *A. Somerville*.
- Eryngium maritimum*, *L.*—S. Uist, *A. Somerville*.
- Sanicula europæa*, *L.*—"Top. Botany."
- Apium nodiflorum*, *Reich.*—Barra, *A. Somerville*.
- Apium inundatum*, *Reich.*—S. Harris, Barra, *W. S. Duncan*.
- Cieuta virosa*, *L.*—Loch na Linna Moire, S. Uist, *A. Somerville*.
- Ceanthe Crocata*, *L.*—S. Uist, *A. Somerville*.
- Caucalis Anthriscus*, *Huds.*—"Top. Botany," ed. 2.
- Hedera Helix*, *L.*—Doubted as native by Watson; but Mr. Somerville, for Barra, says, "wild on rocks on hillside."
- Sambucus nigra*, *L.*—St. Kilda, introduced, *Gibson*.
- Galium uliginosum*, *L.*—S. Uist, *A. Somerville*.
- Galium Aparine*, *L.*—*f. minima*, two to three inches high, leaves erect, $\frac{1}{4}$ inch long, fine pointed. Lochboisdale, S. Uist, *A. Somerville*. A curious state of the plant.
- Sherardia arvensis*, *L.*—S. Uist, *A. Somerville*.
- Valerianella olitoria*, *Moench.*—Barra, *A. Somerville*. Harris, *W. S. Duncan*.
- Gnaphalium uliginosum*, *L.*—Harris, *W. S. Duncan*.
- Chrysanthemum Leucanthemum*, *L.*—Mingulay, *J. Finlayson*. Barra, *A. Somerville*.
- Matricaria Chamomilla*, *L.*—*Macgillivray*; not confirmed.
- Petasites vulgaris*, *Desf.*—Watson suggests that *Tussilago* was mistaken for this by Balfour and Babington. I have no confirmation of it.
- Aretium minus*, *Schk.*—Barra, *A. Somerville*. Scarp, *W. S. Duncan*.
- Cnicus heterophyllus*, *Willd.*—Harris, *W. S. Duncan*.
- Cnicus arvensis*, *Hoffm.*; var. *argenteum* (*Vest.*)—S. Harris, *W. S. Duncan*.
- Saussurea alpina*, *D. C.*—North and South Harris, *W. S. Duncan*.

- Hieracium anglicum*, *Fr.*—Barra, *A. Somerville*.
- Hieracium argenteum*, *Fr.*—S. Uist, *A. Somerville*. Harris, *Backhouse*, "Mon. Brit. Hier." p. 49.
- Hieracium scoticum*, *Haub.*—Barra, *A. Somerville*.
- Hieracium iricum*, *Fr.*—I suppose that by the *H. Lawsoni* of Balfour and Babington's list this is intended; but I have seen no specimen.
- Hieracium crocatum*, *Fr.*—An immature specimen of what is probably this, *Scarp*, *W. S. Duncan*.
- Taraxacum palustre*, *D. C.*—St. Kilda, *Barrington*.
- Sonchus arvensis*, *L.*—Mingulay, *J. Finlayson*.
- Sonchus oleraceus*, *L.*—*Scarp*, *W. S. Duncan*.
- Aretostaphylos Uva-ursi*, *Spreng.*—*Macgillivray*; not confirmed.
- Moneses grandiflora*, *Salisb.*—"Harris and Bernera about 1783 by Mr. James Hoggan, *Mr. Gotobed.*" Smith, in "Flor. Brit." (1800), ii. p. 446; not confirmed by any recent author.
- Lysimachia nemorum*, *L.*—Obbe, Harris, *W. S. Duncan*.
- Anagallis arvensis*, *L.*—Mingulay, *J. Finlayson*.
- Samolus Valerandi*, *L.*—S. Uist, *A. Somerville*. S. Harris, *W. S. Duncan*.
- Gentiana campestris*, *L.*—St. Kilda, *Macgillivray*; not confirmed.
- Myosotis versicolor*, *Reichb.*—*Scarp*, *W. S. Duncan*.
- Calystegia Soldanella*, *R. Brown.*—Eriskay, *A. Somerville*.
- Veronica scutellata*, *L.*—Obbe, Harris, *W. S. Duncan*.
- Plantago maritima*, *L.*; var. *pygmæa*, *Lange.*—St. Kilda, *Barrington*.
- Melampyrum sylvaticum*, *L.*—*Macgillivray*; not confirmed.
- Orobanche rubra*, *Sm.*—Refound in 1891 by *W. S. Duncan* in *Macgillivray's* station.
- Utricularia intermedia*, *Hayne.*—*Scarp*, *W. S. Duncan*.
- Mentha hirsuta*, *L.*—Barra, *A. Somerville*.
- Lycopus europæus*, *L.*—Tarbert, Harris, *W. S. Duncan*. S. Uist, *A. Somerville*.
- Thymus Chamædryes*, *Fr.*—S. Uist, *A. Somerville*.
- Scutellaria minor*, *L.*—S. Uist, *A. Somerville*. Obbe, Harris, *W. S. Duncan*.
- Stachys arvensis*, *L.*—Mingulay, *J. Finlayson*.
- Ajuga reptans*, *L.*—S. Uist, *A. Somerville*.
- Ajuga pyramidalis*, *L.*—*Scarp*, S. Harris, *W. S. Duncan*.

- Atriplex Babingtonii*, Woods.—St. Kilda, *Barrington*. Watson in "Cybele Brit." vol. ii. p. 323.
- Atriplex laciniata*, L.—S. Uist, *A. Somerville*.
- Salsola Kali*, L.—St. Kilda, *Macgillivray*; not confirmed.
- Polygonum aviculare*, L.; var. *arenastrum*.—Mingulay, *J. Finlayson*.
- Polygonum (Roberti)*, *Loesl*; *Raii*, *Bab.*—Barra, *A. Somerville*.
- Polygonum Hydropiper*, L.—Obbe, Harris, *W. S. Duncan*.
- Polygonum amphibium*, L.; *terrestre*, *Leers.*—Barra, *A. Somerville*.
- Polygonum Bistorta*, L.—S. Uist, *A. Somerville*.
- Polygonum viviparum*, L.—Scarp, almost at sea-level; frequent from 50 to 150 feet above it. On Husival More (alt. 1603 feet) it grows but a short way above the base, and on summit with *Habenaria viridis*, etc., *W. S. Duncan*. Abundant on Oreval (2165 feet) and Ceartaval (1807 feet.)
- Polygonum viviparum*, L.; var. *alpinum*, *Wahlb.*—Scarp, *W. S. Duncan*.
- Rumex conglomeratus*, L.—St. Kilda, *Barrington*.
- Myrica Gale*, L.—Barra, *A. Somerville*.
- Malaxis paludosa*, *Sm.*—Harris, *T. A. Cotton*.
- Listera cordata*, *A. Br.*—Harris, Scarp, *W. S. Duncan*.
- Listera ovata*, *R. Br.*—Scarp, N. Harris, S. Harris, *W. S. Duncan*.
- Orehis mascula*, L.—Scarp, *W. S. Duncan*. In chasms in the steep rocky coast, south and south-west of Harris, *Duncan*.
- Orehis incarnata*, L.—Barra, *A. Somerville*. Scarp, *W. S. Duncan*.
- Habenaria bifolia*, *R. Br.*—S. Harris, *W. S. Duncan*. North of Bowe.
- Habenaria chloroleuca*, *Ridley.*—Harris, *W. S. Duncan*. Abundant on coast for $\frac{3}{4}$ mile.
- Allium ursinum*, L.—S. Uist, *A. Somerville*.
- Scilla verna*, L.—Barra, *A. Somerville*. Scarp, *W. S. Duncan*.
- Juncus effusus*, L.—Scarp, *W. S. Duncan*. St. Kilda, *Barrington*.
- Sparganium ramosum*, *Curtis.*—"Top. Bot." In his "Geog. Distrib." Watson recorded under *simplex*, "I have seen no specimens of either species."
- Sparganium affine*, *Schnizl.*—Scarp, *W. S. Duncan*. Barra, S. Uist, *A. Somerville*.
- Lemna minor*, L.—S. Uist, *A. Somerville*.
- Potamogeton natans*, L. (*verus*).—Scarp, *W. S. Duncan*.

- Potamogeton polygonifolius*, *Pour.*—St. Kilda, *Barrington*.
Potamogeton lucens, *L.*—*Macgillivray*; not confirmed.
Potamogeton Friesii, *Rupr.*—S. Uist, *A. Somerville*.
Potamogeton heterophyllus, *Schreb.*—Barra, *A. Somerville*.
Potamogeton pusillus, *L.*—Scarp, *W. S. Duncan*.
Potamogeton pectinatus, *L.*—S. Uist, *A. Somerville*.
Potamogeton filiformis, *Nolte.*—Benbecula, *Dr. Stirton*.
Ruppia rostellata, *Koch.*—(?)
Eleocharis uniglumis, *Link.*—Barvas, Island of Lewis, *Babington*,
 “Manual Brit. Botany,” 1847.
Eleocharis multicaulis, *Sm.*—Scarp, *W. S. Duncan*.
Eleocharis pauciflorus, *Lightf.*—Scarp, *W. S. Duncan*.
Scirpus Savii, *Sch. et Maur.*—Barra, *A. Somerville*.
S. Tabernæmontani, *Gmel.*—S. Uist, *A. Somerville*.
S. maritimus, *L.*—S. Uist, *A. Somerville*.
Carex pauciflora, *Lightf.*—N. and S. Harris, *W. S. Duncan*.
Carex incurva, *Lightf.*—Scarista, Harris, a patch of about 400
 square yards, *F. C. King*. Messrs. *Balfour* and *Babington*
 gathered a single specimen “of this or *C. stenophylla*.”
Carex limosa, *L.*—Scarp, *W. S. Duncan*.
Carex pallescens, *L.*—S. Harris, *W. S. Duncan*.
Carex riparia, *Curtis.*—*Macgillivray*; not confirmed.
Alopecurus pratensis, *L.*—“Top. Botany.”
Agrostis canina, *L.*—Scarp, *W. S. Duncan*.
Aira caryophyllea, *L.*—*Macgillivray*; not confirmed.
Trisetum flavescens, *Beauv.*—St. Kilda, *Macgillivray*; not con-
 firmed.
Avena pubescens, *Huds.*—Scarp, *W. S. Duncan*.
Koeleria cristata, *Pers.*—Scarp.
Poa compressa, *L.*—*Macgillivray*; not confirmed.
Poa pratensis, *L.*; var. *cœrulea* (*Sm.*)—S. Uist, *A. Somerville*.
Festuca loliacea, *Huds.*—Named by *Balfour* and *Babington*, but not
 admitted by *Watson*. Scarp, *W. S. Duncan*.
Festuca sciuroides, *Roth.*—“Top. Botany.”
Bromus giganteus, *L.*—? Very doubtful.
Brachypodium sylvaticum, *R. et S.*—Barra, *A. Somerville*.
Elymus arenarius, *L.*—“Of very rare occurrence,” *Macgillivray*;
 not confirmed.

- Scelopendrium vulgare*, *Symons*.—Scarp, Harris, *W. S. Duncan*.
- Lastrea æmula*, *Brackenbridge*.—Scarp, *W. S. Duncan*.
- Phegopteris polypodioides*, *Fée*.—Harris and Scarp, *W. S. Duncan*.
- Ophioglossum vulgatum*, *L.*—North Rona, *Barrington*. Benbecula, *Dr. Stirton*.
- Ophioglossum vulgatum*, *L.*; var. *polyphyllum*, *A. Br.*—St. Kilda, *Barrington*.
- Botrychium Lunaria*, *Sw.*—St. Kilda, *Barrington*. Scarp, *W. S. Duncan*.
- Equisetum pratense*, *Ehrh.*—Obbe, Harris, *W. S. Duncan*.
- Equisetum arenarium*, *Newman*.—Links of Scaristra, Harris, *W. S. Duncan*.
- Lycopodium annotinum*, *L.*—Authority?
- Isoetes lacustris*, *L.*—Scarp, *W. S. Duncan*.
- Pilularia globulifera*, *L.*—Frequent about Obbe in Harris, *W. S. Duncan*.
- Chara fragilis*, *Desv.*—S. Uist, *A. Somerville*. var. *barbata* (*Gant.*)
—S. Uist, *Somerville*.
- Chara hispida*, *L.*—S. Uist, *A. Somerville*.
- Nitella translucens*, *Agardh*.—Harris, 1889, *Mrs. W. S. Duncan*.
- Nitella opaca*, *Agardh*.—Harris, *Duncan*.
- Nitella batrachosperma*, *A. Br.*—Loch near Obbe, Harris, *W. S. Duncan*. This is the only station at present known in Great Britain. It was discovered here by Mr. Duncan in July 1888, and was sent to me by the finder, through Mr. F. C. King.

Balfour and Babington's estimate of the Flora was 349 species and varieties (without *Characeæ*). This present list adds 143 species and varieties (without *Characeæ*) making a total of 492 at present known. To this I think it probable that at least 50 or 60 species will be added and eventually found to occur.

It would extend this paper too much to give the additional localities for a large number of the species in Balfour and Babington's list, so I only give a few interesting notes on some. But I wish it to be understood that I consider I merely hold these materials "in trust" until some Scottish botanist will undertake a Flora of the Islands, when I shall be pleased to hand over all the material I possess. Unless otherwise stated, the notes are by Mr. Duncan, who

is a resident on the islands, and I hope will do good work in the future.

Thalietrum alpinum, *L.*—In S. Harris to within six or seven feet of high-water mark.

Corylus Avellana, *L.*—Mr. Watson remarks on this “In the Hebrides the hazel has perhaps been introduced, after having become extinct there.” Mr. Somerville considers it certainly wild and native in S. Uist; and Mr. Duncan in Harris.

Populus tremula, *L.*—With its stems twisted, out of rocks in Barra and S. Uist, *Somerville*.

Ajuga pyramidalis, *L.*—S. Harris, etc., not unfrequent in the O. Hebrides, *W. S. Duncan*.

Until more searching has been done it is not advisable to make any comparisons with adjacent counties, etc.

NOTES ON SCOTTISH WILLOWS.

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

I.

AMONGST several collections of willows, which have recently been sent to me for examination, is a very interesting one made in Dumfriesshire by Mr. James Fingland, of Thornhill. In this collection, in addition to several noteworthy forms, about which I may have something to say on another occasion, there are some specimens of a willow which I have been hoping would sooner or later be found, namely a hybrid between *Salix purpurea* and *S. phylicifolia*.

In discussing—in the “Revision of British Willows”—the nature and characteristics of Smith’s *Salix Croweana*, I pointed out that it was probable that under that name two plants had been confounded, one an abnormal condition of *S. phylicifolia*, the other a hybrid of *S. phylicifolia* and *S. purpurea*. As, however, I had seen but two specimens, both imperfect and not of certain British origin, of this supposed hybrid, I could not well say much about it at that time. It was therefore with much pleasure that I found in Mr. Fingland’s collection the plants in question.

As I have shown in the "Revision," the name *Crowcanà* Sm. properly belongs to the abnormal state of *S. phyllicifolia*, and since the hybrid seems to be undescribed, I propose for it the title \times *Salix secerneta* (*S. purpurea* \times *S. phyllicifolia*). Of *S. secerneta* there are in Mr. Fingland's collection examples from two different bushes; and as these are markedly different, it is desirable to give a description of each of them.

No. 59.—Glenairly Bridge, Sanquhar, Dumfriesshire; Sept. 3d and May 30th.—Shoots and twigs like those of *S. phyllicifolia*, quite glabrous. Leaves long and narrow for their size, the largest about 2 inches long by $\frac{1}{2}$ inch wide, ovate-lanceolate acuminate (often obliquely), paler green but scarcely glaucous below; margins finely serrate; mature leaves quite glabrous, some of the younger leaves sparingly hairy below with long straight hairs. No stipules. Catkins (σ) small and narrow, the largest $\frac{1}{2}$ inch long, shortly peduncled, the peduncle with about 3 small lanceolate leaves, which are sometimes hairy below. Scales spatulate, often concave, rounded at the apex, base brown, upper half black, subcoriaceous and often slightly shining, clothed with long white hairs. Nectary short, broadly quadrate. Flowers monandrous, the filaments of the stamens being connate for their whole length; anthers small, four-celled; empty anthers not fuscous.

From the leaves alone this plant might be passed over as merely a form of *S. phyllicifolia*, but in the flowers the *purpurea* element is shown by the structure (but not the colour) of the stamens and also of the scales. At the date (3d May) when the flowering specimens were gathered the catkins were rather *passè*, which suggests that the flowering period is intermediate between those of the parents.

No. 60.—Same locality as No. 59.—Leaves and twigs of *S. phyllicifolia*. Catkins (σ) short and narrow, shortly peduncled, with about two small peduncular leaves. Scales spatulate, acute, lower half brown, upper half very black, subcoriaceous, somewhat shining. Nectary quadrate. Filaments either nearly or quite free, or connate for a short distance.

This form is very near *S. phyllicifolia*, but the connation of the filaments, and in a less degree the structure of the scales, indicate its relationship with *S. purpurea*.

Mr. Fingland has found another very remarkable willow

(No. 40) on the banks of the Nith below Sanquhar. Unfortunately (in some respects) the flowers are hermaphrodite, the upper part of the catkins being ♂ and the lower ♀. Yet although it is thus a monstrosity, of a kind which is not uncommon amongst willows, it deserves special notice, as it seems to be a ternary hybrid, the result of the crossing of *S. purpurea*, *S. phylicifolia*, and *S. aurita*. Whether the binary hybrid (*i.e.* the plant of the first hybridization) was the above mentioned *S. secerneta* (*S. purpurea* × *S. phylicifolia*), or *S. ludificans* (*S. aurita* × *S. phylicifolia*) or *S. dichroa* (*S. purpurea* × *S. aurita*) it is of course impossible to say, although, if I am correct in my assumption of the parentage of the plant, it must have been one of them. It may be thus described—

× *Salix sesquitertia* nov. hybr. (*S. purpurea* × *aurita* × *phylicifolia*). Twigs and shoots like those of *S. phylicifolia*. Leaves (largest $2\frac{1}{2}$ by about 1 inch) oblong obovate, very shortly pointed or plicate-pointed; margins crenate-serrate, slightly incurved below; glaucous below with veins more or less raised, the youngest leaves showing the rugosity more distinctly; the younger leaves more or less subpubescent below, the pubescence somewhat crisped but often shining, old leaves nearly or quite glabrous. Stipules (rarely present) small, reniform. Catkins moderate ($\frac{3}{4}$ inch long), dense-flowered, subsessile or very shortly peduncled, peduncles with 2 or 3 very small leaves; catkins mostly ♀, but with a variable number of ♂ flowers at the apex. Scales spatulate, rounded at the apex, clothed with numerous long white hairs, reddish brown at the base, upper half black, those at the apex of the catkins often somewhat subcoriaceous and concave; ovary conical, subobtuse, densely clothed with white pubescence, as is the pedicel, which is about twice as long as the nectary; style about as long as the moderate-sized stigma; stigma-lobes erect-patent, rather broad, mostly undivided but sometimes notched or bifid; filaments of the stamens connate as far as the anthers, which are four-celled; empty anthers showing a tendency to become subfuscous. Occasionally some of the anthers at the point in the catkins where ♂ and ♀ flowers intermingle are beginning to change into ovaries.

The *purpurea* element in this curious plant is indicated by the monandrous ♂ flowers, and in a less degree by the

structure of the stigmas and the length of the pedicel in the ♀ flowers. From leaf-specimens it might readily be considered to be *S. ludificans*, since the leaves combine the characters of *S. phyllicifolia* and *S. aurita*, their glabrosity, texture, and in some degree their pubescence showing the former species, and their shape, veining (especially of the young leaves), and pubescence the latter. The catkins show some affinity also to that species, but the evident style points to *phyllicifolia*.

It is to be hoped that plants bearing unisexual catkins will yet be discovered. Although I have, in the description given above, mentioned the hermaphrodite nature of the catkins, that is of course no characteristic of the hybrid, being merely peculiar to the specimens seen by me.

In connection with this willow I should like to say a few words about the nomenclature of hybrids, since there is much divergence of opinion on the subject amongst botanists.

In the "Revision" I expressed my belief that "whilst there is a decided advantage in employing a compound name—since it conveys distinct information—such can be used in those cases only where no earlier name exists, and where there is no doubt about the parentage."

This opinion I am now inclined to modify. If only binary hybrids existed the utility of adopting a name composed of the designations of the parent species (when these are certain) would admit of no doubt. Such a name conveys information and is not too unwieldy. But when we have to deal with hybrids into whose parentage three or more species enter, it is doubtful whether the inordinate length of the compound name would not altogether outweigh any advantage it possesses. Names are not essential parts of organisms, but are merely convenient symbols for indicating the particular plant or animal under discussion. If such a symbol is cumbrous—as it would be if the binomial system of nomenclature were replaced by (say) a trinomial system—its convenience would disappear.

It seems to me therefore that for ternary hybrids we *must* adopt a single and not a compound name, and that—whilst there is no imperative necessity—it would be advantageous to do the same in the case of binary hybrids also.

LIST OF FUNGI FOUND AT STIRLING,

On 26th and 27th October 1891.

By CHARLES B. PLOWRIGHT, M.D., H. G. WARD,
and Rev. J. ROBERTSON.

[Those species not recorded from the province of Forth in "Mycologia Scotica" are indicated by *, and one not recorded from Scotland by **]

Agaricus (*Amanita*) *muscarius* *L.* ; *rubescens*, *Fr.*

*(*Lepiota*) *Carcharias*, *Pers.* ; **amianthinus*, *Scop.*

(*Armillaria*) *melleus*, *Fl. Dan.*

(*Tricholoma*) *rutilans*, *Schæff.* ; **imbricatus*, *Fr.* ; *terreus*, *Schæff.* ,
**carneus*, *Bull.*

(*Clitocybe*) *laccatus*, *Scop.* ; *infundibuliformis*, *Schæff.* ; *metachrous*,
Fr.

(*Collybia*) *maculatus*, *A. and S.* ; *butyraceus*, *Bull.* ; *dryophilus*, *Fr.* ;
confluens, *Pers.* ; **ambustus*, *Fr.*

(*Mycena*) *purus*, *Pers.* ; *galericulatus*, *Scop.* ; *polygrammus*, *Bull.* ;
**luteo-albus*, *Bolt* ; **ammoniacus*, *Fr.* ; *galopus*, *Pers.* ; *epiptery-*
gius, *Scop.* ; *vulgaris*, *Pers.*

(*Omphalia*) *fibula*, *Bull.*

(*Clitopilus*) **prunulus*, *Scop.*

(*Pholiota*) **erebius*, *Fr.* ; **flammans*, *Fr.*

(*Inocybe*) **calamistratus*, *Fr.* ; *rimosus*, *Bull.* ; **eutheles*, *B. and Br.* ;
geophyllus, *Sow.*

(*Hebeloma*) **fastibilis*, *Fr.*

(*Flammula*) **sapineus*, *Fr.* ; **inopus*, *Bolt.*

(*Galera*) *tener*, *Schæff.* ; *hypnorum*, *Batsch.*

Stropharia) *æruginosus*, *Curt.* ; *semiglobatus*, *Batsch.*

Hypholoma) *sublateritius*, *Schæff.* ; **capnoides*, *Fr.* ; *fascicularis*,
Huds. ; **dispersus*, *Fr.*

(*Psiloeybe*) *semi-lanceolatus*, *Fr.*

(*Panæolus*) *fimiputris*, *Bull.*

Coprinus *plicatilis*, *Fr.*

Cortinarius ***largus*, *Fr.* ; *collinitus*, *Sow.* ; **anomalus*, *Fr.* ; **ever-*
nus, *Fr.* ; **armeniacus*, *Fr.* ; *castaneus*, *Fr.*

- Hygrophorus hypothejus*, Fr. ; **lætus*, Fr. ; *coccineus*, Fr. ;
 **miniatus*, Fr. ; *conicus*, Fr.
Lactarius turpis, Fr. ; *deliciosus*, Fr. ; *vellereus*, Fr. ; var. *exsuccus*,
Smith ; *rufus*, Fr. ; *serifluus*, Fr.
Russula nigricans, Fr. ; *foetens*, Fr. ; *cyanoxantha*, Fr. ; *Queletii*
 Fr. ; **fellea*, Fr. ; *ochroleuca*, Fr. ; *fragilis*, Fr.
Cantharellus cibarius, Fr. ; *aurantiacus*, Fr.
Marasmius Oreades, Fr. ; *peronatus*, Fr. ; *androsaceus*, Fr.
Boletus luteus, L. ; *chrysenteron*, Fr. ; *edulis*, Bull.
Polyporus amorphus, Fr. ; *annosus*, Fr.
Stereum hirsutum, Fr.
Thelephora palmata, Fr.
Corticium sanguineum, Fr.
Clavaria cinerea, Bull. ; *rugosa*, Bull. ; *inæqualis*, Fl., Dan. ; *ver-*
micularis, Scop.
Calocera viscosa, Fr. ; *cornea*, Fr.
Dacrymyces stillatus, Fr.
Phallus impudicus, L.
Lycoperdon gemmatum, Fr. ; *pyriforme*, Schæff.
Mucor **fusiger*, Link.
Sepedonium chrysospermum, Link.
Helvella crispa, Fr. ; *lacunosa*, Aftz.
Diatrype disciformis, Fr.

ZOOLOGICAL NOTES.

Lesser Shrew (*Sorex minutus*, L.) in Fife.—On the 2d November I noticed an extremely small shrew running among long heather on the northern part of the Tents Muir, Fife. Having succeeded in catching it, I found that it belonged to some species with which I was not acquainted, and I accordingly sent it for identification to Mr. Eagle Clarke, who informs me that it is a specimen of *Sorex minutus*—a species which, though a very widely distributed one in Scotland, has not hitherto, he believes, been recorded for Fife. Under these circumstances the occurrence may be worth noting.—WILLIAM BERRY, Newport, Fife.

Polecat (*Mustela putorius*, L.) in Dumfriesshire.—Mr. George Anderson, gamekeeper, informs me that in May last he captured a

Polecat in one of his weasel traps on the lands of Glenlee. This is the only occurrence on the estate for upwards of 25 years. Formerly Polecats were numerous enough everywhere in this district, and it is very remarkable how quickly they have been exterminated.—ROBERT SERVICE, Maxwelltown.

The Blue-throated Warbler (*Cyanecula suecica*, L.) in Orkney.—On the 15th August 1891 Mr. Gilmour, of the Pentland Skerries Lighthouse, sent me a schedule with notes taken in May 1890, which he intended sending to me at the time, but had laid it aside, and it was only the other day he found it put away in a drawer, and he remarks: "My object in sending it now is to let you see about a bird we saw here on the 12th of May (last year, of course), and which you will see fully described in the schedule on that date. There is little doubt but it was as stated, the Blue-throated Warbler. I had many opportunities at the time of seeing it quite near with the glass. I even shot at it but missed, owing, I believe, to the shot being too large for such a small bird. The blue throat and the nice colours on the breast made it very conspicuous. It was, in fact, the prettiest bird I have seen here." Description of the bird as given in the schedule. "It resembles a Redstart on the back and keeps its tail erect somewhat like a Redbreast. The throat is a bright blue, and underneath the blue is a black border on the breast, also a red band with a white stripe. The red and black is more distinct on the breast than the white. Seen it very minutely with spy-glass. This is undoubtedly the Blue-throated Warbler." On referring again to the schedule, we find under date 12th May that the wind was moderate, the weather variable, with fog and haze. A Blackcap and two male Redstarts were also seen, and at midday several Swallows, all these birds being uncommon, the Blackcap especially so, in Orkney. There can be no reasonable doubt that Mr. Gilmour is right in his identification of this bird, and to him we are thus greatly indebted for being enabled to place on record the appearance of the Blue-Throated Warbler in Orkney for the first time.—T. E. BUCKLEY, Inverness.

Jay (*Garrulus glandarius*, L.) in the Botanic Gardens, Edinburgh.—On the 11th of October 1889 I was greatly pleased to observe a beautiful Jay in the Botanic Gardens, which was very wary, and I again saw it on the 15th of November in the same year. As this bird has become rare in the south of Scotland, the occurrence of a specimen in the city of Edinburgh is worthy of record.—WM. SERLE, Leith.

Wrynecks (*Iynx torquilla*, L.) on the East Coast of Scotland.—Though there is nothing particularly noteworthy in the occurrence of the Wryneck on our coasts during spring and autumn, the simultaneous detection of four examples—pointing as it unmistakably does to the passage of a migratory flight—is perhaps not unworthy

of being placed on record. On 20th August last, one was picked up in a dying condition on the burnside at Thorntonloch, a few miles east of Dunbar, and taken to Mr. Durie, to whom (through Mr. G. Pow) I am indebted for the particulars and the remains of the bird itself. On 24th August Mr. Small, George Street, Edinburgh, received one for preservation from the Pentland Skerries, and at the end of the same month another reached him from Kirkwall. About the same time a fourth was sent to Mr. Lewis Dunbar, Thurso, as I am informed by Mr. John Gunn, who saw it in Mr. Dunbar's hand.—WILLIAM EVANS, Edinburgh.

Snowy Owl (*Nyctea scandiaca*, L.) in Argyllshire.—My keepers have seen a large Snowy Owl here for two or three days. Yesterday it flew across in front of the Duchess, who, with a party, all stopped to see the wonderful big white bird, which seemed to be as big as a White Heron. This is not the first time the bird has been seen here. The late Dr. Smith, minister, told me many years ago that he had seen one hunting in Glen Aray in this parish.—ARGYLL, Inveraray, 30th Sept. 1891.

Spotted Crake (*Porzana maruetta*, Leach.) in Shetland.—Saxby does not mention the Spotted Crake as occurring in Shetland, in his "Birds of Shetland." But Saunders, in the "Manual of British Birds," says it has twice occurred in the Islands. On the 26th October last (1891), whilst snipe-shooting in Shetland, I met with the species. My spaniel "bunched" one in the marshes of Dunrossness, which would not rise on wing, and the dog fetched it alive to me. I have only once before met with an example in Scotland, viz. in a marsh at Dunipace in Stirlingshire, which when flushed, flew three yards or so and alighted, but was not seen again.—J. A. HARVIE-BROWN, Dunipace, Larbert.

The reported occurrence of *Grus leucogeranus*, Pallas, in the Outer Hebrides.—Mr. E. W. Marshall of Marlow, Buckinghamshire, writes as follows to "The Field" of 14th November 1891, p. 758:—"In the report of a recent meeting of the Zoological Society, which appeared in last week's 'Field,' I see that Dr. Hamilton made allusion to the shooting of a white crane (*Grus leucogeranus*) in the Outer Hebrides in August last. I think I am justified in concluding that this bird was one of a pair which belonged to me, and which made its escape last August. These two birds only came into my possession last summer. They were imported by Mr. W. Jamrach, and being full winged, were turned out with one wing 'brailed' instead of being cut. The bird in question must have broken its 'brail,' or contrived to get it off. My man happened to be on the spot at the time it escaped, and saw it rise suddenly and fly away in a northerly direction. I think it well to mention this fact, lest your readers may imagine that this white crane is a rare visitor from Japan or Northern India, upon whose skin probably a high price would be

set." There can be no doubt, I think, that this is the bird which was shot by Dr. MacRury on the Island of Barra, as recorded by me in "The Scottish Naturalist" for October 1891, p. 145.—WM. EAGLE CLARKE, Edinburgh.

The Gray Phalarope (*Phalaropus fulicarius*, L.) in Islay.—As I was driving along the northern shore of Loch Indaal on the 13th of October, I was startled and delighted to see a small flock of six Gray Phalaropes swimming in a little pool of shallow water just beyond the force of the waves. A continued storm of wind from the south-west had blown for several days, and had only then begun to calm down, and this no doubt had arrested the birds in their migration to the south. To an ornithologist the little flock presented a most enchanting sight. Elegant themselves, the birds floated buoyantly on the water, which indeed they scarcely seemed to touch. They were constantly in motion, every movement being gracefully beautiful. Without intermission they pecked at the water getting no doubt microscopic life on the surface. One of their number was on the shore, where it ran nimbly about among the drifted sea-weed, at which it pecked as continually as its companions in the water. The utter fearlessness of the birds, and their indifference to the presence of man, was charming, as they allowed me to approach within a few yards without taking the slightest notice. They remained in the same spot for three days after I first saw them. One Phalarope was observed a fortnight later swimming close to the same spot. The Phalaropes chose the lee and not the windward side of the loch, where at the same time many Storm Petrels (most unusual visitants to Islay) had flown for shelter. During seventeen seasons I never before saw a Phalarope in the island, but I may mention that about the same date a fisherman killed two of these birds with an oar in Loch Fyne near Tarbet. It is clear from published accounts that a very large number of Phalaropes have this year been driven by storms to the seaboard of England, the whole coast line having been alive with the birds. The years 1866, 1867, 1886 were also remarkable in this respect.—R. SCOTT SKIRVING, Edinburgh.

Gray Phalarope (*Phalaropus fulicarius*, L.) in Jura.—A Gray Phalarope was killed, on the 12th of October, by a boy with a stone whilst the bird was wading about on the beach at Ardfin, Jura. The bird is now in my possession.—HENRY EVANS, Jura Forest.

Gray Phalarope (*Phalaropus fulicarius*, L.) in S.W. Scotland.—The Gray Phalarope is a rare straggler to this district when blown off its course by some gale during the autumnal migration. I have received one from Mr. Webster, who shot it on 28th September at Portrack. Early in October another was killed near Carsethorn when swimming in a small pool left by the tide. A boy threw a stone at it and knocked it over. Still another specimen of the same bird was seen swimming in the tideway near the same locality.

The last occurrence I know of was a pair shot by Mr. Irving Murray at Priestside, in November 1887. Previous to that, many years ago, one was shot on the margin of Lochrutton.—ROBERT SERVICE, Maxwelltown.

The Nesting of the Woodcock (*Scolopax rusticula*, L.) in North Uist.—It may be of interest to record the breeding of the Woodcock in the Outer Hebrides. My gamekeeper reports to me having found two nests in the spring of 1891. I am not aware that such a fact has been previously recorded from the "Long Island," and, from the entire absence of both plantations and natural wood, few would expect such a district to be selected. My keeper sends me the following particulars, which I give as nearly as possible in his own words. He found the nests on the 15th of April. Both were within one hundred yards of each other, and in the centre of the best cock-shooting ground, on the south-east side of Eval. One of the nests was on the side of a small moss knoll, and consisted of moss and dry withered grass and contained four eggs. The second nest was on the bank of a small stream, and was placed among withered ferns close beside a boulder. In this case there was no attempt to make a nest, it was simply a natural hollow in which there were two eggs. When visiting the nests, after the young had been hatched, he could easily make out by the pieces of shell found in this second nest that the bird had only three eggs. There is good feeding ground round about the nests. He then proceeds to say—"Although I did not find them, I am of opinion that there were more nests than those, as I saw three other birds on that same date."—J. W. P. CAMPBELL-ORDE, Kilmory.

Ruff (*Machetes pugnax*, L.) in Orkney.—A Reeve was shot by Mr. Watt of Skail, at Tankerness, Orkney, on 7th September 1891. It was one of three observed at same time and place. I have another preserved specimen shot on 27th August 1890 by Mr. Alfred Cowan of London, at Rennibister, Firth, Orkney. As I have heard of several others having been got here during the fall migrations, the Ruff can hardly be termed a very rare visitant in Orkney.—T. S. PEACE, Kirkwall.

Buffon's Skua (*Stercorarius parasiticus*, L.) in the Solway District.—Following on the remarkable visitation of the Fork-tailed Petrels to the Solway, particulars of which will be found in Mr. Evans's note, there has been a much more remarkable immigration of Buffon's Skua. Indeed, more specimens of this handsome species have been seen and shot on both sides of the Solway than have been known to visit us during all the years of the past half a century. There is little doubt that, as was clearly the case with the Petrels, this unusual visit is attributable to the boisterous weather of the early part of October. The first one I heard of was got on the 21st of October at Priestside of Cummertrees, and was received by

me the following morning. The same day one was shot on the moor at Lochanhead. Another bird was sent to Mr. Hastings from Glen Æ. Mr. Robert McCall saw one off Carsethorn on the 24th. Two others were sent from some one in Dumfries to a person in Carlisle. Mr. R. Armstrong, Thornhill, tells me he saw a small Skua sweeping along the troubled surface of the sea off Fairlie, in Ayrshire, on the morning after the stormy night of the 18th-19th. Coupling this with the fact that Skuas were shot so far inland as Lochanhead Moor and Glen Æ, it is highly probable that the Skuas may have travelled over the well-known fly line betwixt the Ayrshire coast and the Solway Firth.—ROBERT SERVICE, Maxwelltown.

Buffon's Skua (*Stercorarius parasiticus*, L.) **in the Scottish Solway area.**—Although Buffon's Skua has occasionally occurred in Southern Scotland, its appearances within the faunal area embraced by the Scottish Solway are sufficiently irregular to be worth chronicling. I have examined two fine adults of this Skua, males in change, sent to a bird-stuffer in Carlisle from the neighbourhood of Dumfries on or about the 17th of October. Nine others were shot about the same time on the north-west coast of England, and these Scottish birds were no doubt travelling down the Irish Channel with the rest when a strong gale on 16th October induced them to seek the shelter of the Solway coast. One of the Dumfries birds retained the long central rectrices. The other had moulted these feathers.—H. A. MACPHERSON, Carlisle, 26th October 1891.

Great Shearwater (*Puffinus major*, Faber) **in Tiree.**—Mr. Peter Anderson of Tiree sent me for identification the head of a Great Shearwater, which he had found on the 14th or 15th of October last "about 200 yards from the sea, and was all battered with rain and eaten by gulls. General plumage brown above and white below." As this species has been much confounded in the past with the Sooty Shearwater (*P. griseus*), satisfactory records of this bird for Scotland are very few; indeed, the Tiree specimen is, perhaps, the third Scotch one about whose identity there can be no doubt. Mr. Anderson sent at the same time the head of a Fork-tailed Petrel (*Cymochorea leucorrhœa*), also from Tiree.—J. A. HARVIE-BROWN, Dunipace, Larbert.

Unusual numbers of the Fork-Tailed Petrel (*Cymochorea leucorrhœa*, Vieill) **on the Scottish Coasts.**—The latter part of September 1891 will long be remembered on account of the succession of severe gales which blew across our Islands from the North Atlantic. The 26th and 28th were particularly stormy days, the wind blowing with hurricane force from the west or north-west. As a consequence many birds which make the wide Atlantic their winter home, or use it as a highway during passage from their summer to their winter haunts, were caught in the tempests and driven upon our western shores—numbers being

carried to inland localities, a few even right across Britain. No species seems to have suffered more than the Fork-tailed Petrel, as the following records, which relate entirely to Scotland, clearly show. The first I heard of was on Tuesday, 29th September, when Mr. Small, taxidermist, Edinburgh, showed me three which he had that day received for preservation. One was from Kelso, where it had been killed the previous evening, the second came from Ayr, and the third was sent from Ardrishaig. Thinking others would likely have been sent to Mr. Hope, I at once called at his shop and found he had received two, one the previous evening from Langholm, and the other had been picked up that morning in the streets of Edinburgh—in the division of George St. between Hanover St. and Frederick St. On 2d October another was received by Small from Kelso, and on the same day a specimen from Mull was taken to Hope. Mr. Small tells me the Kelso birds when first noticed were pursued by rooks, and with regard to the Mull example Mr. A. B. Steele of the Edinburgh Museum writes me as follows, "On the 26th September last a specimen of this bird in a weak condition was shot by Campbell M'Kechnie, Esq., younger of Tenga at the south-east end of Loch Frisa, wind had been blowing a hurricane for days before." At the same time numbers appeared in the Solway, but before proceeding to mention these it may be well to draw attention to other Argyllshire records. In the "Field" of 17th October, Mr. A. D. Lawrie writes as follows from the yacht *Rawn*, Tayvallich Bay, Loch Leven, under date 11th October; "During the recent severe weather we were driven for shelter into Kames Bay, Loch Melfort. The gale was very stiff, and for several days we were surrounded by a large number of Fork-tailed Petrels. Often a dozen at a time would be flying close to us. During the lulls in the squalls I shot five as specimens, and sent them to be stuffed; but although we were anchored close under a weather shore, it was seldom safe for a boat to leave the yacht. At last the storm moderated; the petrels had then become very tame. I touched one with a broom as he flew over, another settled on the bowsprit; after we were under way, one of the crew caught another for a moment in his sou'-wester, but it escaped. Another Fork-tailed Petrel was recently picked up dead here on the shore of Loch Leven. I have never seen any of these birds in Argyllshire before." Mr. Scott Skirving, writing to Mr. Eagle Clarke on 20th October, states that about the same time as the birds were sheltering in Kames Bay, great numbers of Petrels (in all probability likewise of this species) were seen in Loch Indaal, Islay. The remains of one was sent to Mr. Harvie-Brown from Tiree, and the Rev. A. H. Macpherson had another from Skye (letter to Mr. Eagle Clarke, 11th November). To Mr. R. Service I am indebted for the following Notes from the Solway district, where unprecedented numbers appeared. On the night of 27th September

one was killed by coming in contact with the telephone wires in the High Street of Annan, and the following morning, Mr. Wannop shot one (of a flock of six or eight) near the Solway viaduct. Shortly afterwards the same gentleman saw another flock of four or five at Annan Waterfoot and subsequently he saw a single bird at Milnfield Railway bridge. Then Mr. Service examined a pair which were caught at Newbie, and on 30th September Mr. Farish, yr. of Kirkland showed him another which he had found a couple of days previously at Gamerigg plantation some 20 miles from the sea. On 28th September, one was picked up in an exhausted condition in the High Street of Moffat, as recorded by Mr. F. G. Murray in the "Field" of 24th October. The most easterly occurrence I have noted is that of a specimen picked up dead in a bog on the banks of the South Esk, eleven miles from Kirriemuir, Forfarshire (Mr. Sydney Peel, "Field," 3d October). All the examples I have examined were more or less in the moult and in a very emaciated condition. The Edinburgh bird had lost one of its legs. From the numbers that have been driven upon the north-west coast of Ireland we may form some idea of their whereabouts when overtaken by the storm.—
WILLIAM EVANS, Edinburgh.

Occurrence of *Triglops murrayi*, Günther, on the East Coast of Scotland.—The first specimen of this fish for the east coast of Scotland was caught fourteen miles off Aberdeen, on 1st October 1890. Four more were obtained off Montrose, on 7th February 1891; and the sixth specimen was caught off the Kincardineshire coast, on 3d September 1891. These specimens were all caught in the ordinary trawl net, and kindly preserved for me by Mr. Geo. King, master of the trawl vessel "St. Oswin." This fish was first captured by Dr. John Murray while cruising in the "Medusa" in 1887-88 off the Mull of Cantyre and the Island of Sanda, and described as new by Dr. Günther, of the British Museum, from Dr. Murray's specimen.—
GEO. SIM, Aberdeen.

[This species was described and figured, in 1889, by Dr. Günther in the "Proc. Roy. Soc. Edinburgh," xv. p. 209, Plate IV. Fig. A.—
W. E. C.]

Note on *Zeugopterus unimaculatus*, Risso, and its Habitat.—One of the most elegant of the flat-fishes is this little Top-Knot, that has come to be very familiar to us. It differs from *Rhombus punctatus* mainly in having a brilliant second spot on the lateral line an inch or so above the tail. However markedly different from the flounder or the dab, it does not seem to have been noted until lately, or when noted it was not looked up as specifically different from *Rhombus punctatus*. This was the view taken of it when, having captured and figured it in 1881, I showed the drawing to the late Dr. Day. He was wisely opposed to species-mongering, and looked upon this single external colouring mark as insufficient to constitute a species.

But if not specific it is a distinct variety, never to our knowledge reaching the size of its congener, and not being found in the West Highlands along with it. At least we have never taken any other Top-Knot in the Oban district, where this fish is comparatively common, not only in such enclosed lochs as Creran, but outside Mull. It is always taken on rocky tangle-covered ground, does not take a bait, and has all the richness of colouring that commonly pertains to fishes that frequent the tangle area. I am not disposed to look upon it as rare so much as frequenting ground whence it is seldom taken. I have taken it now over a wide area in the West, with the seine net, the dredge, and the trawl net, whenever these latter infringed upon the rough ground in question. I believe it to be an inshore fish, and consequently it has not such a quantity of ova as more pelagic species. It is always fat and in good condition, while it does not show great activity, so that I am disposed to look upon its Top-Knot as probably employed as a lure, like the angle of the Fishing-Frog (*Lophius piscatorius*), the very large mouth and head turned turbot-wise mark it from the ordinary flat-fishes. There is no reason why it should not take bait, if frequenting the ordinary fishing grounds, not having the very small gape that probably saves the Sole from the hook. The large brilliant spot that distinguishes this fish is not sexual, and consequently cannot come under the ordinary Darwinian explanation as if it had pertained only to the male.—W. ANDERSON SMITH, Ledaig, Oban.

The Three-Bearded Rockling (*Motella tricirrata*, Bloch) in the Solway Firth.—A specimen of the Three-Bearded Rockling, captured at Carsethorn, was kindly given to me by Mr. Matthew Wood on the 2d of November last. I am not aware that this fish has ever been captured locally before. Our shores are too shallow and sandy to suit its tastes. In his well-known catalogue, prepared just about one hundred years ago, Dr. Heysham, of Carlisle, included it amongst Cumberland species, but without comment of any kind. The specimen measures 16 inches in length, and when fresh weighed $1\frac{1}{2}$ lbs.—ROBERT SERVICE, Maxwelltown.

Note on *Rossia macrosoma*, D. Ch.—This interesting little Cephalopod was formerly looked upon as being exceedingly rare, but within the last ten years I have supplied the principal museums with specimens. Mr. Alfred Brown took one specimen in the Clyde area, but its locale seemed very circumscribed. Of late, however, while I have not again taken full-grown specimens on the shore at low water as they struggled amongst the tangle, I have become more fully aware that they are neither very rare nor very local. At all depths, and wherever the ground was other than mud, I have taken them, sometimes in considerable numbers, during a day's operation. This refers to the whole West of Scotland, outside the Mull of Cantyre and up to the north of Skye. They appear possessed of considerable

intelligence, and the change of colour as apparently produced under passionate excitement is always remarkable. When trawling two years ago in Loch Creran I came upon a small bunch of ova about the size of peas and opalescent, that appeared to me to belong to this species. Afterwards, outside Mull, a similar bunch came up attached to the roots of tangle, or rather deposited carefully in the interstices. These were so near maturity that we were able to hatch them out, when their character was clearly proved, the little Cephalopoda showing exact duplicates of their parents. I have not satisfied myself as to their food, for although I have kept them in confinement they did not seem to accommodate themselves to a restricted area. I should say that this is really the most common Cephalopod on our Western shores, for although *Loligo* may be more numerous at times, one may fish, trawl, and dredge persistently without ever obtaining a specimen or a sign of its presence. It is of course just possible that, during the season when we procured the greater number of *Rossia*, there may have been a special influx of this species. It is really impossible to judge from single seasons, as exceptionally favourable conditions occasionally produce remarkable quantities of otherwise comparatively rare forms. But the extremely widely dispersed habitats of the species would point to it as a really common West Coast species.—W. ANDERSON SMITH, Ledaig, Oban.

Saperda carcharias, *L.*, in **Elginshire**.—On 3d September last, while staying at Cromdale, near Grantown, Strathspey, my son brought me a longicorn beetle which he had captured at rest on an aspen. Being unable to name it satisfactorily, I sent it to Canon Fowler, Lincoln, who has kindly informed me that it is a "small gray male of *Saperda carcharias*," which he adds is "very variable" and "extremely rare in Scotland." In Murray's "Coleoptera of Scotland," published in 1853, the only locality given for the species is Sutherlandshire. To this Dr. Sharp, after characterising the insect as "very rare," adds Moray (*vide* "Coleoptera of Scotland," "Scottish Naturalist," v. 375); and Canon Fowler in his recently completed "Coleoptera of the British Islands," merely copies Sharp.—WILLIAM EVANS, Edinburgh.

Monochammus sutor, *L.*, in **Midlothian**.—In September 1878, I obtained a longicorn beetle in Colinton Dell, near Edinburgh, which I could not find figured or described in any of the books on British Coleoptera to which I then had access. Not being at the time particularly interested in beetles, I took no further trouble in the matter beyond attaching a label, with locality and date, to the specimen, and placing it in my insect cabinet, where it remained unnamed till October last, when, on Mr. Eagle Clarke's suggestion, I sent it to Mr. C. O. Waterhouse of the British Museum, London, who kindly wrote me as follows: "Your insect is *Monochammus sutor*, a reputed British species; probably the specimens found from time

to time are imported, but there is no reason why it should not breed in Britain." Judging from the length of the antennæ it is evidently a male. On referring to Fowler's "British Coleoptera," in which, however, the insect is not figured, I find it described as "very rare, and probably an importation" (I presume from the Continent). Only six localities are given, all of them in England.—WILLIAM EVANS, Edinburgh.

Sphinx convolvuli, L., at Dumfries.—This handsome moth is a scarce species in Scotland, yet hardly a season passes without one or more being captured in this district. I was presented with a specimen—unfortunately in a terribly battered condition—which had been caught in St. Michael Street early on the 7th of September last. It is somewhat remarkable that three-fourths of all the specimens that I and others have known of here have been caught in the immediate vicinity of the Dock Park. Many years ago Mr. William Lennon took the species in the larval condition in Castle-dykes grounds.—ROBERT SERVICE, Maxwelltown.

[Mr. Wm. Evans has shown me a specimen of this moth, in his possession, which was captured at Peebles about the same date as the above.—W. E. C.]

Sirex gigas, L., in the neighbourhood of Dunbar.—On 16th August last, a specimen of this large Sawfly was captured here by Mr. T. Williams, and brought to me alive to name. Three days later, another was brought to me from Thurston, about five miles from here, by Mr. A. Denholm. The Thurston specimen I have shown to Mr. W. Evans, Edinburgh, who assures me it is an undoubted example of *Sirex gigas*.—G. Pow, Dunbar.

BOTANICAL NOTES

Cauliflower Disease of Strawberry at Aberdeen.—In the last (fourteenth) of Miss Ormerod's valuable reports on Injurious Insects and Farm Pests a disease of strawberries is described and figured, which a good deal resembles the cauliflower head on a small scale. It is the work of eelworms or *Anguillulæ*, nearly related to the gall makers of this family already known, but of a distinct species, which has recently received the name *Aphelenchus Fragariæ* from Dr. Ritzema Bos. The malformation is composed of short flattened distorted inflorescences or stems, with many abortive flower and leaf buds. In the course of the past summer I observed in Old Aberdeen a few examples of this disease, not previously recorded from Scotland. They occurred on old plants only. Probably the disease will be found in other gardens when attention is drawn to their existence here. The best treatment in our present state of

ignorance appears to be the burning of all infested plants.—JAMES W. H. TRAIL.

Scarcity of Oak-galls in 1891.—In my experience the scarcity of oak-galls in the vicinity of Aberdeen has been very marked this year. The "Currant-gall" (*Spath. baccarum*) was especially scarce, while its dimorphic condition—the common "Oak-spangle" (*Neuroterus lenticularis*) was even more uncommon, not one being observed on trees the leaves of which in former years were richly bedecked with them. Has anything similar been observed elsewhere?—J. W. H. TRAIL.

Euphrasia officinalis, L., form *paludosa*, Townsend, is a new form described and figured (*Journ. Bot.* 1891, pp. 161, 162, pl. 305) by F. TOWNSEND, M.P., F.L.S., from marshy ground near Castleton, Braemar. It approaches nearest to *E. gracilis*, Fr.; but is rather larger and coarser, with broader and shorter calyx-segments, shorter middle-lobe of lower lip of corolla, emarginate capsule narrowing below only, and a dark green tinge (instead of dark purple) on the upper surface of leaves, bracts, and exposed parts of capsules.

The Biographical Index of British and Irish Botanists, compiled by JAMES BRITTEN, F.L.S., and G. S. BOULGER, F.L.S., which has been in course of publication in the "Journal of Botany" during the past year or two, is approaching completion. It is to be reprinted with such additional information as has been gained during its publication, and will be issued in one volume. The list is of very great value for reference, and the opportunity of procuring it should not be lost.

The "Key to the genera and species of British Mosses," by the Rev. H. G. JAMESON, also published in the "Journal of Botany" during 1881, and illustrated with a plate, has been issued as a separate paper at the price of 1s. 6d.—It will prove useful as an aid to students of this group of plants.

CURRENT LITERATURE

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October to December 1891.

[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 have access to the sources of information undermentioned.]

ZOOLOGY.

The Mammalian Fauna of the Edinburgh District. By WILLIAM EVANS, F.R.S.E. *Proc. Roy. Phys. Soc. Ed.*, xi. part i.

(1890-1891), pp. 85-160.—Treats on the present and past history and distribution of forty-eight species, with original notes on the habits of some of them.

Some Further Notes on the Summer Birds of Shetland. By HAROLD RAEBURN. *Proc. Roy. Phys. Soc. Ed.* xi. part i. (1890-1891), pp. 67-73.—In addition to further notes on some of the species in the author's former paper (*op. cit.* ix. p. 542), *Pernis apivorus*, *Motacilla lugubris*, *Passer montanus* (?), *Corvus monedula*, *Cotile riparia*, *Syrnhaptes paradoxus*, *Tadorna cornuta*, *Harelda glacialis*, *Colymbus glacialis*, and *Ardetta minuta*—most of them not summer birds—are new to the list.

The Chief Fishing Grounds on the East Coast of Scotland, with Charts showing their Position and Extent. By Dr. T. WEMYSS FULTON, F.R.S.E. *Ninth Ann. Rep. Fishery Board for Scotland* (1890), Part iii. pp. 177-183 (Plates III. and IV.) [Issued 24th Sept. 1891.]—Contains much useful information on the Distribution of Food-Fishes.

Further Observations on the Life-Histories and Development of Food and other Fishes. By Professor M'INTOSH, LL.D., F.R.S. *Ninth Ann. Rep. Fishery Board for Scotland* (1890), Part iii. pp. 317-342 (Plates X.-XIII.)—Pages 334-341 are devoted to a "List of some of the Pelagic Ova, Larvæ, and Young Fishes obtained by the 'Garland' in 1890-1891 in Scottish waters."

West Coast Fauna of 'Garland' Expedition. By W. ANDERSON SMITH. *Ninth Ann. Rep. Fishery Board for Scotland* (1890), Part iii. pp. 297-299.—Records the capture of *Cepola rubescens* (between Jura and Colonsay), *Zeugopterus unipunctatus* (Lochs Linnhe and Scridain), *Rossia macrosoma*, *Brissopsis lyrifer*, *Balano-glossus* (new to Scotland), *Isocardia cor* (Loch Sunart), and other species.

Notes on some Scottish Coleoptera. W. D. R. DOUGLAS. *Ent. Mo. Mag.* (2) ii. (Nov. 1891), p. 305.—*Timarcha tenebricosa*, *Rhynchites cupreus*, *R. æneovirens*, *Corymbites holosericeus*, *Subcoccinella 24-punctata*, *Gyrophæna minima*, and *Phyllotreta nodicornis*, in Kirkcudbrightshire; and *Elater nigrinus*, near Dumfries.

Coleoptera at Fort William. By ALFRED THORNLEY. *Ent. Mo. Mag.* (2) ii. (December 1891), p. 332.—*Aphodius contaminatus*, *Nebria gyllenhali*, *Patrobus septentrionalis*, *Miscodera arctica*, on Ben Nevis.

Melanism and Melanochroism in British Lepidoptera. By J. W. TUTT, F.E.S. (London, October 1891).—Contains much information on the numerous melanic and melanochroic forms found in Scotland, and their bearing upon the elucidation of the phenomenon.

Captures at Sugar in Argyllshire in September. T. M. CHRISTY. *The Entomologist*, xxiv. (October 1891), p. 246.—*Epunda lichenea*, *Hydræcia micacea*, *Triphæna orbona*, *Calocampa vetusta*, *Anchocelis rufina*, *A. litura*, *Cerastis vaccinii*, *Orthosia macilenta*, *O. lota*, *Calymnia trapezina*, *Calocampa solidaginis*.

Notes on Lepidoptera from Various Localities. By JOHN E. EASTWOOD. *The Entomologist*, xxvi. (December 1891), p. 299.—*Aplecta occulta* in Inverness.

Phibalapteryx lapidata, etc., in Stirlingshire. E. C. EGGLETON. *The Entomologist*, xxiv. (November 1891), p. 268.—Abundant near Fintry in September. The other species recorded are, *Larentia cæsiata*, *Chesias spartiata*, *Celæna haworthii*, *Hydræcia nictitans*, *Charæas graminis*, *Tapinostola fulva*, *Emmelesia ericetata*, *Carsia imbutata*, *Agrotis lucernea*, *Plusia bractea*, *P. festucae*.

Micropteryx caledoniella: another new species, probably from Birch. By A. F. GRIFFITH, M.A. *Ent. Mo. Mag.* (2) ii. (November 1891), p. 300.—Described from specimens captured in Sutherland in April 1885.

Drepanopteryx phalænoides, Linn., in Scotland. KENNETH J. MORTON. *Ent. Mo. Mag.* (2) ii. (November 1891), p. 308.—Captured at Cleghorn, on 5th October 1891.

The Invertebrate Fauna of the Inland Waters of Scotland, Part II. By THOMAS SCOTT, F.L.S. *Ninth Ann. Rep. Fishery Board for Scotland* (1890), Part iii. pp. 269-296 (Plates V., VI.)—Deals with the Invertebrata of Loch Leven, Raith Lake, Lochs Camilla and Gelly (Fifeshire); Loch Strathbeg (Aberdeenshire); Loch Achnacloich (Ross-shire); Lochs Ness, Oich, and Lochy (Inverness-shire); Lochs Balnagowan, Kilcheran, and Fiart (Lismore Island, Argyllshire); Lochs Hempriggs and Wester (Caithness); and Lochs Harray and Stennis (Orkney).

Additions to the Fauna of the Firth of Forth. Part III. By THOMAS SCOTT, F.L.S. *Ninth Ann. Rep. Fishery Board for Scotland* (1890), Part iii. pp. 300-310.—Records forty-two species of Crustacea and one of Mollusca as new to the Firth.

Notes on a Collection of Echinoderms and Molluscan Shells from the Moray Firth District. By THOMAS SCOTT, F.L.S. *Proc. Roy. Phys. Soc. Ed.* xi. part i. (1890-1891), pp. 81-84.—The species dealt with are: *Asterias hispida*, *Hippasteria plana*, *Palmipes membranaceus*, *Luidia savignyi*, *Echinocardium flavescens*, *Isocardia cor*, *Scaphander lignarius*, and *Buccinum undatum* var. *paupercula*.

The Land and Fresh-Water Crustacea of the District round Edinburgh. By THOMAS SCOTT, F.L.S. *Proc. Roy. Phys. Soc. Ed.* xi. part i. (1890-1891), pp. 73-81.—Treats on the Amphipoda

and Isopoda, of which there are ten species, with synonyms and descriptions when necessary.

Further Notes on the Medusæ of St. Andrews Bay (August 1890-May 1891). By the Rev. J. H. CRAWFORD, F.L.S., Dundee. *Ann. and Mag. Nat. Hist.* (6) viii. (October 1891), pp. 295-297.—Deals with specimens of Anthomedusæ, Leptomedusæ, Trachomedusæ, Narcomedusæ, Acraspedæ, and Planulæ.

BOTANY.

The Cotyledonary Glands in some species of Rubiaceæ. By THOMAS BERWICK, *Trans. Bot. Soc. Ed.* (October 1891).—Describes these structures in *Galium Mollugo*, in *G. Aparine*, and in several exotic species.

On Temperature and Vegetation at the Royal Botanic Garden, Edinburgh, in June 1891. By ROBERT LINDSAY, *l.c.*—The usual monthly list of plants in flower in the rock garden, and of meteorological notes.

The Phanerogamic Flora of St. Kilda. By ALEX. H. GIBSON, *l.c.*—An enumeration of species observed in August 1889.

Varieties of Phanerogams exhibited at Bot. Soc. Ed., meeting of 9th July, *l.c.*—Viz. hairy *Silene maritima* from near North Berwick; and two varieties of *Matricaria inodora*—*a*, with tubular ray flowerets; *b*, with densely hirsute stem and leaves.

Some British Hawkweeds. By ED. F. LINTON, M.A., *Journ. Bot.* (Sept. 1891).—Describes two new species, viz. *Hieracium Marshalli*, from Unich Water, Forfarshire, and *H. Pictorum*, from several localities in Aberdeenshire, Forfarshire, and Perthshire.

Armeria pubigera*, var. *scotica (Boissier) Mr. BRITTEN, *l.c.*—Queries if this is accepted as a varietal form of *A. maritima* in Scotland. Boissier says, "in insula Staffa Scotiæ . . . legit ch. A. D. C."

The Algæ of the Clyde Sea Area (continued), with a map, *l.c.* By E. A. L. BATTERS, LL.B., F.L.S.—This valuable list is now to be obtained in separate form.

Notes on Mycetozoa. By A. H. LISTER, F.L.S., with 5 plates, *l.c.*—Among numerous other forms two are described and figured from examples gathered at Moffat by Prof. Balfour, viz. *Physarum Braunianum*, De Bary, and *Lamproderma echinulatum* (Berk.), Rost.

British Tremellineæ. Revised by M. C. COOKE, *Grevillea* (Sept.)—Gives short descriptions of all known British species, but does not mention any localities.

REVIEWS

Melanism and Melanochroism in British Lepidoptera. By J. W. TUTT, F.E.S. (London: Swan Sonnenschein, and Co. October 1891), pp. 66.

We have perused with much interest this contribution to an important phenomenon, about which there is singularly little to be found in the literature of British Natural History. This is not a little remarkable because it is a subject that should especially demand the attention of our naturalists, since our islands appear to be the headquarters of melanic forms. This peculiarity is considered, by the author, to be due to the great humidity of our climate; and it is interesting to note that where the humidity is at its maximum with us—*i.e.* in Ireland and certain districts in Scotland,—melanism and melanochroism among the Lepidopterous insects are also at their maximum. As bearing upon this subject we may remark that there are two important cases of melanism among the mammalia which bear out these views. These are:—(1) the black form of the Common Rat, the *Mus hibernicus* of Thompson, which is fairly abundant throughout Ireland, and not unknown in the Hebrides, and yet practically absent from the mainland of Britain. (2) The black variety of the Water Vole (*Arvicola amphibia*), which is much commoner than, and, perhaps, replaces the type in some of the northern districts of Scotland. This animal is widely distributed in Britain—there are no voles in Ireland—but melanic forms are of exceptional occurrence out of Scotland. Though the little volume under consideration treats of the subject under the light afforded by the evidence relating to one order of the Insecta, yet it is a valuable contribution to an interesting subject, and it should be read not only by entomologists but by all interested in the peculiarities of our insular fauna. To the Scottish naturalist we have said enough to indicate that it is of especial value and interest.

British Edible Fungi, how to distinguish and how to cook them, by M. C. COOKE, M.A., LL.D., deserves hearty commendation as well fulfilling its aim of giving clear information regarding the edible Fungi of our country in a manner that can be understood by any one wishful to know how to recognise and how to make use of them. The admirable figures on the twelve plates, illustrating forty-three species, add much to the value of the book as a ready means of identifying the Fungi.



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[APRIL

THE OCCURRENCE OF THE HOODED SEAL (*CYSTOPHORA CRISTATA*, ERXLEBEN) IN BENBECULA.

By J. MACNAUGHT CAMPBELL, F.Z.S.

THAT this rare species may have occurred more frequently than is recorded is very probable; the want of competent observers and the habits of the whole tribe are such as to prevent its appearance being noted more often than it has been. Semi-migratory in its nature, it is possible that in our outlying islands and skerries this well-marked species may be a more frequent visitor than we are aware of.

Although its appearance has been without doubt recorded on three different occasions on the shores of the United Kingdom, once in the Orwell in 1847 ("Zoologist" 1847), once at Frodsham on the Mersey in 1873 ("Proc. Zool. Soc." 1873), and at St. Andrews on the 22d July 1872; the latter record is the only one, so far as I am aware, relating to Scotland, and is fully described in the "Scottish Naturalist," vol. ii. pp. 1-8, by Mr. Robert Walker. In the Orkneys, although it is "said to have been killed there," no record is given of such a fact in the recently published and valuable contribution to our faunal literature the "Fauna of the Orkney Islands," by Messrs. Harvie-Brown and Buckley, the authors

remarking "that had a specimen of such a striking beast been procured, it is more than likely that some special notice would have been taken of it." The late Mr. Alston, in his "Mammalia of the Fauna of Scotland," published by the Natural History Society of Glasgow in 1880, states on the authority of Mr. Howard Saunders that the "Bladder Nose" is well known as a visitor to the Ve Skerries in Shetland. Under these circumstances, it is perhaps interesting to place another record of the occurrence on our Scottish shores of this rare seal.

In the summer of last year one of my correspondents, Mr. Ranald Macdonald, lately schoolmaster at Loch Uiskevagh, Benbecula, and to whom I am indebted for valuable assistance in other subjects, wrote me that he had secured "a very beautiful seal-skin" for me, and judging from the tone of his letter that it was not a common one, I wrote him to send it on together with the skull and any other bones which might be obtainable. The skin reached me in due course together with the skull, which was all that had been preserved of the animal, and on subsequent inquiry, I learned that it had been killed by a man about the end of May last, in Loch Uiskevagh. I was extremely sorry that it had not been skinned in such a manner as to fit it for a mounted specimen, the skin of the head and the flippers having been cut off, but from an examination of the skull it was evidently a young Hooded Seal. The skin as it stands measures 3 ft. 4 in. in length and 2 ft. 3 in. in breadth, so that the animal would probably be from 4 ft. 6 in. to 5 ft. in total length. The hair above is rather long, silky in texture, of a silvery-gray colour, and has a close underlying fur of a light brown shade, the sides and underparts yellowish white. The skull is $6\frac{1}{4}$ in. in length and $4\frac{1}{2}$ in. in greatest breadth, flat in appearance, the height of the cranium (exclusive of the lower jaw) being $3\frac{1}{4}$ inches. The dental formula is inc. $\frac{2-2}{1-1}$; can. $\frac{1-1}{1-1}$; molars $\frac{5-5}{5-5} = 30$. The incisors and canines are slightly incurved, the surfaces of the former grooved or plaited, the two upper and outer ones being about one-third less than the canines, these latter having on their inner surfaces two strong ridges or plaits. The first and

third molars in the upper jaw are the smallest (at least on one side, as the last three are missing from the other), and all the crowns of the molar teeth are strongly plaited. The animal had evidently been clubbed, as the nasal bones and the left mandible of the lower jaw are broken, and that may also account for the missing molar teeth in the left side of the upper jaw. The skull with the skin, which, as I have stated above, were all that was preserved, are in my possession. The sex was not ascertained, the man who killed it having no idea of the rarity of his find, and having done so solely for the sake of its hide and oil.

REPORT ON THE GREAT SKUA (*STERCORARIUS
CATARRHACTES*, LINNÆUS) IN SHETLAND
DURING THE SEASON OF 1891.

BY WILLIAM EAGLE CLARKE.

THE attention which was called to the persecution of the Great Skua, at the close of the disastrous breeding-season of 1890, was undoubtedly the means of doing much good, since it aroused and secured the interest and influence of ornithologists and others on behalf of the bird's future welfare, and for its preservation as an indigenous British species. Then followed the wise and generous act of the Council of the Zoological Society of London in presenting its much-prized silver medals to the representatives of the families of Scott and Edmondston in recognition of their valued services as protectors of the Skuas on their respective domains in past years—a timely recognition which was well calculated to secure for the bird even greater attention in the future.

In the hope that the publication of the various particulars relating to the Skua in its British breeding-stations during the past year may be the means of furthering the much-needed protection which has been so recently renewed, I have been induced to prepare the following report. In addition to the information indicated, the report gives some particulars

of interest to naturalists, and touches upon questions bearing on the economy and life-history of the species which are worthy of elucidation.

For the facts and information afforded I am indebted to Mrs. Traill, an Edinburgh lady, who spent two of the summer months on Foula, and is well known for the kindly and practical interest she manifests in all that concerns the remote island and its inhabitants; and to Mr. G. E. Paterson, of New Kilpatrick. This indebtedness it now affords me much pleasure to fully acknowledge. For the information relating to the Unst Colony the excellent and satisfactory letter of Mr. Thomas Edmondston which appeared in "The Times" of 1st August 1891 is quoted.

FOULA.

Mrs. Traill reports as follows:—

Although we have not yet returned to the happy days when the man who killed a Bonxie was fined sixteen shillings and eightpence, there are indications that the kingly birds are not to be persecuted as they have been, at all events not in Foula.

About one hundred pairs arrived on the 27th of March, a full week earlier than is usual, and all had come by the 3d of April. Of the first-laying all the eggs were taken except six, and these hatched in due course. About forty nests of the second laying were noted. Of these one half contained a pair of eggs, and the other half a single egg each. From these sixty birds were reared. There was no third laying, or at any rate, no more birds were hatched. As no steamer came to the island this year, the number of strangers who landed was very small; and no skuas' eggs, so far as I could learn, were sold on the island. A Scalloway man who would have bought largely declined to give the price asked by the natives; and a tourist from Birmingham, who was inclined to be more liberal, was too late in the season to get anything, but promised to return in good time next year. A gentleman from Kent killed a full-grown Bonxie in June.¹ I give you his name and address, as well as that of the Birmingham visitor, for publication or otherwise. A pair of young birds were taken from the nest, kept for eight weeks, and taken alive in August to an eminent ornithologist in England.

As a ground-officer has now been appointed, whose duty it is to follow strangers wherever they go on the hills and to report those natives who take eggs, it may be expected that each year the birds will enjoy greater peace and safety and will multiply accordingly.

¹ This was done with the written permission of the proprietor, or his agents, who ought to know that the law cannot be set aside by them.

This report of Mrs. Traill's is a valuable and interesting one, and if it did not disclose the existence of a wholesale system of egg-taking by some of the natives it might be considered satisfactory. There is, however, in it much that is calculated to encourage us to hope for a better state of things in the now approaching season. It also throws important light upon the relative numbers of the breeding and non-breeding birds. This goes to prove that though we may fairly estimate the number of Skuas now resorting to Foula annually during the summer at not less than one hundred and twenty individuals—an estimate we can endorse the correctness of from personal observation—yet we must not conclude that all these visitors to the island of their birth are breeding birds, but it would appear now that two-thirds of them are to be reckoned as such. This is an important fact, and one upon which we have not hitherto, I believe, had any reliable data.

Mr. G. E. Paterson reports—

I received a letter from a Scalloway fisherman, whose name I give you, dated 3d August 1891, in which he says he had been to Foula, and that he had the chance of a lot of egg shells, and could get them and send on the lot to me when I could select them and send on the value at my own price, there being a lot of Bonxies among them. I wrote him to send on the eggs, which were sent off from Scalloway on 31st August. They arrived upon 5th September, and I found fifty-five Great Skua's eggs in the box. The following was written upon a slip of paper—"4 dozen and 7 bonxy egg shells, they are separated from the others by this line." I wrote in reply to this that I was sorry to see so many Great Skua's eggs, and that I did not know what to do with them, and also asked him what was the people's idea of price, and on 14th September he wrote me to the following effect.

"They came to me from Foula just as you got them, I was away when the box came. I told my wife to send them on to you, so I have never seen them. I am sorry if there are more than you may require, for I had either to take them all or none. Also I told them I would not price them as I knew nothing about them. Mr. ——— has not got many shells this year, for he has been wondering to me what has come of all the shells this year."

I wrote to Mr. ———, Scalloway, who deals in eggs and who is alluded to by the Scalloway fisherman, to ask him if he had any Great Skua's eggs for sale. On 21st September he replied:—

"I did not receive many eggs this year, in fact scarcely any, about a dozen Bonxies only, which are all gone."

Mr. Paterson's object in getting possession of these eggs was to prove the statement made by him after a visit to Shetland in 1890, viz. "The Great Skuas' nests are pillaged regularly and persistently by the inhabitants of Foula."

The above communications bear out Mrs. Traill's statement that practically all the eggs of the first-laying were taken. While this is greatly to be deplored, and it is hoped may be prevented in the future, it suggests a sinister question, namely—What would have been the result if an early and ready market for these first-eggs had been found? Would not the disasters of the season of 1890 have been repeated, when it is said not a single chick was reared by the whole of the Foula colony? The names of all concerned in this little less than shameful business have been placed in my hands, and I shall have to consider whether it is not my duty to inform Mr. Scott, the proprietor of Foula, what has been done against his expressed orders and desires, and give to him the names of those who are implicated.

UNST.

Regarding the welfare of the Great Skua in Unst Mr. Thomas Edmondston wrote as follows in "The Times" (of 1st August 1891).

At the beginning of May I engaged a special keeper to live for three months on Hermanness, and keep watch and ward by night and day over the Skua's home. Notices were published and extensively posted in the island, intimating that any person or persons found trespassing within the enclosure of Hermanness during the months of May, June, and July, would be prosecuted; but I am glad to say that no proceedings of this nature have been necessary. Early in May nine pairs of Skuas returned to the neighbourhood of their ancient nesting-place. One pair established themselves—an interesting fact—upon the hill at Saxavord, a promontory opposite Hermanness, and a former, but long-abandoned station of the Skua. Another pair selected as a domicile the heights of Sneuga, some distance to the south of Hermanness, and not on our land. Seven pairs sought again asylum within the territory of their old protectors. I grieve to say that both of the outlying nests were harried by egg-stealers, and that neither of the pairs succeeded in hatching their

young. The Hermanness birds had a different fate; for thanks to careful and zealous watching, the eggs in every one of the seven nests were hatched out, and the young birds were safely on the wing some weeks ago. This gratifying result is greatly owing to the personal supervision and unwearied care of my nephew, Mr. Laurence Edmondston, of Halligarth, from whose report to me I take the foregoing particulars.

“I may here repeat, what I had the honour of stating last April before the Zoological Society, that in my opinion the Skuas on Hermanness cannot be expected to increase much beyond the number now attained. In years gone by, when the colony reached 30 or 40 pairs, the two species of gulls on which the Skuas chiefly depend for their piratical system of living, the Lesser Black-Back and the Herring Gull, were far more numerous in and around Hermanness than they are now. Protection for the Skuas implies some measure of protection also for the gulls; but unless the latter greatly increase, the former cannot be expected to do so. In existing conditions, and pending a possible large increase in the number of gulls, it is nearly certain that the Skua colony can only be increased by enlarging the area of ground protected.”

All naturalists will accord Mr. Edmondston their warmest thanks for his great, and happily successful, efforts to protect the birds upon his domain.

With regard to the views expressed by Mr. Laurence Edmondston as to the numbers of the birds at Hermanness being at about their maximum and the reasons he adduces in support of that belief, I would venture to question their correctness. Let us test the value of this theory by the aid of the evidence afforded by the Island of Foula, which, from the fact of its being *the* headquarters of the species, and also from its remarkably isolated position—it is 15 miles from its nearest co-island of the Archipelago—enables us to form conclusions of special value upon such a question as this. Now, at Foula there are not less than 120 Great Skuas to be provided for, and yet the numbers of the Lesser Black-backed Gull and the Herring Gull are, if anything, rather remarkable for their paucity, so far as my experience goes, and also that of my friends who have visited the island. Here it seems almost certain that the Skua must either levy toll upon other species—if on the Larinæ, on the Kittiwake—or it must procure food by other methods than by practising those characteristic piratical

propensities which render it and its congeners so remarkable.¹ Thus I am led to consider that Foula bears most important testimony against the soundness of Mr. Laurence Edmondston's views upon this subject; and I sincerely hope that the Skuas at Hermanness may multiply to such an extent as to become themselves witnesses against that gentleman; and I believe, indeed, from the Unst report, that they will soon not fail to do so.

The Great Skua would seem to be confined to the immediate vicinity of its chosen haunts during the nesting season, for during a month's cruise among the Shetlands in the season of 1890, when our attention was devoted to birds, Mr. Harvie-Brown and the writer never observed this species except in the proximity of its stations.

ON MALFORMED TROUT FROM SCOTTISH WATERS. No. I.

By R. H. TRAQUAIR, M.D., F.R.S.

Keeper of the Natural History Collections in the Museum of Science
and Art, Edinburgh.

PLATES III., IV., V.

IT is now twenty-one years ago since the late Mr. C. W. Peach² drew attention to a peculiar malformation of the caudal fin occurring abundantly in trout *Salmo fario*, L., from Loch-na-Maorachan, a small lake in Islay. In these fish, which have since that time been popularly called "Tailless Trout," the caudal fin, instead of showing a large broad triangular expansion of the usual form in this species, is stiff, abortive in development, and rounded posteriorly, looking indeed at first sight as if some one had with a pair of

¹ Dr. Edmondston, of Unst, informed Macgillivray ("British Birds," 1852, v. p. 483) that this bird "does not possess the habit of his congener, the Arctic Gull, that of making some other water-birds not only cater fish but cook it for his table. He has a good beak and pinions of his own, and he disdains to *sorru* for the disgorgement of others." This is an important statement by one who had unusual opportunities for observation; but it would seem not to be the experience of later authorities.

² "Brit. Assoc. Rep." Aug. 1871, Transactions of Sections, p. 133.

scissors cut off a large portion of the fin, and trimmed it into the peculiar and abnormal shape which it now presents.

In the following year (1872) Mr. James Thomson, F.G.S., published a paper¹ in which he minutely described the position of the lake, both geographically and geologically, giving also two woodcut figures of the trout themselves, in one of which the tail-fin appears simply rounded, in the other rounded-acuminate, as it shows a little point projecting from the middle posteriorly. In this paper Mr. Thomson states that he had not found any of the fins save the caudal affected by this peculiar abnormality, and gives to the fish the distinct name of *Salmo Islayensis*.

About the same time I published a brief anatomical description, with figures, of the "Tailless Trout of Islay,"² taken from two specimens given to me by Professor (now Sir William) Turner and Mr. Peach. Here, besides giving an account of the essential nature of the malformation of the caudal fin, I demonstrated that a similar condition was also present in the anal and pectoral fins of the larger specimen, the dorsal and caudal remaining alone unaffected.

On the occasion of the "Tailless Trout" of Islay being first exhibited to the British Association by Mr. C. W. Peach, the late Dr. Grierson of Thornhill in Dumfriesshire mentioned that he had heard of similar "docked" trout having been taken near Wanlockhead, but I have never seen any specimens from that locality, nor have I heard of any such having been described or figured. It was not until the year 1882 that Mr. Harvie-Brown afforded me ocular proof of the occurrence of this malformation in trout from a locality in Scotland far distant from Islay, by presenting to the Museum of Science and Art two specimens from Loch Enoch in Kirkcudbrightshire, which he had obtained from Mr. Adam Skirving of Croys. Of these I published a description in the same year,³ in which I showed that not only was the malformation of the caudal fin of precisely the same nature as in the Loch-na-Maorachan fish, but that here also the anal

¹ "Science Gossip," April 1872.

² "Journ. Anat. & Physiology," vol. vi. 1872, pp. 411-416, pl. xix.

³ "Proc. Roy. Phys. Soc. Edinburgh," vol. vii. 1882, pp. 221-223.

and pectoral fins had not escaped participation in this singular condition.

Mr. Harvie-Brown likewise informs me that he had about the year 1856 or 1857 been in the habit of catching similar trout in the Gonar Burn at Abington in Lanarkshire, and I quote the following from a note with which he has kindly supplied me,—“As is well known, the trout of Gonar Burn, as is remembered by me personally, were (or are, if they are not now extinct) invariably deformed and had tails as in the Islay specimens and those also from Loch Enoch, and quite as pronounced. These little trout were very fat and otherwise in prime condition.” It is to be regretted that none of these trout from Gonar Burn have been preserved, if they are now extinct, as Mr. Harvie-Brown thinks is probable, whether from poisoning by washings from lead-mines or otherwise.

But from Mr. Harvie-Brown I have acquired the knowledge of yet another locality for trout with deformed tail-fins, of which he had fortunately procured specimens, for the possession of which the Museum is now indebted to his generosity, as it has been in so many other instances. This is the River Carron near Larbert in Stirlingshire, though it will presently be seen that the condition of the caudal fin in these specimens, though somewhat resembling that in the Islay and Kirkcudbrightshire fish, is nevertheless not precisely the same.

Mr. Harvie-Brown having greatly interested himself in these peculiarly malformed trout, for which the term “Docked-tailed,” is altogether more appropriate than “Tailless,” has been at very great trouble not only to obtain specimens of the fish themselves, but also to procure analyses of some of the waters in which they existed, in order to put to test the validity of a wide-spread notion that the quality of the water may have something to do with the causation of the malformation in question. And in inviting me to return to the subject once more, Mr. Harvie-Brown has not only presented to the Museum all the specimens of deformed trout in his possession, but has also placed at my disposal a quantity of correspondence and other documents relating to the matter. The following is a description of the specimens—

i. Trout from Loch-na-Maorachan.

The notion is widely spread that all the trout which occurred in Loch-na-Maorachan, for I understand they have now altogether disappeared from the lake, were docked-tailed, but this is not the case, however abundant the malformed examples may have been. I have now two specimens from this locality before me, which have been given to the Museum by Mr. Harvie-Brown, in both of which the caudal fin is perfectly normal. The larger of these measures sixteen inches in length, and in general appearance resembles the so-called *Salmo ferax*. All its fins are exceedingly well developed and normal in their structure; the ray-formula is,—*D.* 14, *A.* 12, *P.* 13, *V.* 9. The smaller specimen, represented in Plate III, Fig. 1, reduced to one-half, measures twelve inches in length, and in the development and structure of its fins presents nothing in the least abnormal, save that their rays are rather fewer than usual, and those at the anterior margin of the left pectoral show a peculiar twist, suggestive of some injury sustained at an earlier period of the life of the fish. The fin-ray formula is here—*D.* 12, *A.* 10, *P.* 11, *V.* 7.

In Plate III, Fig. 2, is represented, reduced to three-fifths, a typical specimen of the Docked-tailed Trout from Loch-na-Maorachan, the same individual of which in 1872 I gave a small outline figure. The specimen is now in the Museum of Science and Art.

The length of this specimen is ten inches. All the fins look rather small, but the most striking feature is the conformation of the caudal, which is very short, rounded off above and below, and with the hinder border thick and stiff. In this specimen there is also a slight angular projection or blunt point rather below the middle of the posterior margin, as in the acuminate form figured by Mr. Thomson. In Plate V, Fig. 3, a dissection of the left side of the tail is shown, slightly enlarged, which renders the real nature of the abnormal condition perfectly clear. The tail fin here is seen to be composed in all of 42 rays, of which 13 above and 11 below are as usual short, and except the hinder two in the upper, and the hinder one in the lower series destitute of transverse articulations. One of them, near the middle of the fin, is evidently composed of two ordinary rays fused together at their proximal ends. The 18 long middle rays, forming the mass of the caudal expansion, proceed in the usual straight and diverging manner to near the hinder border of the fin, when the extremities of the rays above and below become suddenly bent downwards and upwards respectively, thus converging towards the angular projection of the posterior margin already noticed. Nor do these rays end in the fine and slenderly dichotomising manner characteristic of the normal fin, but their bent and somewhat contorted extremities are thick and coarse, and their transverse articulations are much reduced in number. In some cases one of the branches resulting from the

primary bifurcation of the normal portion of the ray stops altogether short where the stunting of the fin commences; in other cases the two branches unite once more at their abnormal extremities, and still more remarkable is the fact that at three different portions of the margin of the fin the extremities of several rays are actually seen to become fused together into one piece.

The *anal* fin in this specimen is also seen to be rather stunted in its dimensions, and, instead of presenting the normal somewhat triangular figure, is rather rounded acuminate in shape. It is composed of 13 rays as shown in Fig. 4, of which the third to the ninth inclusive, counting from the front, are abnormal. The apex of the fin, directed downwards and backwards, is supported by the extremity of the eighth ray, towards which the ends of the third, fourth, fifth, sixth, and seventh rays converge backwards, and that of the anterior division of the ninth converges forward. The extremities of these rays are thick and coarse, and those of the fifth and sixth are fused together.

The *pectoral* of the right side is small for the size of the fish, measuring only $1\frac{1}{4}$ inch in length, and being contained $2\frac{1}{2}$ times in the distance between its origin and that of the ventral of the same side, and $1\frac{1}{3}$ time in that between the posterior margin of the orbit and the angle of the gill-cover. It is acuminate in form, and contains only 13 rays, 14 being the usual number in normal trout. The second ray is here the longest; the third has a coarse extremity, in which the branches originating from its primary bifurcation again unite; the fourth and fifth rays have also abnormal extremities, which bend in towards each other and nearly fuse. After the sixth ray, which is also slightly affected, the rest are normal in structure and aspect. The pectoral of the left side is also very similarly affected, there being a strange convergence towards one point of the abnormal extremities of the second, third, and fourth rays.

The *ventral* fins were in this specimen normal as regards the nature of the rays, but showed a very remarkable want of symmetry as to size. That of the right side was perfectly normal in size and development, measuring $1\frac{1}{6}$ inch in length, and containing the usual number of 9 rays. But the left measured only one inch in length, and in it only 5 rays could be counted.

The *dorsal* fin presented nothing unusual in its appearance, and contained the very common number of 13 rays.

In Plate V., Fig. 2, is represented the caudal extremity of another and smaller specimen from Loch-na-Maorachan, in which, as will be seen, the maldevelopment of the extremities of the fin-rays has not gone to so great an extent. In all the trout from Loch-na-Maorachan with malformed tails which I have seen, the condition of this fin is essentially the same. The rays are abnormally shortened, are coarse at their terminations and deficient as to

amount of dichotomisation: besides which they show also a tendency to coalesce at their terminations, then by the convergence downwards of the upper long rays, and upwards of the lower ones, the fin comes to present a rounded instead of the usual broad fanshaped form. I have examined one species in which all the fins but the caudal are normal as regards the development of the rays, but in others, as in the specimen described above, the pectoral and anal fins are also more or less affected in the same way. Nevertheless in no case have I seen any such affection of the rays in either the dorsal or the ventral fins, though the latter indeed sometimes appear smaller than usual.

ii. Trout from Loch Enoch.

The three specimens from this lake which I have examined resemble each other very closely in general appearance. They are small, measuring respectively $5\frac{3}{8}$, 6 , $6\frac{1}{6}$ inches; they are dark-coloured and closely spotted; the head is rather large in proportion to the body. In Plate V, Fig. 1, is represented one of the original specimens given to the Museum by Mr. Harvie-Brown in 1881. Here the caudal fin presents an abnormal condition of exactly the same nature as in the Loch-na-Maorachan specimens,—only the stunting of the development of the fin seems to be carried to a still greater extent. Of the other fins the anal is distinctly stunted in development and abnormal in its shape, being low and rounded instead of triangular-acuminate; the pectorals and ventral are rather small, the dorsal is normal.

In one specimen, not figured, the malformed caudal has assumed a slightly oblique unsymmetrical contour, while the anal has become most remarkably stunted in its development. None of the other fins save the dorsal are normal in their development, and the principal rays of the right pectoral are coarse, stiff, and slightly contorted.

iii. Trout from the River Carron.

Two specimens of Trout with malformed tail fins from the River Carron near Larbert have been given by Mr. Harvie-Brown to the Museum of Science and Art, and are now before me.

The first (Plate IV. Fig. 1) measures 11 inches in length, and resembles an ordinary river trout in everything save the condition of the caudal fin, and to a small extent also of the anal. The tail fin is not broadly expanded, nor can it be expanded by pulling it with the fingers; its upper and lower margins are nearly parallel, the greatest depth of the fin being $1\frac{1}{10}$ inch. The posterior margin is truncated, and slightly emarginate, so that the posterior inferior angle projects a little further back than the posterior superior. The rays which should form the upper and lower angles of the fin are abnormally short, and, along with the rays forming the middle of its expanse,

show a peculiar subparallel wavy contortion for a good part of their length. Nevertheless as usual they dichotomise twice, the dichotomisations being fine and closely jointed, and the posterior margin of the fin thin and delicate, and in those points the condition of the fin essentially differs from that in the Docked Trout already described. The anterior rays of the anal are not quite so long as is usually the case.

The second specimen (Plate IV. Fig. 2) is 12 inches in length, and has a strikingly large head, the length of which from the point of the snout to the posterior angle of the opercular flap is contained only about $3\frac{3}{4}$ in the total. The caudal fin is oval, stiff, not expansive; the rays show a peculiar unparallel wavy contortion as in the last specimen, but as the upper rays converge downwards and the lower ones upwards a rounded contour is given resembling superficially that of the caudal fin of the docked fish from Loch-na-Maorachan and Loch Enoch. But the condition here again differs by the fact that the rays are finely dichotomised, while the posterior margin of the fin, though reduced to being only half an inch in extent, remains thin and delicate.

It is only necessary to compare the figures on Plates IV. and V. to perceive the difference, and to observe that the rays of the caudal fins of the Carron specimens have a peculiar "frizzled up" appearance not present in the others.

Nevertheless it is interesting to find that in this malformed trout (Fig. 2) from the Carron, the anal and pectoral fins are affected by a condition resembling that in the Islay fish, while again the ventrals and dorsal remain unaffected. In the anal the anterior rays are stunted in growth, and deficient in dichotomisation, so that an appearance is produced as if a large piece had been cut off from the anterior part of the fin.

Summary of Facts.

1. Actual specimens are preserved, figured, and described, of the Docked-tailed condition in trout (*Salmo fario*, L.) from Loch-na-Maorachan in Islay, Loch Enoch in Kirkcudbrightshire, and the River Carron in Stirlingshire.

2. There is credible testimony as to trout showing the same or a similar malformation having occurred in the Gonar Burn, Lanarkshire, near Wanlockhead, and in the Water of Leith,¹ but no specimens have been preserved or described.

¹ The following passage occurs in Stoddart's "Art of Angling" 1836, p. 75.— "On the Water of Leith we saw a friend capture three successively out of one stream during spring, all of which wanted the tail: this defect was probably occasioned in winter, the water from which they were taken happening to be extremely shallow, and the frosts shortly before somewhat severe." It is now of course hardly possible to ascertain whether the defect in these fish was, or was not, of a nature similar to the stunting of the fin-rays characteristic of the Docked Trout of Islay.

3. The Docked-tailed condition consists in a malformation of the caudal fin-rays. The condition of these rays is not quite the same in the Carron specimens as in those from Islay and Kirkcudbrightshire, inasmuch as in the latter the minute dichotomisation of the fin-rays is destroyed, whereas in the former it largely persists.

4. The caudal is not the only fin liable to be affected by this condition. It is generally shared in by the anal fin, frequently also by the pectorals, more rarely by the ventrals.

5. The dorsal fin is normal in every specimen I have seen.

Theories as to Causation.

The theories which have been hazarded regarding the cause of the docked-tailed condition may be enumerated as follows:—

1. That it may be caused by impurities contained in the water in which the fish live.

2. That it may be the result of mechanical injury; either by the fish nibbling each other's tails, or by friction against rocks or stones.

As regards the first of these supposed causes, the late Mr. F. Day in his "Fishes of Great Britain and Ireland" (vol. ii. p. 102), observes that the "tailless" condition "in some streams has been traced to be due to the action of deleterious matter in the water (see 'Angler's Note Book,' 1880, p. 66)." Further, quoting from an unpublished note by Mr. Harvie-Brown, he goes on to say that this gentleman "observed about 1876, in the River Carron, that a contraction of the rays of the tail fins of the trout commenced, due it was universally believed to the action of deleterious matter in the water, through the agency of paper mills." I see from Mr. Harvie-Brown's notes, to which he has so kindly given me access, that he was also at one time inclined at least to suspect that the docked condition of the Gonar Burn trout was due to the stream having been poisoned by washings from lead mines. As to the pollution of the River Carron below Denny, there is unfortunately no room for doubt, though, unless corroborated by numerous other similar instances, it does not follow that this is the cause of the malformation of the trout-tails. Accordingly, with a view to testing the Gonar Burn case, Mr. Harvie-Brown had an analysis of the water made by Mr. J. Falconer King, Edinburgh City Analyst, the results of which, expressed in grains per imperial gallon, are as follow:—

Carbonate of Lime	2.06	Lead, etc.	trace
Carbonate of Magnesia	0.55	Arsenic	none
Sulphate of Lime	0.68	Zinc	none
Sulphate of Magnesia	1.17	Phosphoric Acid	trace
Sulphate of Soda	0.17	Silica	0.80
Chloride of Sodium	0.92	Loss by Ignition	0.32
Nitrate of Soda	trace	Saline Ammonia	trace
Nitrites	none	Albumenoid Ammonia	0.0016
Oxide of Iron	none		

Commenting upon this analysis, Mr. Falconer King says in a letter addressed to Mr. Harvie-Brown, and dated 23d June 1891,—

“I am perhaps not very competent to speak of the effect of lead on fish, but I am inclined to think that the very small amount in the sample sent to me could have very little influence one way or another. The quantity of impurity present was so little that it is difficult to say whether it existed originally in the water in solution or suspension.”

Even if we supposed that the “trace” of lead in the water of the Gonar Burn were sufficient to affect the fish injuriously, corroboration would have to be forthcoming before we could accept the theory that it was the cause of this special malformation of the fin-rays. What then of the waters of the two lakes, Loch-na-Maorachan and Loch Enoch, from which the most typical examples of Docked-tailed Trout have been taken?

Mr. Harvie-Brown having in 1888 sent a small quantity of water from Loch-na-Maorachan to Mr. Falconer King for analysis, the last mentioned gentleman reported as follows in a letter dated 15th November of that year:—

“I have examined the sample of water you sent me so far as the quantity of material at my disposal would allow. As the result I have to inform you that the water is chiefly remarkable for its purity. I have not been able to detect anything which by its presence would so far as I know affect fish in the way you describe. A possible explanation, however, may be that as the water is so very destitute of mineral matter (lime and other substances) containing only about one part in 60,000 parts of water, the fish are suffering from something akin to rickets.”

A larger quantity of water having been subsequently forwarded to Mr. King, the following is his detailed analysis, the results being expressed in grains per imperial gallon:—

Carbonate of Lime . . .	traces	Chloride of Magnesium . . .	0.130
Carbonate of Magnesia . . .	0.045	Chloride of Sodium . . .	2.608
Sulphate of Lime . . .	0.080	Silica	0.060
Sulphate of Magnesia . . .	0.478	Loss by Ignition . . .	0.320

Now as to Loch Enoch. Mr. Harvie-Brown having procured a sufficient supply of the water of this lake and entrusted it to Mr. Falconer King for analysis, it was found to contain per imperial gallon the following substances expressed in grains:—

Carbonate of Lime . . .	0.04	Nitrate of Soda . . .	traces
Carbonate of Magnesia . . .	0.19	Nitrites	none
Sulphate of Lime . . .	0.08	Phosphoric Acid . . .	trace
Sulphate of Magnesia . . .	0.15	Iron oxide, etc. . . .	0.52
Sulphate of Soda . . .	0.08	Loss by Ignition . . .	0.54
Chloride of Sodium . . .	1.01		

I extract the following passage from a letter from Mr. King to Mr. Harvie-Brown commenting on this analysis, and dated 29th August 1890 :—

“The results you will notice come out very much as they did before, showing the water to be one of great purity. It hardly contains anything except a very small quantity of common salt.

There is a little Iron Oxide present, but this I am afraid has arisen from the tin vessels in which unfortunately the sample was sent.”

Again, three days later, Mr. Falconer King writes to Mr. Harvie-Brown :—

“As to the comparison between this Galloway water and the Islay one, the great point seems to be their similarity as regards freedom from lime and magnesia compounds. They both contain a little common salt, but they are both exceptionally free from all other salts. A man when he eats takes lime from his food, but perhaps a fish is more dependent on lime in the water than in its food.”

Here then we have the impure water theory refuted at once by the fact that the waters best known for the production of Docked-tailed Trout are, on the contrary, of most remarkable purity. And we have the new theory suggested that it is this very purity which is the cause of the malformation.

But in the first place, if *impurity* of the water will not account for the presence of Docked-tailed Trout in Loch-na-Maorachan and Loch Enoch, neither will *exceptional purity* account for the occurrence of a similar malformation in the River Carron and in Gonar Burn. This is the first hitch in the theory.

In the second place, I rather think that this paucity of lime will be found more or less characteristic of all our lakes whose bed is formed by ancient crystalline rock such as the quartzite and granite in which Loch-na-Maorachan and Loch Enoch are respectively embasined. The docked condition ought therefore to be characteristic of the trout in very many more lakes in Scotland than these two solitary tarns, but as yet we know of no others in which they occur.

In the third place, these fish do not suffer from rickets or any disease akin to rickets so far as I can see. The extremities of the rays of certain fins are *malformed*, but the skeleton is as well ossified as in any other trout which I have ever dissected. Lime of course enters into the system of the fish in some way, and what can be more natural than to suppose that it exists in their food, just as it exists in our own.

I venture therefore to submit that there is as yet no evidence that the chemical composition of the water has anything to do with the occurrence of the Docked-tailed condition in trout.

We now turn to theories of mechanical injury. It has been suggested that this abnormal condition may have been caused by the fish nibbling each other's tails, and I must own that I have once, in the small aquarium attached to the Museum, seen a trout, which was subjected to some persecution by his neighbours, succeed in getting his caudal fin nibbled into a tolerably good imitation of that of a Loch-na-Maorachan trout. But it is pretty certain that simple nibbling would not produce the appearance of the extremities of the rays as depicted in Pl. V. Fig. 3, and moreover, when we consider that this abnormal condition is liable to attack every fin, even to the pectorals, with the one strange exception of the dorsal, the "nibbling" theory must fall utterly to the ground. A pugnacious trout would much more easily get at his neighbour's dorsal than his pectoral fin!

Again, it has been suggested that mechanical friction by contact with or rubbing against hard rocks or stones in the bottom of the lake may have something to do with the production of the Docked-tailed condition. It is pointed out that Loch-na-Maorachan is shallow with a rocky bottom of hard quartzite; while Loch Enoch, though very deep, has a floor or at least shore of fine hard granite sand; and there is a certain attractiveness in the idea that the delicate extremities of the fins may be injured or worn by coming roughly in contact with such hard rocks, stones, or sand. It is indeed not inconceivable that such friction might set up an inflammatory process, which might result in the arrestment of the normal development of the fin-rays and the distortion of their extremities. It is remarkable that besides the caudal, the affected fins are those on the *under* surface of the body, the dorsal remaining normal. But the upper lobe or half of the caudal fin is affected in the same manner as the lower, so that Mr. Adam Skirving remarks in a letter to Mr. Harvie-Brown,—“Had it been only the lower part of the tail that was defective, I should have accused the fine white sand of wearing it.” Moreover, one would suppose that the ventral fins were more exposed to such friction than either the anal or the pectorals, and yet they are comparatively rarely affected by this condition.

It has also been suggested by some of my friends that injury to the fins originally inflicted in the way referred to above might become hereditary, and this, if true, would be a most startling refutation of the Weismannian doctrine of the non-transmissibility of acquired characters! But I fear it has still to be proved, and that the mystery of the phenomenon which has formed the subject of this paper has not yet been penetrated.

One word in conclusion. Not having seen the Gonar Burn specimens, I do not know the special nature of the affection of their caudal fins. The Carron specimens are not quite the same as those from Islay and Galloway, and in them the malformation may be

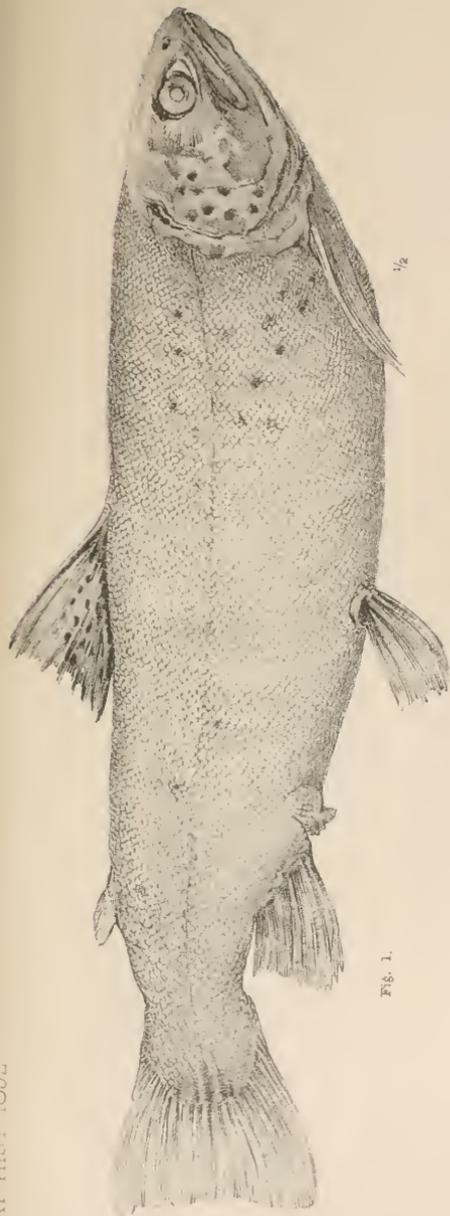


FIG. 1.

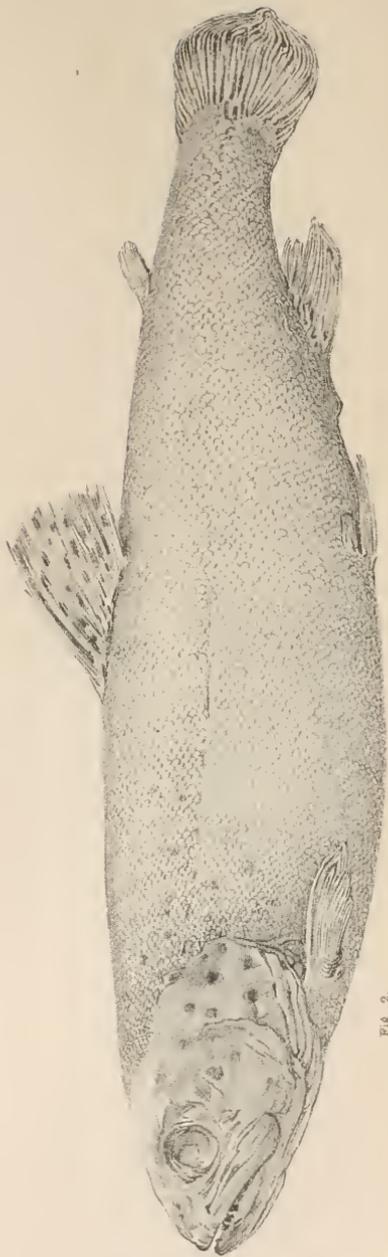


FIG. 2.

SALMO FARIO, LINNÆUS, FROM LOCH-NA-MAORACHAN ISLAY

N. A. H. CLARK DEL.

W. & A. G. BIRCH, ED.

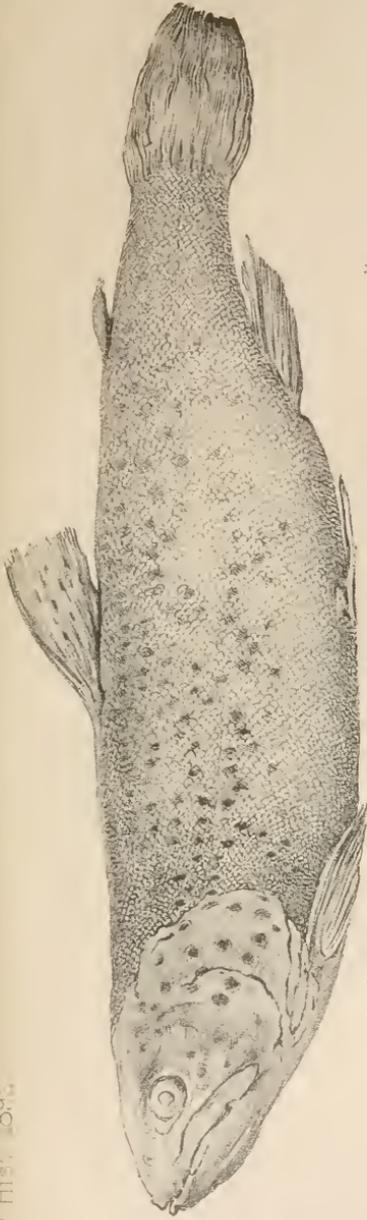


FIG. 1.

1/2

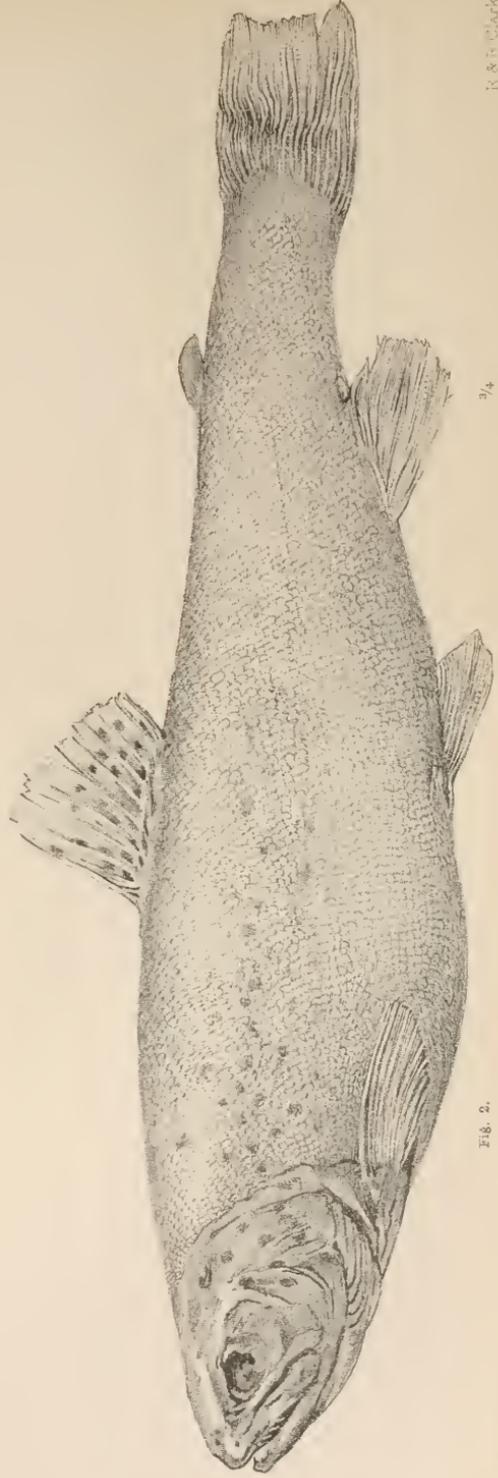


FIG. 2.

3/4

R & B Clark imp

SALMO FARO, LINNÆUS, FROM RIVER CARRON, STIRLINGSHIRE.

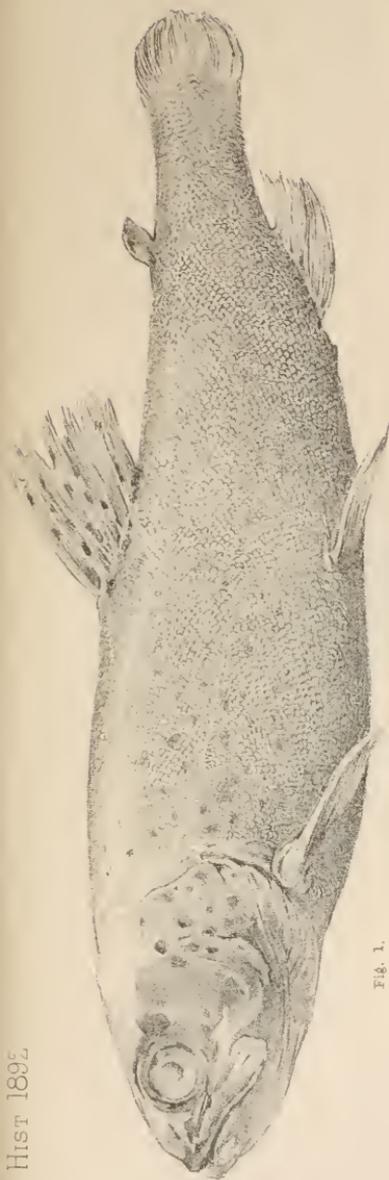


FIG. 1.



FIG. 2.



FIG. 4.

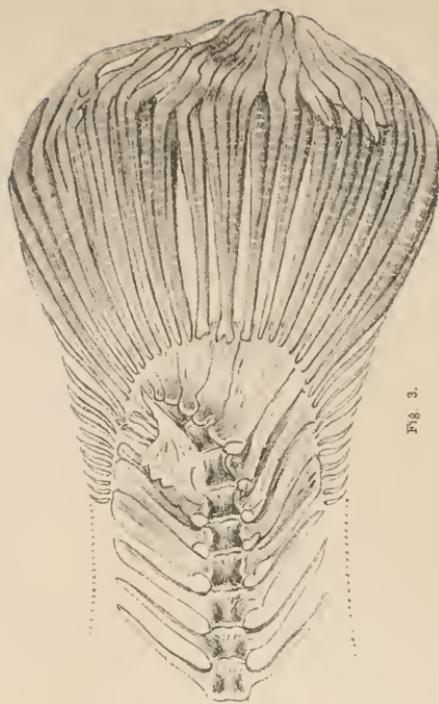


FIG. 3.

sporadic or accidental. But in the case of the trout now living in Loch Enoch, and those which formerly lived in Loch-na-Maorachan, the affection seems of a truly endemic nature, and is pretty sure to be in some way connected with the environment, though not traceable either to the softness of the water or the roughness of the bottom.

Explanation of the Plates.

PLATE III.

- Fig. 1. — Normally developed trout from Loch-na-Maorachan. Reduced to $\frac{1}{2}$. In this and in the other specimens the colour is faded by light and preservation in spirit.
- Fig. 2. — Docked-tailed example from the same lake. Reduced to $\frac{3}{5}$.

PLATE IV.

- Fig. 1. — Trout from River Carron with distorted caudal fin. Reduced to $\frac{1}{2}$.
- Fig. 2. — Another specimen with the fins still more malformed. Reduced to $\frac{3}{4}$.

PLATE V.

- Fig. 1. — Docked-tailed trout from Loch Enoch. Natural size.
- Fig. 2. — Outline of posterior extremity of body in a small specimen from Loch-na-Maorachan.
- Fig. 3. — Skeleton of caudal extremity of the specimen represented in Plate III. Fig 2. Magnified.
- Fig. 4. — Structure of anal fin in the same specimen.

NOTES ON THE FRESHWATER FISHES
OF THE SOLWAY AREA.

By Sir HERBERT MAXWELL, Bart., F.L.S.

PERMIT me to add the following notes to Mr. Service's interesting paper in your first number.

Cyprinus carpio.—THE CARP.—Inhabits a small piece of water called Laggan Loch, in Glasserton Parish, Wigtonshire, where it grows to a large size. It was introduced to this lonely lake, far from any house, by Admiral Stewart, early in the century.

Leuciseus rutilus.—THE ROACH.—Is abundant in the White Loch of Inch, near Stranraer.

Leuciseus phoxinus.—THE MINNOW.—Is not found in any streams in Galloway, west of the Cree, except where it has recently been introduced in Glasserton parish.

Salmo ferox.—Mr. Service follows other ichthyologists in distinguishing *Salmo ferox* as a distinct species. Is there any true specific difference between the Great Lake Trout and large *Salmo fario*? The largest trout I can remember being killed in Galloway was one of 13 lbs. in Loch Dee, about the year 1870. There is a plaster cast of it at Galloway House. In 1890, I killed five trout in Loch Arkaig in the course of one afternoon. They weighed 17½ lbs., 8 lbs., 5 lbs., 2½ lbs., and 2 lbs. As they were all taken by trolling they were all called *ferox*; but I doubt not had the smaller ones been taken with the fly, they would have been regarded as ordinary loch trout.

[Dr. Günther ("Study of Fishes," 1880, p. 633) remarks that a "wide spread species, however, like *S. fario*, when it inhabits a small mountain pool with scanty food, may never exceed a weight of eight ounces, whilst in a large lake or river, where it finds an abundance and variety of food, it attains to a weight of fourteen or sixteen pounds. Such large River-trout are frequently named and described as Salmon-trout, Bull-trout, etc." Dr. Day ("British and Irish Salmonidæ," 1887, p. 193) considers *Salmo ferox* simply a large, probably an old, common trout (*S. fario*), and treats it as a variety of that species.—EDS.]

ADDITIONS TO THE AUTHENTICATED COMITAL CENSUS OF THE LAND AND FRESHWATER MOLLUSCA OF SCOTLAND.

WM. DENISON ROEBUCK, F.L.S.

SINCE the publication of my "Census of Scottish Land and Freshwater Mollusca" in 1891 by the Royal Physical Society of Edinburgh, and of a further paper by myself in the *Scottish Naturalist* for July 1891, I have received specimens from various friends, to whom, and particularly to my indefatigable helper Mr. William Evans, F.R.S.E., of Edinburgh, the Rev. George Gordon, LL.D., and Mr. Robert Service, I am much indebted for the material here incorporated.

I propose to continue my notes from time to time in *The Annals of Scottish Natural History*, regularly if possible, at all events as often as the kindness of Scottish naturalists will keep the recorder and referees of the Conchological Society supplied with material for authentication. It is to be understood that these papers will not deal (unless in very exceptional cases) with any records except such as have been authenticated by the submission of the actual specimens to the society's referees.

The present instalment is mainly devoted to slugs. I have some testaceous species to report in a future paper, but at present their examination is not completed.

1. ***Limax flavus* in Kirkcudbrightshire.**—On the 20th July of 1891 I received from Mr. Robert Service a nearly adult example of *Limax flavus*, which is an additional species for the county and brings up its authenticated total to 54. He also sent a small example of *Limax maximus* var. *ferussaci*. Both were from a damp cellar in his house at Maxwelltown, where the two species occur very commonly. *L. flavus* is a species which (although it occurs abundantly enough in cellars) is very seldom sent me, and as yet I have seen it from but five Scottish counties, viz., Kirkcudbright, Renfrew, Edinburgh, Fife, and Elgin.

2. ***Limax cinereo-niger*, etc. in Elginshire.**—I am indebted to Mr. William Evans for the sight of a couple of examples of this rarity from Cromdale, Elginshire, on the 25th August of this year. One was about three-fourths grown and with the trifasciated footsole which is one of the distinguishing characters of the species. The other was a small one, and had not the coloured side-bands of the keel, but it was nevertheless unmistakably of the same species. From the same locality Mr. Evans sent me *Limax arborum*, several of the typical form and pale in colour, an adult *Arion subfuscus*, and *A. ater*, also adult, all of these being additions to the authenticated county list, which now numbers 52 species. A fine adult *A. ater* from near the old heronry on the Findhorn, was also sent me in verification of its existence in the county by the Rev. Dr. Gordon, on the 7th September. Mr. Evans's Cromdale gatherings also included an adult

Arion minimus, but this has already been recorded in my census.

3. **Banffshire Slugs.**—I have to report four additional species of slugs for Banffshire, making its total list amount to 23, a small figure as yet. These are *Arion ater*, represented by a couple of immature examples; *A. subfuscus*, several adult, some deeply and richly coloured; *A. minimus*, in great abundance and of all ages to adult; and several *Limax arborum*, adult and young. Specimens of the already recorded *Limax agrestis* and *Arion bourguignati* accompanied the newly recorded species. All these were found by Mr. Wm. Evans on the banks of the Avon, above Ballindalloch.

On the 11th September Mr. Evans sent me a consignment of slugs from Tomintoul, a very out-of-the-way place, the slugs of which it is well worth while to record. They were a fine adult and a young specimen of *Limax maximus*, var. *fasciata*, a half-grown *Arion ater*, several fine *A. hortensis*, and several not quite mature examples of *A. bourguignati*.

On the 17th of July 1891 I had the pleasure of receiving from the Rev. George Gordon an example of *Limax cinereo-niger*, about three-quarters grown, with the keel-line dull ochre and a pale stripe down each side, together with a small and very dark *L. arborum*, var. *alpestris*, which he had found under the decayed and loosened bark of an old fallen birch-tree, some hundred yards south of the Duke of Richmond and Gordon's shooting lodge at Glenfiddich, Banffshire, and about 800 feet above sea-level. This fine species, which is in these islands a particularly northern and western form, is an important addition to the Banffshire list.

4. **The Tree-slug in the Outer Hebrides.**—It is to my old friend, Mr. W. Eagle Clarke, F.L.S., that I am indebted for the next record that I have to make, viz. that of a very dark example of *Limax arborum* from the Shiant Islands, an outlying group of the Outer Hebrides, which brings the Hebridean authentications up to 16 species.

5. **Faunal Status of *Limnæa stagnalis* in Scotland.**—Since the publication of my paper on the introduction of this species into Lanarkshire, I have had placed in my hands two letters bearing on the topic addressed to Mr. Clarke. The

first is from Mr. James Bennie, to whose vigilance it is that we were indebted for showing that the Possil Marsh specimens were introduced and thereby setting my census right on the point. In justice to our Glasgow friends, it is but right to say that in their West of Scotland list, which I had occasion to consult since my paper was published, it is distinctly stated that the species was "introduced." Mr. Bennie mentions that having found an old letter of date 4th January 1863, for which he had been in search, he can give the date of introduction as New Year's day of 1863, and that the specimens, some two hundred in number, were sent from Liverpool for the purpose, and were scattered throughout the Possil Marsh.

The other letter is from Mr. W. Grant Guthrie of Hawick with reference to the occurrence of *L. stagnalis* in that district. He does not think there are any grounds for supposing it to have been introduced there, as he took three specimens of it in one of the neighbouring lochs on the 15th August this year, quite a different locality from where he had taken it before.

SOME ADDITIONS TO SCOTTISH COLEOPTERA, WITH NOTES ON SPECIES NEW OR RARE IN THE "SOLWAY" DISTRICT.

By W. LENNON; and W. D. R. DOUGLAS, M.A., F.L.S., F.E.S.

THE following notes on Coleoptera taken in the "Solway" district in Scotland, may not, we think, be without some interest appearing after the completion of Canon Fowler's most recent work on British Coleoptera. We have included those species taken by us, which seemed most worth recording, either because they are new to Scotland or new to "Solway" (though some are common species), or because, though not new, they are generally rare in Scotland. We have taken Dr. Sharp's Catalogue, "The Coleoptera of Scotland," as our basis, since Canon Fowler has apparently made use of it for most of his Scottish localities. A good deal of Dr. Sharp's collecting in Scotland was done in this "District" some time

ago, about Thornhill and Dumfries, and the Rev. W. Little, of Kirkpatrick Juxta, also worked in days of yore very carefully and energetically within the limits of the "District," about Moffat; so that during a period of very many years it has been comparatively well explored.

It only remains to add that the species to which the initials (W. L.) are appended are chiefly from the immediate neighbourhood of Dumfries, collected in one or two well wooded spots, or by the banks of the River Nith: and that those with initials (W. D. R. D) are, with very few exceptions, from a limited area (which includes some high moorland, low arable and rough ground, a considerable amount of wood, and a seashore), lying on the Solway Firth: the two collecting grounds being some twenty miles apart. We subjoin three lists:—

- A. Containing those which seem new to Scotland.
- B. Containing those which are additions to the "Solway" list.
- C. Containing those which, though not new, are rare, and yet turn up in fresh localities from time to time.

List A. Species New to Scotland.

- Amara similata*, *Gyll.*—Rare. Orchardton. W. D. R. D.
- Hydroporus granularis*, *L.*—Not uncommon. Maxwelltown Loch, Dumfries. W. L.
- Berosus spinosus*, *Stev.*—Occasionally taken in small numbers in brackish water on Caerlaverock salt-marshes. W. L.
- Helephorus tuberculatus*, *Gyll.*—Very rare. One specimen in flood refuse from the Nith, near Kelton. W. L.
- Falagria thoracica*, *Curt.*—Rare. Orchardton. W. D. R. D.
- Quedius tristis*, *Crav.*—This species, considered doubtfully Scottish by Dr. Sharp, is common at Orchardton. W. D. R. D.
- Oxyporus rufus*, *L.*—Very rare. One specimen in a fungus close to the house. Orchardton. W. D. R. D.
- Cereus rufilabris*, *Latr.*—Rare. Near Orchardton. W. D. R. D.
- Meligethes difficilis*, *Heer.*—On bracken, at Burnfoot, near Langholm. W. D. R. D.
- Rhizophagus*,⁷ *eribatus*, *Gyll.*—Rather common (on fungi, or in carrion) in one wood close to Orchardton. Once found (as

recorded in "Entom. Month. Mag." vol. xxvi.) in abundance, on a dead hedgehog. W. D. R. D.

Geotrupes Typhœus, *L.*—One ♂ in May 1890, near Orchardton. Not strictly new to the Scottish list (see "Murray's Catalogue"), but omitted in Dr. Sharp's list. W. D. R. D.

Hoplia philanthus, *Füssl.*—Very rare. One specimen by sweeping in Dalskairth Wood near Dumfries. W. L.

Elater elongatulus, *F.*—Very rare. A single specimen beaten off an old birch tree in Dalskairth Wood. W. L.

Telephorus oralis, *Germ.*—Common in one or two places on the banks of a stream, where it falls into the Solway, but very local. Orchardton. W. D. R. D.

Malthinus fasciatus, *Ol.*—Not common. Woods about Orchardton. W. D. R. D.

Timarcha tenebricosa, *F. (lævigata, Duft).*—Already recorded in "Scottish Naturalist" for October 1891, and indeed not without a previous—but precarious—position on the Scottish list; but perhaps worth prominence again now that its place is assured. Potterland Hill. W. D. R. D. and W. L.

Longitarsus anechusæ, *Payk.*—Orchardton. W. D. R. D.

Phyllotreta nodicornis, *Marsh.*—Apparently rare. One ♂ specimen by sweeping near the shore. Orchardton. W. D. R. D.

Heledona agaricola, *F.*—Four specimens beaten off old oaks. Carnsalloch Wood; Dumfries. W. L.

Apion Bohemanni, *Thoms. (ononidis, Gyll.)*—Once, by sweeping near Dalskairth. W. L.

Apion simile, *Kirby.*—Rare; on birch. Orchardton. W. D. R. D.

Trachyphlœus alternans, *Gyll.*—Very rare. One specimen in flood refuse near Kelton; Dumfries. W. L.

Hypera pollux, *F.*—Rare; taken by sweeping. Orchardton, 1888. W. D. R. D.

Hypera alternans, *Steph. (Julini, Sahl.)*—Very rare; by sweeping. Orchardton, June 1890. W. D. R. D.

Cænopsis Waltoni, *Schön.*—Very rare. One specimen in flood refuse near Kelton. Dumfries. W. L.

Eirirrhinus (Thryogenes) Nereis, *Payk.*—Maxwelltown Loch. W. L.

Bagous frit, *Herbst.*—Rare, and very local. By sweeping wet places, on the west side of Maxwelltown Loch. W. L.

Anthonomus pomorum, *L.*—Not infrequent on wild crab-apple trees. Orchardton and Almorness. W. D. R. D.

- Ceuthorynchus setosus*, *Boh.*—Rare. Orchardton, August 1891. W. D. R. D.
- Rhinoneus perpendicularis*, *Reich* (subfasciatus, *Gyll.*)—Not common. Orchardton, 1891. W. D. R. D.
- Balaninus pyrroceras*, *Marsh.*—Rare. Orchardton, 1891. W. D. R. D.
- Xylocleptes bispinus*, *Duft.*—Very rare. A few specimens at Carnsalloch. W. L.
- Tomicus typographus*, *L.*—Very rare. By beating old trees at Carnsalloch. W. L.

List B. Additions to the Solway List.

- Carabus glabratus*, *Payk.*—Summit of Cairnsmore-of-Fleet. W. L.
On Screel; at a comparatively low altitude. W. D. R. D.
- Blethisa multipunctata*, *L.* Very local. Lochrutton. W. D. R. D.
- Amara curta*, *Dej.*—Rare. Flood refuse. Orchardton. W. D. R. D.
- Amara trivialis*, *Gyll.*—Common. Orchardton. W. D. R. D.
- Amara lunicollis*, *Schiöd.*—Near Dumfries. W. L.
- Haliplus obliquus*, *Er.*—Not common. Glenmill Burn; Dumfries. W. L.
- Haliplus fluviatilis*, *Aubé.*—Very rare. One specimen in a clear running stream above Moffat Well. W. L.
- Hydroporus piectus*, *F.*—Not uncommon in lochs and ponds. W. L. and W. D. R. D.
- Hydroporus Davisii*, *Curt.* Very abundant in all clear streams above Moffat Well; also near Carsethorn. W. L.
- Hydroporus rufifrons*, *Duft.*—Very rare. One specimen in Maxwelltown Loch. W. L.
- Agabus biguttatus*, *Ol.* Common. Orchardton. W. D. R. D.
- Agabus paludosus*, *F.*—Not uncommon in all clear streams near Moffat. W. L.
- Laccobius alutaceus*, *Th.* Orchardton. W. D. R. D.
- Hydrochus angustatus*, *Sturm.*—Very rare. Once by dredging at the head of Maxwelltown Loch. W. L.
- Isehnoglossa prolixa*, *Grav.*—Not common; under bark of old beech trees; near Dumfries. W. L.
- Oxyptoda hæmorrhœa*, *Sahl.*—Occasional, near Dumfries. W. L.
- Myrmedonia collaris*, *Pk.*—Rare. In moss and sphagnum (usually along with ants); occasionally by banks of Glenmill Burn, Dumfries. W. L.

- Conosoma lividum*, *Er.*—Common. Orchardton. W. D. R. D.
- Quedius puncticollis*, *Thoms.*—Not common; in wet moss, Broomrigg Wood, Dumfries, and once near Moffat. W. L.
- Philonthus laminatus*, *Creutz.*—Common. Orchardton. W. D. R. D.
- Lithocharis ochracea*, *Grav.*—Not common; in rubbish heaps. W. L. and W. D. R. D.
- Stenus impressus*, *Germ.*—Not infrequent. Orchardton. W. D. R. D.
- Lathrimæum melanocephalum*, *Marsh*; (*atrocephalum*, *Gyll.*)—Orchardton. W. D. R. D.
- Homalium punctipenne*, *Thoms.*—Orchardton. W. D. R. D.
- Agathidium nigripenne*, *Kug.*—At oozing sap on an old ash. Carnsalloch, Dumfries. W. L.
- Anisotoma cinnamomea*, *Panz.*—Very rare. One specimen in flood refuse, Kelton. W. L.
- Choleva angustata*, *F.*—Not rare. Orchardton. W. D. R. D.
- Olibrus æneus*, *F.*—Rare; in flood refuse. Kelton. W. L.
- Anatis (Halyzia) ocellata*, *L.*—Rare. Potterland Hill. W. D. R. D.
- Hister purpurascens*, *Herbst.*—Rarely in flood refuse. Kelton. W. L.
- Gnathoncus nannatensis*, *Marsh.*—One specimen in a bird's nest near Dumfries. W. L.
- Saprinus maritimus*, *Steph.*—Rare. Whiteport Bay, Almorness. W. D. R. D.
- Micropeplus staphylinoides*, *Marsh.*—Not common. Orchardton. W. D. R. D.
- Micropeplus margaritæ*, *Duv.*—Occasionally; by sweeping near banks of the Nith and Cairn. W. L.
- Soronia punctatissima*, *Ill.*—Rare. Orchardton. W. D. R. D.
- Poecadius ferrugineus*, *F.*—Bred somewhat freely from puff-balls. Orchardton. W. D. R. D.
- Lathridius lardarius*, *Deg.*—Rather common. Dumfries and Orchardton. W. L. and W. D. R. D.
- Corticaria pubescens*, *Gyll.* Not common; near Auchencrieff Loch. W. L.
- Antherophagus nigricornis*, *F.*—Not common; by sweeping along railway banks near Dumfries. W. L.
- Cryptophagus cellaris*, *Scop.*—Not common; in haystack refuse, Dumfries. Common, Orchardton. W. L. W. and D. R. D.
- Byrrhus foveolatus*, *F.*—Not common. Orchardton. W. D. R. D.

- Onthophagus nuchicornis*, *L.*—Extremely local, but not uncommon where found. Craigrow and Parkbrae's, Orchardton. W. D. R. D.
- Aphodius fœtens*, *F.*—Very rare. Moffat. W. L.
- Aphodius constans*, *Duft.*—Rare. Dungarry Hill. W. D. R. D.
- Laeon murinus*, *L.*—Common. Dumfries and Orchardton. W. L. and W. D. R. D.
- Elater nigrinus*, *Payk.*—Very rare. One specimen in Dalskairth Wood. W. D. R. D.
- Corymbites pectinicornis*, *L.*—Rare; in meadows near Moffat. W. L.
- Corymbites holosericeus*, *F.*—Not uncommon; off Scots Fir, Orchardton. W. D. R. D.
- Corymbites æneus*, *L.*—Very rare. One specimen beaten out of a clump of *Silene maritima*, Rascarrel. W. D. R. D.
- Ragonycha elongata*, *Fall.*—Not common. Taken at Moffat by sweeping in meadows; there were no fir-trees near the place where the specimens were taken. W. L.
- Malachius bipustulatus*, *L.*—Very rare; by sweeping long grass along banks of Nith, close to Dumfries. W. L.
- Priobium castaneum*, *F.*—Rare; on old trees. Dumfries and Orchardton. W. L. and W. D. R. D.
- Ernobius mollis*, *L.*—Very rare. Once taken in Carnsalloch Wood, Dumfries. W. L.
- Ernobius nigrinus*, *Sturm.*—Rare; on Scots Fir, Dumfries. W. L.
- Octotemnus glabriculus*, *Gyll.*—Abundant in *boleti*. Orchardton. W. D. R. D.
- Pogonochærus fasciculatus*, *De G.*—Rare. Two specimens beaten from a bundle of dead branches in a wood, near Glencaple. W. L.
- Cryptocephalus bipunctatus*, *L.*; *Var. lineola*, *F.*—Very rare. Three specimens beaten off some clumps of birch and willow. Dalskairth. W. L.
- Longitarsus luridus*, *Scop.*—Not common. A few specimens by sweeping nettles along the Caerlaverock shore. W. L.
- Tenebrio obscurus*, *F.*—One found in a decayed willow stump at New Abbey. W. L.
- Lagria hirta*, *L.*—Extremely local, but abundant in one or two places, among *Iris pseudacorus*, near Orchardton. W. D. R. D.
- Cistela murina*, *L.*—By the Solway shore. Rare. Orchardton. W. D. R. D.

- Rhinosimus viridipennis**, *Steph.*—Rare. Four specimens under bark of a decaying beech-tree, Carnsalloch Wood, Dumfries. W. L.
- Antheicus floralis**, *L.*—Very abundant in heaps of cut grass or garden rubbish. W. L. and W. D. R. D.
- Apion virens**, *Herbst.*—Common. Orchardton. W. D. R. D.
- Apion punctigerum**, *Payk.*—Rare, on *Vicia cracca*. Orchardton. W. D. R. D.
- Apion striatum**, *Kirby.*—Not common, in broom about Dumfries and Orchardton. W. L. and W. D. R. D.
- Pissodes pini**, *L.*—Very rare. In a fir-wood, near Tinwald Downs, Dumfries. W. L.
- Nanophyes lythri**, *F.*—Rare, near Orchardton. W. D. R. D.
- Cionus blattariæ**, *F.*—Very rare. One specimen in flood refuse from the Nith, near Kelton. W. L.
- Acalles roboris**, *Curtis.*—Rare. A few specimens by beating old trees, Carnsalloch Wood. W. L.
- Ceuthorynchus marginatus**, *Payk.*—Rare, by beating in Dalskairth Wood. W. L.
- Ceuthorynchus rugulosus**, *Herbst.*—Rare. Old meadow lands near Dalskairth. W. L.
- Hylastes ater**, *Payk.*—Common. Dumfries and Orchardton. W. L. and W. D. R. D.
- Hylastes cunicularius**, *Er.*—Very rare; beaten off old fir trees, in Carnsalloch Wood, Dumfries. W. L.
- Phlæopthorus rododactylis**, *Marsh.*—One specimen beaten off Scots Fir, near Dumfries. W. L.
- Pityogenes chalcographus**, *L.*—Two specimens beaten off old branches, in Carnsalloch Wood, Dumfries. W. L.

List C. Rare and Local Species.

- Pogonus chalcæus**, *Marsh.*—Near Orchardton Bay. W. D. R. D.
- Lebia chlorocephala**, *Hoff.*—Occasionally near broom, also in flood refuse near Dumfries. W. L.
- Aleochara mœrens**, *Gyll.*—In fungi. Orchardton. W. D. R. D.
- Oxypoda spectabilis**, *Mæk.*—Flood refuse. Orchardton. W. D. R. D.
- Tachyusa atra**, *Grav.*—Orchardton. W. D. R. D.
- Gyrophœna minima**, *Er.*—In some numbers in fungi. Orchardton. W. D. R. D.

- Quedius longicornis*, *Kr.*—Once at Orchardton. Two or three specimens near Dumfries. W. L. and W. D. R. D.
- Quedius auricomus*, *Kiesw.*—In moss near waterfalls. Scree, and by Dumfries. W. L. and W. D. R. D.
- Philonthus fumigatus*, *Er.*—Broomrigg Wood, Dumfries. W. L.
- Philonthus nigrita*, *Nord.*—Orchardton. W. D. R. D.
- Lathrobium multipunctum*, *Grav.*—Orchardton. W. D. R. D.
- Scopæus Erichsoni*, *Kol.*—Flood refuse. Kelton, near Dumfries. W. L.
- Stenus bimaculatus*, *Gyll.*—Orchardton, and Dumfries. W. L. and W. D. R. D.
- Bledius atricapillus*, *Germ.*—Very local; near Dumfries. W. L. and W. D. R. D.
- Deleaster dichrous*, *Grav.*—In a tuft of moss and grass, in a fir wood; near Dumfries. W. L.
- Silpha tristis*, *Ill.*—Moffat, and Orchardton. W. L. and W. D. R. D.
- Lasia globosa*, *Schneid.*—In flood refuse, and by sweeping; near Dumfries and Orchardton. W. L. and W. D. R. D.
- Halyzia 16-guttata*, *L.*—Orchardton, and Dumfries. W. L. and W. D. R. D.
- Hister neglectus*, *Germ.*—In flood refuse. Orchardton. W. D. R. D.
- Omosita depressa*, *L.*—Near Dumfries. W. L.
- Cryptohypnus maritimus*, *Curtis.*—Not uncommon under small stones, on banks of the Ae, Nith, and Cairn. W. L.
- Cryptohypnus sabulicola*, *Boh.*—Very rare; banks of Nith and Cairn (in flood refuse). W. L.
- Telephorus Darwinianus*, *Sharp.*—Among seaweed; near Dumfries, and Orchardton. W. L. and W. D. R. D.
- Telephorus thoracicus*, *Ol.*—Very local. Found on the bog-thistle, *Lythrum*, and other plants; at Maxwelltown Loch. W. L.
- Phlærophilus Edwardsi*, *Steph.*—A small series by beating old oak trees, in Carnsalloch Wood, Dumfries. W. L.
- Cryptocephalus moræi*, *L.*—Near Maxwelltown Station. W. L.
- Chrysomela marginata*, *L.*—In flood refuse; banks of the Nith at Kelton. W. L.
- Phædon concinnus*, *Steph.*—Salt-marshes. Orchardton and Dumfries. W. L. and W. D. R. D.
- Cassida hemisphærica*, *Herbst.*—In flood refuse; near Dumfries, and at Orchardton. W. L. and W. D. R. D.
- Brachytarsus varius*, *F.*—Near Orchardton. W. D. R. D.

- Rhynchitis cupreus*, *L.*—By beating rowan-tree blossom ; also off black-thorn. Orchardton, and Glen Mill and Mabie, Dumfries. W. L. and W. D. R. D.
- Rhynchitis æneovirens*, *Marsh.*—Off oak trees ; at Orchardton. W. D. R. D.
- Rhynchitis minutus*, *Herbst.*—Orchardton. W. D. R. D.
- Polydrusus chrysomela*, *Ol.*—By cutting turf near the Solway, Dumfries : by sweeping along the shore, Orchardton. W. L. and W. D. R. D.
- Erirrhinus æthiops*, *F.*—Four specimens, by sweeping round Maxwelltown Loch. W. L.
- Magdalis carbonaria*, *L.*—On birch. Dalskairth Wood. W. L.
- Trypodendron domesticum*, *L.*—Once in some abundance under the bark of a decayed beech. Orchardton. W. D. R. D.

Supplementary note on species taken in the “Moray”
District, near Huntly, by W. Lennon.

I SHOULD like to add to the above list the following species taken last autumn near Huntly, Aberdeenshire.

- Clinochara (Orchesia) undulata*, *Kr.*—Three specimens, under bark of a decayed beech tree near Huntly. This species is new to Scotland. W. L.
- Blitoochara lucida*, *Grav.*—Three specimens ; amongst moss in a fir wood, near Huntly. W. L.
- Sphærites glabratus*, *F.*—One taken upon a fungus. W. L.
- Hypera suspiciosa*, *Herbst.*—One specimen was found in moss in a fir wood near Huntly. W. L.

W. LENNON, 11 Brooke St., Dumfries.

W. D. R. DOUGLAS, Orchardton, Castle-Douglas.

POTAMOGETON UNDULATUS, WOLFGANG,
IN STIRLINGSHIRE.

By ALFRED FRYER.

THIS little-known species, only recognised as a British plant in the “Journal of Botany” for October 1891, has already been added to the Flora of Scotland by the joint industry of Mr.

R. Kidston and Col. J. S. Stirling, who found this critical plant in the Union Canal near Falkirk. Their attention was first arrested by abnormal forms of *P. perfoliatus*; on further examining these a series of variable forms was found, which they were unable to place under any species described in British Floras. These doubtful forms, although of widely different facies, they grouped together, and with excellent judgment labelled "*P. perfoliatus* \times *crispus*?" :—which, with little doubt, is exactly the parentage of the hybrid named *P. undulatus* by Wolfgang.

The two supposed parents were the only Potamogetons found growing with the hybrid form; except some of the linear-leaved species, which, as Mr. Kidston remarks, "do not affect the plant in question." Messrs. Stirling and Kidston sent all their specimens of the new form to me for examination; and that no available help might be lacking, they kindly added the whole of their Stirlingshire collection of this genus—a very necessary addition for the investigation of a critical Potamogeton.

The *undulatus* forms I found to agree fairly well with my own very extensive series from Mr. E. F. Cooper, collected in Leicestershire, and from Mr. C. R. Billups, collected in Cheshire (described in "Journal of Botany" as *P. undulatus*, Wolfg. v. *Cooperi nihi.*), but presenting a sufficient amount of difference to make a further comparison desirable. With this object I then compared the Stirlingshire plant with Wolfgang's type of *undulatus* in the National Herbarium at the British Museum, and with the series of "*P. perfoliatus* v. *Jacksoni*" (= *P. undulatus* var.) in the same collection. Specimen-matching, always difficult in the genus Potamogeton, and especially so in the case of a form which simultaneously produces states resembling *crispus*, *perfoliatus*, and *nitens*, is not altogether satisfactory; and is apt to be very misleading. In this instance I found one specimen of the Yorkshire *P. Jacksoni* to exactly agree with one of the Stirlingshire plant; but the earlier and the barren states of the two plants did not well correspond. Ultimately I thought it better to refer the new form to the *type* rather than to either of the already known British varieties. This decision was afterwards confirmed by further comparison with a specimen of *P. undulatus*

gathered by Wolfgang himself, and given to me by my generous friend Dr. Tiselius for the furtherance of this investigation. This latter specimen fortunately presented both the *crispus* and *perfoliatus* states of the species, and more closely resembles the Stirlingshire specimens than any of the English forms do. Hence I think we may safely add typical *P. undulatus*, Wolfg., to the British Flora.

P. undulatus may be easily recognised in its ordinary states in living specimens by its compressed stem, like that of *P. crispus*, with foliage somewhat resembling that of *P. perfoliatus*; but the stem-character disappears to a great extent when the plant is dried, and then, in most cases, is only to be detected by the most careful examination. Hence the examination of the fresh stems of doubtful *perfoliatus*-forms is advisable to collectors who wish to find the species in their own localities. It should always be borne in mind, however, that hybrid forms such as *undulatus*, *decepiens*, and *nitens* are never clearly-defined species like *natans* and *densus*, but vary to a considerable extent according to the variation of the species they are bred from, whether induced by local conditions, or inherent variation in the parents themselves. Therefore it will be better for botanists to depend upon a general *specific* resemblance than upon matching their specimens with others gathered in distant, and often widely different, localities.

To enable students to recognise the present species, they would do well to consult the original description of Wolfgang in Roemer et Schultes, "Syst. Veget. Mant.," ed. 3, p. 259 (reprinted in my note in "Journ. Bot."), and also the excellent note in the "Report of the Botanical Record Club," 1880, p. 150, on "*P. perfoliatus* v. *Jacksoni*," by Mr. F. A. Lees. With these and the accurate plate by Mr. R. Morgan which illustrates the paper in the Journal, no difficulty will be found in naming the species correctly.

P. undulatus, like many of Wolfgang's proposed species, seems to have escaped the attention of botanists until recently, when the re-discovery of the form by Messrs. Cooper and Billups led to its recognition as a distinct species, and to a knowledge of its true place in the genus. It had hitherto been placed by many good botanists under *P. praelongus*, as an extreme variety. And as this view is entertained to some

extent by one of the most eminent authorities on the genus of the present day, it will be well, in the first place, to note the dissimilarities by which the two species may be most readily separated, especially in the dried state, when the stem characters are not readily available.

In *P. prælongus* the leaves are more distinctly hooded at the tip, 13-21-ribbed, translucent, with numerous distinctly visible transverse reticulations; the peduncles are stout, slightly swollen upwards, and always considerably exceeding the subtending foliage. In *P. undulatus*, the leaves are but slightly hooded, or even flattened at the tip, 5-7-ribbed, with few widely separated transverse reticulations which are often hidden in the opaque substance of the leaf; and the peduncles are slender, equal, and much shorter than the subtending foliage.

Rœmer and Schultes placed *undulatus* under *P. crispus* as a variety or subspecies; guided, no doubt, by the compressed stem and by the early foliage, which often closely resembles that of *crispus*. From this, however, the entire margins of the leaves, like those of *perfoliatus*, afford a clear distinction at all times. Although, as in the latter species, the margin is furnished towards the tip with minute spines, it is never serrulate like that of *crispus*.

Mr. Lees provisionally placed his "var. *Jacksoni*" under *P. perfoliatus*, apparently not having attached much importance to the compressed stem; and possibly, also, from not having characteristic examples of the early states of the plants submitted to him. However this may be, *P. undulatus* v. *Jacksoni* has found its place into our lists as "*P. perfoliatus* v. *Jacksoni*" and it is necessary to point out the best way of separating all *perfoliatus*-like states of *P. undulatus* from the older species of Linnæus. *P. perfoliatus* has amplexicaul, cordate, many-ribbed leaves, and the stipules are rarely to be met with except with the youngest shoots and leaves, and the lowest one is very rarely expanded into an ear-like imperfect leaf; whilst in *P. undulatus* the leaves are semi-amplexicaul, not cordate at the base, and few-ribbed, and the stipules are more persistent, with the lowest, on both stem and branches, frequently furnished with a small distinct leaf on the back, resembling the ordinary leaves. Practically this distinction

will be little needed, because states of the plant composed entirely of *perfoliatus*-like shoots rarely, or never, occur.

Although I have examined many hundreds of fresh stems of this species, I have never found a single instance in which the terete stem of *perfoliatus* was approached even in the slightest degree ; nor any instance in which the flowers were not abortive ; yet both terete stems and fertile spikes may occur, and should be carefully sought for. Again, individual specimens of the two species now in question may have a greater or less number of ribs in some of the leaves than is usual, or some other character may disappear, or be present, in one or more branches ; but these need never mislead the youngest student if care be taken in observing the *aggregate characters* of such doubtful specimens. For instance, a cultivated plant, grown for three years, has produced a single branch with leaves indistinctly serrulated somewhat towards those of *P. crispus* ; but in this case the stem was quite typical, and the hundreds of other specimens from the same rootstock are all normal *undulatus*.

The Potamogetons collected by Col. Stirling and Mr. Kidston during the past two summers present many remarkable forms, more than one of which seem new to our Flora. A rich harvest in this genus lies awaiting the hands of Scottish naturalists to gather it, a task that can only be successfully accomplished by resident workers.

RECORDS OF SCOTTISH PLANTS FOR 1891,
ADDITIONAL TO "TOPOGRAPHICAL BOT-
ANY," Ed. 2.

By ARTHUR BENNETT, F.L.S.

AGAIN these records tell up to a larger number (320) than could have been anticipated ; I must therefore be as brief as possible in my remarks.

I wish most earnestly to impress on any botanist seeing these records, that I shall esteem the rectification of any errors even more than additional records.

I hardly like to mention the fact that some records are not made with that truth-seeking spirit that ought to animate all botanists. Some are compelled to be "weighed" as to their truth, etc., and I regret to say are found "wanting."

The sequence of the counties and the abbreviations are the same as in last year's list; *i.e.*, "Scot. Nat." = Scottish Naturalist: "J. B." Journal of Botany. Specimens seen are marked with "!" Introduced species are marked with "+"

72. DUMFRIES.

[1890 Report. Transfer *Hordeum pratense* to 73; also several records should be under Mr. J. T. Johnson's name, *viz.*, *Saxifraga nivalis*, *Hieracium sparsifolium*, *Senecio viscosus*, and *Salix ambigua*.]

Fumaria confusa, *M'Andrew*.

Fumaria densiflora, *J. T. Johnstone*.

Nasturtium officinale, *Scott Elliot* records this at 2000 ft. "1080 ft." was highest habitat known to Watson.

Lepidium campestre, *Scott Elliot*.—Confirmed.

Rubus cordifolius, *Bab.*

Rubus amplicatus, *Lees.*

Rubus infestus, *W. and N.*

} *Fingland*.—Determined by Mr. J. G. Baker.

Rosa spinosissima.—At 1250 ft.

*Hieracium*₂*buglossoides*, *Arv.-Touvet*; *Linton*!

Vaccinium uliginosum, *J. T. Johnstone*.

Aretostaphylos Uva-ursi, *J. T. Johnstone*.

Salix undulata; *S. viridis*, *Fr.*; *S. laurina*; *S. Smithiana*; *S. rubra*.—All *Fingland*. Determined by F. B. White.

73. KIRKCUDBRIGHT.

Records by Mr. J. M'ANDREW.

Thalictrum alpinum.

Ranunculus heterophyllus.

Ranunculus Lenormandi.

Aquilegia vulgaris.

Spergularia rubra.

Radiola millegrana.

Hypericum Androsæmum.

Rhamnus Frangula.

Vicia lathyroides, *Rev. J. Fraser*.

Vicia Orobus.

Rubus suberectus, Ball herb. at Kew.—*J. B.* 1891. p. 162.

Saxifraga hypnoides.

Cicuta virosa.

Æthusa Cynapium.

Apium graveolens.	Salix Caprea.
Centaurea Cyanus.	Salix herbacea.
Carduus heterophyllus.	Salix purpurea.
Filago minima.	Listera ovata.
Sonchus asper.	Scirpus multicaulis.
Convolvulus Soldanella, <i>Rev. J. Fraser.</i>	Carex pauciflorus.
Mertensia maritima.	Carex paniculata.
Scrophularia aquatica.	Carex curta.
Pinguicula lusitanica.	Carex glauca.
†Plantago media.	Agrostis canina.
Plantago Coronopus.	Avena strigosa.
Lamium amplexicaule.	Melica nutans.
Salsola Kali.	Festuca Myurus.
Suæda maritima.	F. elatior.
Euphorbia Peplus.	Asplenium viride.
†Salix fragilis.	Nephrodium Oreopteris.

74. WIGTON.

Arabis hirsuta, *Coles*, 1882.—*Scott Elliot, Fl.*

75.

Salix phylicifolia, *Fingland.*—Determined by F. B. White.

76. RENFREW.

Trientalis europæa, *J. Wood!*

77. LANARK.

Carlina vulgaris, *P. Ewing!*

86. STIRLING.

[Under 86 in 1890 Report delete *Potentilla alpestris*, *Alchemilla vulgaris*, and *Rumex nemorosus*. Transfer *Atriplex (patula) erecta* to 96. *Carex lævigata* is in "Top. Bot."!]

COL. STIRLING and R. KIDSTON, all.!

Ranunculus Lingua.	Stellaria aquatica.
†Helleborus fœtidus.	Stellaria palustris (glauca).
†Lepidium ruderales.	Lepigonum neglectum.
Silene noctiflora.	Elatine hexandra.

Hypericum dubium.

Anthyllis Vulneraria.

†*Prunus domestica.*

†*Spiræa salicifolia.*

†*Rosa arvensis.*

†*Pyrus Aria.*

†*Ribes rubrum.*

†*Sedum reflexum.*

Callitriche autumnalis.

†*Carum Carui.*

†*Carum petroselinum.*

†*Cornus sanguinea.*

†*Crepis biennis?*

Hieracium lingulatum.

Hieracium anglicum.

Hieracium prenanthoides.

Hieracium Friesii, Hartm.

Hieracium crocatum.

Hieracium gothicum.

Calystegia sepium.

Linaria minor.

†*Mimulus luteus.*

†? *Nepeta Cataria.*

†*Lamium maculatum.*

†*Borago officinalis.*

Salix viminalis.

Rumex domesticus.

Rumex viridis.

†*Daphne Laureola.*

†*Humulus Lupulus.*

†*Populus nigra.*

Sparganium affine.

Sparganium simplex.

Typha latifolia.

Carex paniculata.

Carex teretiuscula, var. Ehrhartiana.

Carex aquatilis, var. elatior, Bab.

Carex Oederi, Ehrh. (non auct.)

Carex riparia?

Phleum arenarium.

Alopecurus agrestis.

Avena pubescens.

Glyceria maritima.

†*Sclerochloa procumbens.*

Sclerochloa loliacea.

Chenopodium album, P. Ewing.!

[*Orobus tuberosus*, mentioned in a former Report for Stirling, had better be deleted.]

87. PERTH, W.

Hieracium holosericeum, E. S. Marshall.

88. PERTH, M.

Pyrola minor.—"2500 ft, barren." *Marshall* in "J. B." 1891, p. 113.

Carex alpina, Groves.

Eriophorum alpinum.—Mr. Holt has sent a fragment of this from "Craig Challiach, Perthshire, Mr. Henry Stansfield." Mr. Holt writes, "I do not know the date of this, but it was

collected by Mr. S. some 20 years ago." I sent it to Dr. F. B. White, so that it might be looked for again.

Equisetum pratense, "2700 ft.," *Marshall*.

96. EASTERNESS.

Mr. A. SOMERVILLE!

Rubus fissus, *Bab.*; *fide*, *J. G. Baker*.

Hieracium argenteum.

Hieracium Friesii, *Hartm.*

Hieracium Schmidtii, *Tausch*.

Hieracium auratum, *Fries*.

Mentha arvensis.

†*Salix alba* (cœrulea).

Drosera intermedia, *Grieve*.—In "Edin. Nat. Field Club," 1881.
"Badenoch."

97. WESTERNESS.

To avoid repetitions the records are placed under the names of the recorders.

Rubus rhamnifolius, *Macvicar*, sp.; *fide* *Baker*.

Rubus umbrosus, *Macvicar*, sp.; *fide* *Baker*.

Phragmites communis, *Rev. E. F. Linton*. By *Mr. Bruce*.

†*Aquilegia vulgaris*.

†*Berberis vulgaris*.

†*Acer pseudoplatanus*.

Vicia angustifolia.

Orobus tuberosus.

Prunus spinosa.

†*Prunus Avium*.

Prunus Padus.

Rubus "suberectus."

Rubus "plicatus."

Rubus "mucronatus, *Blox*."

Rosa tomentosa.

Pyrus Malus.

Epilobium parviflorum.

Circæa "alpina."

Saxifraga "sponhemica."

Callitriche hamulata.

Scleranthus annuus.

Sonchus arvensis.

Hieracium melanocephalum.

Hieracium senescens.

Hieracium anglicum.

Hieracium boreale.

Centaurea Cyanus.

†*Convolvulus sepium*.

Mentha arvensis.

Polygonum lapathifolium.

Polygonum "maculatum."

Rumex domesticus.

Rumex conspersus.

Rumex acutus, *L.*

Rumex conglomeratus.

†*Humulus Lupulus*.
Ulmus montana.
Quercus sessiliflora.
 †*Populus canescens*.
 †*Salix alba*.
 †*Salix purpurea*.
Orehis incarnata.
Carex flava, *agg.*

Carex xanthocarpa, *Deg.*
Phleum pratense.
Phleum alpinum.
Agrostis nigra.
Avena pubescens.
Bromus racemosus.
Triticum repens.

Mr. MACVICAR, all !

Draba verna.
Hieracium gracilentum.
Centunculus minimus.
Carex arenaria.
Hymenophyllum tunbridgense.
Viola Curtisii.

†*Tanacetum vulgare*.
Utricularia vulgaris ? (may be
 neglecta.)
Plantago intermedia.
Koeleria cristata.

98. ARGYLE.

[Delete "*Sparganium affine*," as already on record !]

Thalictrum majus *Crantz, E. S. Marshall.* !

Mr. P. EWING, all !

Cardamine amara.
Lepidium Smithii.
Arenaria trinervia.
Pimpinella Saxifraga.
Arctium majus.

Jasione montana.
Veronica Anagallis.
Scutellaria minor.
Briza media.

99. DUMBARTON.

Mr. L. WATT, all !

Raphanus maritimus.
Cerastium tetrandrum.
Spergularia marginata.
 †*Centaurea Cyanus*.
Tanacetum vulgare.
Jasione montana.
Anagallis tenella.
Lycopsis arvensis.
Utricularia vulgaris.

Potamogeton Zizii.
Ruppia rostellata.
Alisma ranunculoides.
Schœnus nigricans.
Scirpus acicularis.
Carex [*aquatilis*, *var. elatior*,
Bab.]
Koeleria cristata.
Equisetum maximum

104. HEBRIDES, N.

Mr. P. EWING, all.!

Barbarea vulgaris.	Potentilla Sibbaldi.
Sisymbrium officinale.	Mertensia maritima.
Raphanus maritimus.	Carex Ederi Ehrh., (not <i>auct.</i> <i>Angl.</i>)
Lychnis Githago.	Hieracium buglossoides, <i>Arv.-</i> <i>Touvet</i> ; <i>Linton</i> , "Ex. Club Report," 1890.
Spergularia marginata.	
Geranium dissectum.	
Geranium lucidum.	

105. ROSS, W.

Mr. P. EWING, all.!

Spergularia marginata.	Plantago Coronopus.
Spergularia media.	Urtica urens.
Vicia hirsuta.	Carex filiformis.
Daucus Carota.	Aira caryophyllea.
Stachys arvensis.	Isoetes echinospora.
Salicornia herbacea.	

106. ROSS, E.

Rev. E. S. MARSHALL, all.!

Ranunculus Lingua. Con- firmed.	Geum intermedium.
Teesdalia nudicaulis.	Galium erectum.
Viola canina.	Hieracium anglicum.
Cerastium tetrandrum.	Myosotis palustris, strigulosa.
Spergularia marginata.	Anagallis tenella.
Geranium pratense.	(Utricularia neglecta?)
†Trifolium agrarium.	Salsola Kali.
Oxytropis uralensis. New sta- tion. Reported extinct in the old one.	Atriplex patula.
Rubus fissus.	Salix phylicifolia.
Rubus corylifolius.	Habenaria chlorantha.
Rosa rubiginosa. "Certainly wild."	Potamogeton prælongus.
Potentilla reptans.	Potamogeton pectinatus. Con- firmed.
	Ruppia rostellata.
	Carex pilulifera.

Carex distans.	Catabrosa aquatica.
Carex extensa.	Bromus sterilis.
Avena flavescens.	Bromus commutatus.
Ammophila arundinacea.	Asplenium Adiantum-nigrum.
Milium effusum.	Athyrium Filix-fœmina.

Mr. C. BAILEY, in "Ex. Club Rep.," 1890.

Rubus plicatus.

Rubus Schlechtendalii.

Rubus mucronatus,

Rosa involuta,

Veronica Buxbaumii,

} *Marshall and Hanbury.* In "J. B." 1891,
p. 112.

Mr. P. EWING. !

Myriophyllum spicatum.

Carduus nutans.

Carduus crispus.

Salix fragilis.

† Hippophae rhamnoides.

Scirpus Savii.

(*Rhinanthus major* (1890 Rep.)
must be deleted, *fide Rev.*
E. Marshall.)

107. SUTHERLAND, E.

Rubus plicatus, *Marshall and Hanbury.* In "J. B." 1890,
p. 111.

Rubus mucronatus, *Marshall and Hanbury.* In "J. B." 1890,
p. 111.

108. SUTHERLAND, W.

Spergularia marginata, *Marshall!*

Hieracium flocculosum, *Marshall and Hanbury.*—In "J. B.," 1891.

Callitriche hamulata.—At 2300 feet on Ben More of Assynt.
Marshall. In "J. B." 1891, p. 113.

110. OUTER HEBRIDES.

Mr. W. S. DUNCAN, all. !

Ranunculus trichophyllus, *A.*
Somerville, sp.; 1888.

Arabis hirsuta.

Orobus tuberosus.

Rosa canina (lutetiana).

Alchemilla vulgaris.

Rubus ineurvatus, *fide Baker.*

Epilobium alpinum, *var.*

Helosciadium inundatum.

Hieracium iricum.

Carduus heterophyllus.

Arctostaphylos Uva-ursi.

Ilex aquifolium.—Confirmed.	Habenaria chlorantha.
Veronica scutellata.	Potamogeton pusillus.
Orobanche rubra.	Carex pauciflora.
Lysimachia nemorum.	Lastrea æmula.—Confirmed.
Polygonum Hydropiper.	Pilularia globulifera.
Listera cordata.	Equisetum variegatum, <i>Sch.</i> ;
Habenaria bifolia.	var. majus, <i>Syme.</i>

111. ORKNEYS.

Potamogeton lucens, f. *W. Irvine Fortescue.*

112. SHETLAND.

Mr. BEEBY, in "Annals," *et. sp.*

Lapsana communis.	Hieracium Friesii, <i>Hartm.</i>
Hieracium zetlandicum, <i>Beeby.</i>	Hieracium auratum, <i>Fr.</i>
Hieracium oreades, <i>Fr.</i>	Hieracium truncatum, <i>Lindb.</i>
Hieracium Farrense, <i>Hanb.</i>	Hieracium crocatum, <i>Fr.</i>
Hieracium protractum, <i>Lindb.</i>	Matricaria maritima, <i>L.</i>

PLANTS OF GLEN SPEAN, WESTERNESS.

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

THE following list of plants was made by myself and E. H. Robertson, Esq., of Burnside, Forfar, during a week's botanising of the hills from Roy Bridge, and the Bridge of Spean. Lord Abinger and Mr. J. K. Cross kindly gave us permission to go over their forests. The weather was showery, and the season rather too far advanced to allow of a larger list being made. It will be observed that several alpinæ gathered by "The Camp" of the Scottish Alpine Club were not seen: but these were not especially sought after (nor was their list seen till afterwards), nor was the summit of Aonach Mòr itself reached. The cliffs of that mountain were, however, pretty thoroughly explored. Some critical plants are yet under consideration. I am indebted to the Rev. W. Moyle Rogers, the Rev. E. Marshall, Mr. Arthur Bennett, and Mr. F. J. Hanbury, for

critical assistance. The plants which are believed to be new records are marked *. Introductions are marked †.

Numerous common species were noted in addition to those enumerated below; but as they had already been recorded from the district their names have been omitted for the sake of brevity. The total number of species of Phanerogams noted was 373, including introductions; made up of 277 Dicotyledons, 2 Conifers, and 94 Monocotyledons.

Thalietrum alpinum, *L.*—Common in the corries.

Ranunculus Flammula, *L.*—Common; also the var. *pseudo-reptans*, *Syme.* *R. aeris*, *L.*; common in at least three forms. None of the montane plants were quite identical with the var. *pumilus*, *Wahl.*, from the Cairngorms. *R. aeris* was noticed at over 3800 feet on Aonach Mòr.

Caltha palustris, *L.*—Common. The var. *minor*, *D.C.*, occurred by the springs in the corries, and was very common on Beinn Chaoruinn.

Trollius europaeus, *L.*—Aonach Mòr.

*† *Aquilegia vulgaris*, *L.*—On the north bank of the Spean between Roy and Inveroy. It was away from houses; but the seeds may have been washed down from gardens at Roy. The plants were much above the summer level of the river, and were associated with *Hieracium corymbosum*, and *Vicia sylvatica*.

† *Berberis vulgaris*, *L.*—As a relic of cultivation about dismantled cottages, etc.

Cardamine pratensis, *L.*—As the form *C. palustris*, *Petermann*, in Glen Spean; *C. hirsuta*, *L.*, Roy; *C. flexuosa*, *With.*, Aonach Mòr.

Nasturtium officinale, *Br.*—Gairloch.

Cochlearia officinalis, *L.*; var. *alpina*, *Bab.*—Aonach Mòr. With this were other montane forms, which are not apparently named.

Brassica Sinapistrum, *Boiss.*—Roy. This is an earlier name for *Sinapis arvensis* than that of *B. Sinapis* adopted in the "London Catalogue"; since Visiani, in the "Flora Dalmatica," quotes Boissier for *Brassica alba* of the same date, but does not adopt his name for this plant. It occurred only in cultivated fields about Roy.

Helianthemum Chamæcistus, *Miller.*—Very rare; on a rock near the western end of Loch Laggan.

Viola arvensis, *Murr.*—At Roy, etc. *V. lutea*, *Huds.*—Rare; Moy.

This was the var. *V. amœna*, *Symons*, which Watson in "Cyb. Brit." (vol. i., p. 181), 1847, reduced to a variety of *V. lutea*.

**Polygala vulgaris*, *L.*—North bank of Spean between Roy and Inveroy.

P. serpyllacea, *Weihe*.—Common.

Silene maritima, *With.*—On river shingle near Gairlochy.

Cerastium triviale. var. *alpestre*, *Syme.*—Stob Coire-an-Easain and Aonach Mòr. *C. alpinum*, *L.*; Aonach Mòr, Creag Meaghaidh; var. *pubescens*, *Syme.* To this name Rev. E. Marshall would refer a tall erect plant which occurred on Aonach Mòr. Mr. Arthur Bennett was induced to call it var. *alpestre* of *C. triviale*. My own impression at the time of gathering it, and now, is that it is a hybrid *C. triviale* × *alpinum*. *C. areticum*, *Lange*; cliffs of Aonach Mòr and Stob Coire-an-Easain.

C. trigynum, *Vill.* (= *C. refractum*, *All.*)—Common in the corries on the talus slopes; rarely as the glabrous, usually as the pubescent form, *i.e.* *C. nivale*, *Don.* Very fine by the ridge connecting Beinn Chaoruinn and Creag Meaghaidh.

Stellaria media, *Cyr.*—Also as the var. *major*, *Koch* (= *S. neglecta*, *Weihe*).

Arenaria serpyllifolia, *L.*—Near Moy bridge, very rare. Not quite the type form, but nearer to it than to *leptoclados*.

Sagina Linnei, (1835), so spelled by Presl. Probably it is the *S. Spergella*, *Fenzl.* (1833). Aonach Mòr.

**Spargula sativa*, *Boenn.*—Common.

Montia fontana, *L.*; * var. *major*, *All.*—Spean side.

Hypericum humifusum, *L.*—Rather rare, near Inveroy.

Geranium sylvaticum, *L.*—The * var. *parviflorum*, *Blytt*, occurred by the Spean near Inveroy. *G. molle*, *L.*; local. *G. dissectum*, *L.*; rare, and perhaps only casual, near Unachan. *G. Robertianum*, *L.*; local, by the Spean near High Bridge.

† *Acer Pseudo-platanus*, *L.*—Seedling plants occurred on the banks of the Spean near Roy.

Ulex europæus, *L.*—Spean.

Trifolium medium, *L.*—Spean bank, Inveroy, etc.

† *T. hybridum*, *L.*—Common as a relic of cultivation. *† *T. agrarium*, *L.*—Roy, in cultivated fields. * *T. dubium*, *Sibth.*; Gairlochy.

Anthyllis Vulneraria, *L.*—Rare; on the shingle at Gairlochy, and as an entire-leaved plant on the Spean banks near Inveroy.

Lotus corniculatus, *L.*—Also a lax form near Roybridge.



- Vicia hirsuta*, Koch.—Rare, Auchnabobaune. *V. sylvatica*, L.; on the Spean banks. Very beautiful between Roy and Inverroy. * *V. angustifolia*, L.; Spean. † *V. sativa*, L.; only in corn crops.
- * *Lathyrus montanus*, Bernh. (*L. macrorhizus*, Wimmer).—Near Roy.
- * *Prunus spinosa*, L.—Spean.
- † *P. domestica*, L.—Roy. * *P. avium*, L.; Roy, near the bridge.
- * *P. Padus*, L.—Loch Laggan side, and also by the Spean.
- † *Spiræa salicifolia*, L.—As a garden relic on the south bank of Spean.
- Rubus Idæus*, L.—Roy, etc. * *R. nessensis*, Hall (*R. suberectus*, And.)—Near Roy bridge, near Spean, Coneachan, etc. * *R. plicatus*, W. & N.; Roy, Spean. * *R. villicaulis*, Koehl. Roy. * *R. mucronatus*, Blox.; near the Roman Church, Roy; near Roy; and near High bridge. *R. saxatilis*, L.; near the Roman Church, Roy. *R. Chamæmorus*, L.; on the peaty places of Aonach Mòr, and Stob Coire-an-Easain.
- Geum rivale*, L.—Ascending to 3000 feet on Aonach Mòr.
- Potentilla Sibbaldi*, Hall. f.—Aonach Mòr, etc. *P. Fragariastrum*, Ehrh.—Spean banks near Inverroy.
- Rosa involuta*, Sm.—Roy, Inverroy, etc.; not uncommon; * var. *Nicholsoni*, Crèpin.; Near Roy. *R. villosa*, L. hb. (*R. mollis*, Sm.); common; also as * var. *cœrulea*, Woods.
- R. tomentosa*, Sm.; common; var. *scabriuseula* (Sm.)—Spean; * var. *subglobosa* (Sm.); Inverroy. *R. canina*, L.; * var. *lutetiana* (Lem.), Roy.; var. *dumalis* (Bechst.); also intermediate forms, and sometimes with a few setæ on the peduncles, about Roy; * var. *dumetorum* (Thuill); a small-leaved form, at Spean; * var. *urbica* (Lem.); common. A very pretty rose was not unfrequent from Roy to Docharty. It answers fairly well for *pruinosa*, Baker, except in its leaf serration. It was rather backward, as the petals had only recently fallen; and it may belong to the *subcristata* group. It is a very distinct-looking plant. * *R. glauca*, Vill.; a common rose from Roy to the Great Glen. * var. *R. coriifolia*, Fries.; Roy, Inverroy, Inverlair, etc. * var. *subcristata*, Baker, Roy, Blairour, etc. †* *R. arvensis*, Huds.; A curious form in an old hedge by a garden on the south side of Spean nearly opposite Roy.
- * *Pyrus Malus*, L.—Roy.
- Saxifraga oppositifolia*, L.—Rare, or gone over; Stob Coire-an-Easain.

- S. nivalis*, *L.*—Aonach Mòr. *S. stellaris*, *L.*; Common. On Aonach Mòr occurred a curious form. It grew at the base of high and steep cliffs, down which water was dripping, among *Bartramia* and *Epilobium alpinum*, the latter of which it somewhat mimicked. Instead of the usual rosette of leaves with a leafless erect scape, this had procumbent flower stalks along which the leaves were scattered. The stalks and leaves were more fleshy than usual and the leaves less cut. Whether these marks are permanent or not cultivation may decide. The form might be provisionally distinguished as var. *fontana*.
- S. aizoides*, *L.*—Common; also with the leaves ciliate, *i.e.* *S. autumnalis*, *L.* *S. rivularis*, *L.*; Abundant at the base of the high cliffs in the corries, as on Aonach Mòr, Stob Coire, etc.
- S. hypnoides*, *L.*—Aonach Mòr, and as a condensed state. **S. quinquefida*, *Harworth* (*S. sponhemica*, *Gmel.*); rare; Stob Coire-an-Easain.
- † *Ribes Grossularia*, *L.*; † *R. nigrum*, *L.*; † *R. rubrum*, *L.*—All as relics of cultivation about ruins of crofters' houses.
- Sedum roseum*, *Scop.*—At Lochan Uaine, and the higher rocks.
- † *Sempervivum tectorum*, *L.*—On a cottage roof.
- Drosera anglica*, *Huds.*—Inveroy, Moy, etc.
- **D. obovata*, *Mert. et Koch.*—Moy.
- Myriophyllum alterniflorum*, *D.C.*—Loch Laggan, Gairloch.
- Callitriche stagnalis*, *Scop.*; **C. hamulata*, *Kuetz.*—Gairloch.
- Epilobium montanum*, *L.*; *f. minor*, *Hauskn.*—Near Highbridge, Spean. *E. obscurum*, *Schreb.*; Common. *E. palustre*, *L.* **E. alsinefolium*, *Vill.*; rather rare; Creag Meaghaidh, not observed on Aonach Mòr. *E. alpinum*, *L.*, and as the form *seapoides*, *Hauskn.*; on Beinn Chaoruinn.
- Circæa Lutetiana*, *L.*—Near Highbridge, in the woods. **C. alpina* *L.*; south side of Spean near Dalnabie.
- † *Ægopodium Podagraria*, *L.*—Roy.

(To be continued.)

ZOOLOGICAL NOTES.

Mole (*Talpa europæa*, *L.*) in the Island of Ulva.—Mr. P. C. Mackenzie, of Calgary, informed me to-day (24th February 1892), *ex ore*, that the first Mole ever seen in the Island of Ulva, on the

west coast of Mull, was captured a few days ago. It would be interesting to know how this species was introduced into the island, for His Grace the Duke of Argyll, to whom I mentioned this subject, informs me that the Mole cannot swim. His Grace tells me that he once threw a mole into a river and expected it to swim, but although it floated, it was perfectly helpless and could not move an inch across the stream.—J. A. HARVIE-BROWN.

Hedgehog (*Erinaceus europæus*, L.) in Shetland.—I was somewhat astonished to be informed, when staying at Tingwall Manse in October last, that the Hedgehog was well known along the shores of the freshwater loch at Tingwall. Mrs. Bain told me that they were introduced into Shetland by the farmer at Veersgarth, and that he planted whins for their protection. This took place about thirty years ago. They are supposed to have been introduced into the Island of Burra by means of a cargo of empty casks, or the ballast of a vessel. From Veersgarth they soon spread over the parish of Tingwall. Mrs. Bain put them on several occasions into the walled garden, but they soon died.—J. A. HARVIE-BROWN.

Varieties of the Otter (*Lutra vulgaris*, L.) in Jura.—White and cream-coloured Otters are not uncommon in Jura, and perhaps half-a-dozen have been killed of late years to my knowledge.—HENRY EVANS, Jura Forest.

Wild Cat (*Felis cattus*, L.) in Sutherland.—On 22d September 1891, whilst beating Gruambeg Wood, on the north side of Loch Naver, the keeper and one of the gillies saw a Wild Cat. The wood is a large rough wood of natural-grown birch, and part of it is a huge mass of fallen rock and debris. The cat was within gunshot of the gillie, and he had plenty of time within which to identify it. I may add, that I have heard that two Wild Cats were trapped in the same wood, some seven or eight years ago, by a man of the name of Campbell.—E. T. BALDWIN, Altnaharra, Sutherland.

On the Appearance of the Brown Rat (*Mus decumanus*, Pallas) on Ailsa Craig.—There is perhaps no animal that has so persistently followed man in his migrations, or has so adapted itself to the varied nature of climate or habitation, as the rat; and there are few places, indeed, in the occupancy of the human race where it has not obtained a footing. Given suitable surroundings—and where is the place not suitable?—the rat will increase and spread its boundaries wider and wider in spite of all the efforts made to extirpate it. Considering these circumstances and its well-known fecundity and omnivorous appetite, there are few situations in our islands that are free from its ravages. One such, Ailsa Craig, in the Firth of Clyde, has quite recently been conquered by the enemy. Up till the year 1889, rats were unknown on the Craig, but in that year (the exact date is not

certain) one of the dogs belonging to the lighthouse keeper killed one at the head of the jetty, which was the first seen or heard of on the island. At the time there was a lighter lying there discharging coal for the Light Station, and it was supposed the rat had come from her. On 11th December 1889, Mr. Dawson, the second keeper at the station, wrote me, saying, "It was said at one time that rats would not live here, but we find that to be a mistake; for of late 48 have been killed, and as yet there seems to be plenty more about the place." From this, it will be seen that at that date they had obtained a firm footing on the island, which, being a favourite breeding-place of sea-fowl, and with a fringe of rough boulders and masses of rock round the base of its steep cliffs, had all the essential requisites as a suitable home for the rat. In the following year, Mr. Dawson (*in lit.* 3d March 1890) says, "The rats are commencing to be a perfect nuisance here. Mr. Ross, the keeper of the lighthouse station, killed one a few days ago which weighed 18 ozs.;" and again, a few months later, "it is not safe to put your hand into a hole for a puffin, for the chances are that you get a rat instead." So serious were matters beginning to appear that, on 17th November, Mr. Dawson wrote me, saying, "Rats are on the increase: last Sunday, 59 were killed by one dog at the west side of the island. We are going to have a regular field day amongst them, all hands are to turn out with their dogs." From this time on, constant warfare was waged against the vermin by the tenant who rents the island, he being the chief sufferer, as the rabbits were eaten in the traps and the strings cut by them. The eggs and young of the sea-fowl also paid large tribute to the omnivorous rodent, so much so, that fewer young, I believe, were reared than has ever been the case before. On 2d November last, Mr. Ross wrote, saying, "last year from the 1st October till the end of December [*i.e.* in 1890], while the keeper was catching rabbits, he killed over 900, and I am sure my dog killed over 100 about the doors; since then we have not been keeping count of the numbers we have killed until the first of last month, and since then there has been over 300 killed, and yet they seem as plentiful as ever. They are all over the island, from the very top down to the water's edge. Meat is getting very scarce for them now since the birds have left, so that they have started to eat the ones that have been killed. There is bound to be a good number poisoned as well, as the tenant mixes up arsenic with all the rabbit offal, and it all disappears. We thought last year, seeing they were getting so much poison and eating one another, that they would all disappear, but now they are thicker than ever." As this was the state of matters within three years after the introduction, or rather the invasion of the rat, it is not difficult to see that Ailsa Craig will, like Puffin Island, on the Welsh Coast, and the Copeland Islands in Belfast Bay, be ruined as a

rabbit producing island, and the effect on the other fauna will also be disastrous. It is difficult, if not impossible, to suggest a cure, but if any such can be found there is no more favourable spot on which to operate, for the Craig, lying as it does about eight miles from the nearest point on the mainland, the vermin cannot, unless by a chance similar to their introduction above noted, receive any outside accession to their numbers. In the meantime, the vermin are masters of the situation, against the united efforts of the inhabitants and their canine assistants.—J. MACNAUGHT CAMPBELL, Kelvingrove Museum, Glasgow.

Melanic Variety of the Rat (*Mus decumanus*, Pallas) in North Uist.—I send you a Black Rat which was caught in the larder here, Spanish House, Loch Maddy, on the 12th of November last. We caught altogether five in about a week, so that a party of them must have come in.—JAMES GRAY WEBSTER, Loch Maddy.

[We have examined the specimen and find it to be the melanic form of the Common Rat described by Thompson (P.Z.S. 1837) as the Irish Rat (*Mus hibernicus*). This form is not uncommon in Ireland, and was first recorded for the Outer Hebrides from Benbecula in 1888. It appears to be extremely rare on the mainland of Britain.—EDS.]

Notes on the Vole Plague.—I do not blame the destruction of vermin for the great and sudden increase of Voles (*Arvicola agrestis*, Schreber), otherwise they might have been as numerous as they now are at any period, and all the time during the past thirty years other micro-mammalia have not unduly increased. During the period between early in 1889 and up till August 1891, the weather throughout this district was much below the average in rainfall, and wells, springs, burns, and rivers were getting abnormally low. The hills hereabouts hold water like a sponge. The long continued dry weather reduced this moisture so much as to permit (on the hills only) quite a luxuriant crop of herbage in 1890 and 1891, which covered up the nests of young voles from the crows and rooks—the latter are their most effective natural enemy. It is amazing how greedily they hunt up and devour the young “blind mice.” Then the dry weather in the earlier months of the summer allowed the voles comfortable healthy nests. So you have only to figure up what can be done in the way of fecundity by one single pair of voles and their offspring in one single breeding season to realise how difficult it is for the bucolic mind to believe the voles did not drop from the clouds. I have found nests of young blind voles at the end of March, even in damp meadows, and again about the last week in September, and they—the same pair—would have young numbering from six to eight or sometimes ten in each intervening month. The voles are spreading westward—that is, were doing so at close of last breeding season.—ROBERT SERVICE, Maxwelltown.

The Squirrel (*Sciurus vulgaris*, L.) in **Wigtonshire**.—The Squirrel is the latest spontaneous addition to the fauna of Wigtonshire. I heard of one or two being seen in the woods at Monreith about ten years ago; but it was not till 1889 that I saw one myself. They are now becoming pretty abundant.—HERBERT MAXWELL, Monreith, Wigtonshire.

Occurrence of the Chiff-Chaff (*Phylloscopus rufus*, Bechst.) in **Banffshire**.—On the 8th of October last, I heard the unmistakable note of the Chiff-chaff, and followed the bird for some time in the birchwoods of Dell, Strathavon, about eight miles below Ballindalloch. The strong southerly winds prevailing at the time—that of the autumnal migration—probably account for the presence of this bird in a part of Scotland where I believe it has rarely been observed.—LIONEL W. HINXMAN, Edinburgh.

Dipper (*Cinclus aquaticus*, Bechst.) in **North Uist**.—Sheriff Webster informs me that he has seen a Dipper or Water Crow in North Uist, but adds that the bird is not common. This is the first time I have been able to record the Dipper in any of the islands of the Outer Hebrides, south of Harris.—J. A. HARVIE-BROWN.

Great Grey Shrike (*Lanius excubitor*, L.) in **Solway District**.—A specimen of this bird, shot on 25th February at Drumclyre, Kirkcudbrightshire, by Mr. Smith, gamekeeper there, has been presented to me. This is the only bird of the species I have heard of this winter.—ROBERT SERVICE, Maxwelltown.

Red-backed Shrike (*Lanius collurio*, L.) at the **Pentland Skerries**.—I saw two Red-backed Shrikes here on the 4th of September 1891, and captured one of them, a female, so that there is no mistake about the bird. I have since got it stuffed. This is only the second time I have seen this bird here for the last ten years.—J. GILMOUR, Pentland Skerries.

Waxwing (*Ampelis garrulus*, L.) in **Berwickshire**.—A fine adult female Waxwing was found dead on 11th December 1891, at Mordington, near Berwick-on-Tweed, and being in a perfectly fresh condition, was forwarded to me for preservation.—ROBERT SMALL, Edinburgh.

Waxwing (*Ampelis garrulus*, L.) in **Caithness**.—A female of this very rare bird in Caithness was shot at Shurrery, on the estate of Thomas Pilkington, Esq., Sandside, on the 3d of November 1891.—LEWIS DUNBAR, Thurso.

Rook (*Corvus frugilegus*, L.) **singing**.—This morning (25th February 1892) as I was walking through the grounds of Loretto, Musselburgh, my attention was attracted by a bird-note that was

entirely unknown to me. On looking about to ascertain what bird it might be I saw a common rook (*Corvus frugilegus*) sitting on the top of a large isolated lime-tree, and indulging in a most unmistakable song, that resembled a bass or guttural reproduction of the varied and spluttering song of the starling, and accompanied, like the starling's, by a *fluttering* of the wings, besides the usual bowing and spreading of the tail and wings of the rook. The most remarkable part of the song was a peculiar deep single whistling note, repeated three or four times in succession and coming every now and then in the middle of the other notes, of which there were, so far as I could tell—and I was standing within 25 yards of the tree—some three or four different kinds, varying in both pitch and quality. The song was continuous and lasted the whole time—about three minutes or a little more—that I was watching the bird. The song was only brought to an end by the bird flying off and joining a flock of its own species that passed over the tree. As to the nature of the song, it is just possible, with the well-known imitative qualities of the Corvidæ, that this bird may have actually copied the song of the starling.—NORMAN MACLACHLAN, Loretto, Musselburgh.

Rollers (*Coracias garrulus*, L.) in Caithness.—On the 1st of October 1891, a Roller, a male, was found dead near Mey. Three specimens of this bird have come under my notice for the county during the past twenty-six years. One of these, also a male, was killed at Watten on the 21st May 1890.—LEWIS DUNBAR, Thurso.

Dichromatism in the Tawny Owl (*Syrnium aluco*, L.)—I have been engaged for the last eight months in making careful investigations upon the subject of Dichromatism, and having arrived at a certain stage in the work regarding the common Screech-Owl (*Megascops asio*), am desirous of obtaining information concerning the Tawny Owl in various parts of Europe. I shall deem it a special favour if any one will kindly furnish information in answer to the following. (1) How many specimens have come under your notice, and what proportion of them were in the gray? (2) Which is the prevailing colour in your locality? (3) What forest trees are most uncommon in your locality—deciduous or coniferous? (4) If you have observed a pair of old birds with young, state the character of young as to plumage, and also that of the parents; whether both red, both gray, or one red and the other gray. Any additional information will be very acceptable.—E. M. HARBROUCH, 1610 15th Street, Washington, D.C., U.S.A.

[We have pleasure in making the above known to our readers, and shall look forward with interest to the conclusions to be deduced from Scottish data.—Eds.]

Hen Harrier (*Circus cyaneus*, L.) in Caithness.—This species is now becoming scarce in this county owing to the persecution to which it is subjected by keepers. I received a very fine female

which had been killed at Dalnawillan, on the 24th of June; and a male changing from the young to the adult plumage, and nearly blue, was obtained at Westfield, near Thurso, on the 8th of January 1892.—LEWIS DUNBAR, Thurso.

Rough-legged Buzzard (*Archibuteo lagopus*, Gmel.) near **Kingussie**.—On the 18th of December a Rough-legged Buzzard was trapped on a low part of the moors at Bellville. It had been causing great annoyance for some considerable time by hunting the ground most systematically and clearing whole beats of birds. My keeper says that he generally sees birds of this species in September, and that they remain until April.—C. B. MACPHERSON, Whitechurch, Salop.

Albino Cormorant (*Phalacrocorax carbo*, L.) in **Orkney**.—An Albino Cormorant was shot by Mr. Jas. M'Lauchlan at Kettletoft Pier, Sanday, Orkney, in February 1891, which I purchased, and have now in my possession. It is full-grown, slightly flecked with brownish feathers on neck, back, and thighs, elsewhere white. Curiously enough the eyes, instead of being of the pinkish tint generally found in albinos, were yellow, the feet, legs, and bill, horn white. A slight ring of dark brown feathers surrounds the eyes, and edges the gape. It was got in good condition, and had been observed in company with its normally coloured brethren on several occasions before it was shot, so in all probability it was bred in the neighbourhood. I do not recollect seeing or reading of an albino Cormorant being previously obtained in this neighbourhood, and should like very much if any of your correspondents can inform me if they are common anywhere.—T. S. PEACE, Kirkwall.
[One is figured in Graham's "Birds of Iona and Mull," p. 130; and according to Saxby ("Birds of Shetland," p. 319) two pure albino cormorants with light-coloured feet and bills, were observed in Unst during the years 1869 and 1870.—EDS.]

The Bittern (*Botaurus stellaris*, L.) in **Wigtonshire**.—I regret to have to record the destruction of a fine specimen of the Common Bittern (alas! there is a melancholy irony in the adjective) on the White Loch of Myrton, Monreith, Wigtonshire, in January last. Is there no hope of arousing a feeling of interest in harmless species annually becoming more rare; and of inducing sportsmen to limit their operations to game birds?—HERBERT MAXWELL, Monreith, Wigtonshire.

Bittern (*Botaurus stellaris*, L.) at **Moffat**.—I shot a Bittern on the 23d of January last in a small marsh situated about a mile below Moffat. The ground is generally wet and covered with long grass, rushes, and at one spot some reeds. The bird got up about the reeds, and I did not recognise it, as I had not seen one before.—ADAM FYFE, Moffat.

The Shoveller (*Spatula clypeata*, L.) Nesting in Sanday, Orkney.

—As I think it will be somewhat interesting to record the breeding of the Shoveller in Orkney, I may now state that during the spring of 1891 I observed four pairs of these ducks frequenting a small loch on my farm; I therefore purposed to watch them in order to find out whether they would remain to breed. About the second week of June I frequently missed the females, but always found the males on the loch. I then searched through a marshy place near the loch for nests, but did not find any. However, on the 19th of June, as I was walking round a cornfield near the loch, I observed a duck rise from the side of the field about fifteen yards off, and on going to the place, I found the nest with six eggs, neatly concealed in a tuft of long grass, the nest being lined with withered grass. On 22d June, along with Messrs. W. T. Dennison and W. Muir, I again visited the nest, which now had eight eggs, the full number laid. The female rose when we were at a distance, and continued very shy. Mr. Dennison took one egg for preservation. The eggs are much smaller than those of the common Stock-Duck, and rather darker in colour. I visited the nest again on the 18th July, but the young had left, the egg shells only remaining. The males left the loch during the time of incubation, the females alone appeared to bring out the young brood. The young broods—for I saw above thirty young ones altogether—kept well out of sight during the daytime, hiding among the rushes (locally called “stowers”) until they could fly. They remained at this small loch until September, but whether they removed to larger lochs or left the island, I cannot tell. Parties shooting at them, without doubt, scared them away.—WM. HARVEY, Sanday, Orkney.

[This species has not hitherto, so far as we are aware, been recorded to have nested in Orkney.—Eds.]

Great Bustard (*Otis tarda*, L.) in Orkney.—On the 8th February last, Mr. D. H. Learmonth, farmer, Honebay, Stronsay, a very enthusiastic sportsman, was informed by some of his men that a strange bird, a sort of goose they thought, had been feeding about the centre of one of his fields since the preceding Saturday (6th). He took his gun, and going to the field mentioned, a thirty-eight acre turnip field, observed it immediately. There was no chance of stalking it, so he approached in a contracting circuit, and when about seventy yards distant it got up, and he fired. It fell, just one pellet having struck it on the head. It was a fine female, and though in poor condition I am informed that it weighed exactly $9\frac{1}{2}$ lbs. The weather had been wet and stormy for some time. The bird was quite alone. It seems to have frequented the same field all the time, as it was not observed elsewhere. It is noteworthy that a Bustard obtained in Stronsay in 1876, was shot by Mr. Wm. Stevenson on the contiguous farm of Holland.—T. S. PEACE, Kirkwall.

Oystercatcher (*Hematopus ostralegus*, L.) **Incubating under Difficulties.**—A pair of Oystercatchers breed annually on a small patch of shingle on an island in the river Teith. This spring the first hatch of eggs was destroyed by a spate, and a second nest was made which I discovered on the 5th June: the bird was then sitting on three eggs. On the 9th June, the river being extremely low, a contractor came across the water, with his carts, to remove gravel from the island. It was a long business, and every day (except Sundays) from 8 a.m. till 6 p.m., the carts passed backwards and forwards, and the work of sifting the gravel was carried on within fifteen yards of the Oystercatchers' nest; so that the birds, during those hours, had no opportunity of sitting on the eggs. I showed the nest to the men, who promised to safeguard it, and we placed a mark close to the spot as a guide to the carters not to drive over it. At 10 p.m. on the 23d June, when all was quiet, I visited the nest, the old bird stole off, and I found the eggs chipping. The next morning, the three young chicks were all out, and running about with their parents. During the whole time between the dates specified, viz. 9th and 23d June, the weather was exceptionally warm and sunny, which must, I suppose, account for the fact that the eggs were kept alive, without the aid of the bird's warmth during the daytime.—W. H. M. DUTHIE, Doune, Perthshire.

The Gray Phalarope (*Phalaropus fulicarius*, L.) **in Barra.**—On the 26th of September last, I found a specimen of this pretty bird in the possession of some boys at Castlebay, on the south-east of this island. They had caught it in an exhausted state near the village shortly before I met them, and as they had been using it rather roughly it soon died, but I got it preserved. On the same day, another bird was caught on the west side of the island by Mr. MacVean of the Crofters' Commission, but he allowed it to go again. I think this is the first record of its occurrence in the Outer Hebrides. The day on which these birds were caught was very stormy, and for some days previously there was a strong gale from the west and south-west, so that they were probably blown on the island from their line of migration, which Mr. Harvie-Brown thinks is west of the Outer Hebrides.—JOHN MACRURY, Barra.

Ruff (*Machetes pugnax*, L.) **in the Outer Hebrides.**—In August 1888 I sent a record to Mr. Harvie-Brown from Benbecula, of which he makes mention in Appendix D of the "Fauna of the Outer Hebrides." In May 1889 I got a Ruff in full plumage in the same island, and on the 20th September following, I saw another bird—either a ruff or reeve—in the bird-of-the-year plumage, on the west side of Barra. From my own observation, and from what I have learned from others in the place, I am inclined to think that a pair or two of these birds may have nested in Benbecula within the last few years.—JOHN MACRURY, Barra.

Whimbrel (*Numenius phaeopus*, L.) **Wintering in Barra.**—During the whole time, from the summer of 1889 (when I came to Barra) up to the 17th of September 1891, a Whimbrel was seen by me on the west side of this island. It was always to be seen in the same bay, generally accompanied by curlews, oystercatchers, and small shore-birds, and was not a wounded bird, being strong and active, and as wary and wild as any of the curlews. During the summer migrations, I saw numbers of other Whimbrels in the same place, but after these had left, one always remained, and I concluded it was the same bird. I have not seen it since the 17th of September last, when I met it about a mile farther south, near the shore; but as I have not lately visited the place it may still be there. Barra seems to be a favourite place with stragglers, as about the middle of July last I observed a long-tailed duck (*Harelda glacialis*)—a male in full breeding plumage—diving on the west side of the island, at a spot frequented by large flocks in the winter. On going back to the place in a few days it was gone.—**JOHN MACRURY**, Barra.

Occurrences of the Iceland Gull (*Larus leucopterus*, Faber) **on the West and North Coasts of Scotland.**—**INVERARAY.**—I got a glimpse, a week or ten day ago, of what appeared to be, at a distance, a very pale Herring Gull. Since then, my keeper found it out, and this morning (23d February 1892) he shot it feeding near a dead sheep on the shore. It is nearly adult—a slight brown spotting appears on the back and scapulars.—**ARGYLL.**

POLTALLOCH.—An immature specimen of the Iceland Gull was shot here yesterday, 4th February 1892. The bird had frequented a grass field below the house for more than a week. Attention was drawn to it by its apparently perfectly white colour, and by its keeping entirely aloof from the Black-headed Gulls, which frequent the house in great numbers, as I am in the habit of feeding them.—**J. W. MALCOLM**, Poltalloch.

LEWIS.—Early this year tons of Razor-fish (*Solen siliqua*) were cast ashore at Broad Bay, about two miles north of Stornoway, after an unusually severe gale from the north. Great quantities of this shell-fish were carted away for food and bait; and thousands of Gulls of various species were attracted to the spot. Among them I noticed three or four Icelanders, one of which I shot and send you for inspection.—**D. MACKENZIE**, Stornoway.

[We received the Gull, which is a specimen of *Larus leucopterus* in immature plumage.—**EDS.**]

CAITHNESS.—On the 23d of January 1892, Mr. M'NICOL, Sand-side, shot an Iceland Gull.—**LEWIS DUNBAR**, Thurso.

[Iceland Gulls have been somewhat abundant during the late winter on the west coast. Mr. G. E. Paterson examined an immature specimen which had been killed at Fort William. Mr. Robert

Warren, of Ballina, informs us that there has been a visitation of this species to the N.W. coast of Ireland.—EDS.]

Glaucous Gull (*Larus glaucus*, Fabricius) in the Solway.—One of these fine gulls, in what I take to be the third winter's plumage, was shot on Netherwood Merse, near the mouth of the Nith, in Dumfriesshire, on 6th February. So far as I know, it is some six or seven years since this species has been noted in "Solway." This specimen is being mounted for the Observatory Museum.—ROBERT SERVICE, Maxwelltown.

Great Crested Grebe (*Colymbus cristatus*, L.) in the Tay.—A young male Great Crested Grebe was shot on the 22d of February, on the estuary of the Tay, about six miles below Dundee. This species is very rare on the Tay.—W. A. BROWN, Dundee.

Occurrences of *Labrus mixtus*, L., on the West Coast of Sutherlandshire.—A specimen of this fish was brought to me by a fisherman in the month of September 1891, having been taken in the bay of Lochinver, and was identified for me by Col. Drummond Hay as the *Labrus mixtus* of Linnæus, the Blue-Striped Wrasse of Yarrell, or the Cook Wrasse of Fleming. During the same month, while fishing with long lines for haddocks in about thirty fathoms, close to the edge of the seaweed I took three more specimens, one, however, varying considerably in colour. Having found no record of this fish being taken on the west coast of Sutherlandshire, while, according to the local fishermen, a few have been taken every year for the last ten or twelve years, I think it of interest to record this as a locality. The specimens taken coincide exactly with the description given by Yarrell. The first specimen measured 10½ inches in length and weighed half a pound, and was in good condition. The specimen, which varied in colour, coincided with Yarrell's description, but was uniformly of an orange-red colour, darker on the back, lighter on the belly. Yarrell mentions that this species varies much in colour, and probably this was the same species.—ARTHUR BEVERIDGE, Lochinver.

[This species has been recorded for Loch Carron, and for several of the Hebrides.—EDS.]

***Deilephila galii*, Schiff, and *Macroglossa bombylifformis*, Och., in Jura.**—It may interest your entomological readers to know that both these species have occurred in Jura during the past five years. I was much surprised to find the latter species just emerged from the pupa; and the former was captured by Miss Campbell, of Jura.—HENRY EVANS, Jura Forest.

Is *Amphithopsis latipes*, M. Sars, a Commensal?—I have obtained this species, which is the *Calliope ossiani* and *pingalli* of Bate and Westwood, in the Firth of Forth on two different occasions, and several specimens were obtained each time. On both occasions

they were found associated with *Antennularia antennina*, and were clustered about and adhering to the zoophyte when brought up in the trawl net. They continued to cling to the *Antennularia* after being removed from the net, and had to be forcibly detached with the aid of forceps, or by plunging the zoophyte into spirit. I have not been able to ascertain whether *Amphithopsis* is usually found associated with the *Antennularia* by other observers, but its occurrence in the Forth in the manner described seems to indicate that such is its habit, and if so, it forms an interesting example of commensalism, or semi-parasitism.—THOMAS SCOTT, Leith.

Hæmobaphes cyclopterina, Fabr., in the Firth of Forth.—This species was added to the British fauna in 1891, and is recorded in the "Ninth Annual Report of the Fishery Board for Scotland," Part III. p. 310. It was obtained by Mr. Peter Jamieson, Assistant Naturalist to the Fishery Board, adhering to the gills of a Pogge (*Agonus cataphractus*) taken from a Cod (*Gadus morrhua*), captured off Dunbar by Mr. Jamieson, who kindly handed over the *Hæmobaphes* to me. I gave it a place in my Report to the Fishery Board, as an addition to the Forth fauna. Its claim to be considered a member of the fauna of the Forth was, however, liable to be questioned, for though the cod had been captured by a fisherman in the vicinity of Dunbar, it does not follow that the pogge had been captured by the cod near the same place. When trawling between the Bass Rock and Fidra, during February this year (1892), several living specimens of pogge were captured, and an examination of them brought to light a second specimen of *Hæmobaphes*. The body of the parasite is swollen but somewhat compressed, and of a blood red colour, each ova-sac resembles a coiled-up rope—one coil over the other. The ends of both ova-sacs were partly unwound. The parasite was attached to the gills of the pogge by a slender but firm chitinous-like rod, the extremity of which was doubly barbed. The occurrence of *Hæmobaphes* on a living fish in the locality named gives the parasite a better claim to be included in the Forth fauna.—THOMAS SCOTT, Leith.

The Food of Sagitta.—Sagittæ are sometimes very abundant in our tow-net collections, and occasionally when time permits they form a subject of special study. The food of the Sagitta has engaged my attention for a considerable time; but, so far, the result has not been very encouraging. The living Sagitta is transparent, or nearly so, and the outline of any organism it may have swallowed, if not too small, can therefore be readily made out, whilst dissection of the Sagitta, so as to set free the organism, renders assurance doubly sure. I have ascertained in this way that Sagitta lives on small larval and post-larval fishes, on Copepoda—as *Calanus finmarchicus*—and on small Amphipoda. Quite recently I obtained a Sagitta with a small specimen of *Phoxus plumosus* (*Harpina plumosa*)

inside it; the amphipod was somewhat imperfect, no doubt due to it having been partly digested. I have never seen more than one organism in a Sagitta, nor have I been successful in observing the manner in which it attacks its prey.—THOMAS SCOTT, Leith.

BOTANICAL NOTES AND NEWS

Linaria minor, L., in Stirlingshire.—Replying to Dr. F. Buchanan White's note in the October number of the Scottish Naturalist, p. 193, as to the occurrence of *Linaria minor* in other parts of Scotland, this plant has suddenly appeared at Gargunnoch Station in considerable quantity. It has also been reported to us as having been found on the railway near Kippen, about three miles west of Gargunnoch. These are the first occurrences of the plant in the county as far as we know. Is it not the case that in England it is also very partial to railway banks?—R. KIDSTON and F. S. STIRLING.

Mr. James M'Andrew has favoured us with reprints of papers published recently by himself in the "Transactions of the Dumfriesshire and Galloway Nat. Hist. and Antiquarian Society," on the Mosses, Hepaticæ, and Lichens of S.W. Scotland. Mr. M'Andrew's researches have added largely to what was on record previously; and in these papers he sums up the results of his own labours and of those of other botanists in the same district. Excluding varieties, of which many are recorded in these lists, the species reach the following numbers;—From Dumfriesshire and Kirkcudbright,—Mosses 234, Hepaticæ 102. (To these should be added *Dicranum spurium*, from Moffat, *Barbula vinealis* from Kenmure Castle, *Cephalozia multiflora*, from Dumfries, *Harpanthus Flotvianus*, from Glenlee and Glenkens, *Scapania umbrosa* from Dalry and Moffat, *Nardia densiflora* from Black Craig, New Galloway, and *Aneura latifrons* from Bennan Hill, discovered in the district by Mr. M'A. since the publication of the above lists.) The Lichens collected in the S.W. counties of Scotland (mostly by himself in the Glenkens), including some from Rerrick collected by the Rev. G. M'Conachie, reach the number of 217 species, with very many varieties. The papers will be found very helpful to all local students of the groups treated of, and they should be consulted by all who interest themselves in the Cryptogamic Botany of Scotland.

In *Grevillea*, for March, is a paragraph which will be read with regret by all British botanists, announcing that Dr. M. C. Cooke has resolved, because of "fickle health, increasing years, and diminished vigour," to withdraw from the editorship after the issue of the next number, which will complete the twentieth volume. He adds "Whether some more enterprising proprietor can be found

is yet uncertain; our only concern now is to make known our determination to stand open to any proposal whereby our pecuniary interest shall cease, so that we may rest from the periodical anxieties of the past two decades."

Dr. Cook's volume on *British Desmids*, published in 1887, is offered at the reduced price of £2, including postage, in order to dispose of a small number of copies still in hand. Upwards of 1600 coloured figures are given on the 66 coloured plates. The present opportunity should be taken advantage of by Natural History Societies and libraries not already possessed of the work to procure it at so low a price. Communications should be addressed to Dr. M. C. Cooke, 146 Junction Road, London, N.

CURRENT LITERATURE

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—January to March 1892.

[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.

Polecat in Aberdeenshire. G. MACKAY. *The Field*, 5th March 1892, p. 313.—"Recently killed" in the Forest of Glenmuick.

On the occurrence of Hybrids between the Red Grouse and Ptarmigan. By WALTER CHAMBERLAIN, F.Z.S. *The Zoologist* (3), Vol. xvi. (February 1892), pp. 41-51.—No unimpeachable record of such a hybrid, and only one probable example—a specimen shot at Kintradwell, in Sutherland, on 1st September 1878, by Captain Hauston, and now in the University Museum, Cambridge.

Hybrid Blackcock and Red Grouse. G. M. *The Field*, 2d January 1892, p. 2.—Shot at Sandside, Caithness, in November 1891.

Bernicle Goose at North Berwick. F. COBURN. *The Zoologist* (3), Vol. xvi. (Jan. 1892) p. 33.—Female shot on 8th Oct. 1891.

An Investigation into the Variations of the Viper in Great Britain. By G. A. BOULENGER. *The Zoologist* (3), Vol. xvi. (March 1892), pp. 87-93.—Several Scottish specimens are alluded to, and their peculiarities described. Its distribution is also sketched.

Note on a New Species of Onychodus from the Lower Old Red Sandstone of Forfar. E. T. NEWTON, F.G.S. *Geol. Mag.* (3), Vol. ix. (February 1892), pp. 51-52.—Description and figures of the

teeth of a species of *Onychodus*, obtained from the Old Red Sandstone of Forfar. The author compares it with *O. anglicus*, and *O. arcticus*, and regards it as a new species, *Onychodus scoticus*.

Butterfly Notes. C. W. DALE. *Ent. Mo. Mag.* (2), Vol. iii. (February 1892), p. 49.—*Pieris napi*, female, at Lairg, on 14th June 1890, of a cream ground colour, resembling some examples of *P. rapæ*.

Notes on Lepidoptera Bred or Captured in 1891. W. M. CHRISTY. *The Entomologist*, xxv. (January 1892), pp. 18-19.—*Sphinx convolvuli* captured at Rannoch.

The British Noctuæ and their Varieties. By J. W. TUTT, F.E.S. Vol. ii. (January 1892).—This volume, of 180 pages, deals with the Family Noctuidæ, and contains many descriptions of Scottish specimens.

The Paisley "Pug" (*Eupithecia castigata*, var.) By W. H. TUGWELL. *The Entomologist*, Vol. xxv. (February 1892), pp. 41-42.—This form, which has long puzzled entomologists, is determined a melanism of *E. castigata*.

Notes on British Lepidoptera. By RICHARD SOUTH. *The Entomologist*, Vol. xxv. (February 1892), pp. 29-36.—Scottish varieties of *Noctua brunnea* and *Noctua festiva* are described.

Annotated List of British Tachiniidæ. By R. H. MEADE. *Ent. Mo. Mag.* (2), Vol. iii. (March 1892).—At p. 77 *Miltogramma punctata*, Mgn., is mentioned for Arran, *vide* Curtis.

Exorista apicalis. C. W. DALE. *Ent. Mo. Mag.* (2), Vol. iii. (February 1892), p. 50.—Mr. Dale captured this rare fly at Vallay, North Uist, on 18th June 1883.

The Hemiptera Heteroptera of the British Islands. By EDWARD SAUNDERS. Part i. (January 1892); Part ii. (March 1892).—The Scottish species of the families Pentatomidæ and Berytidæ are treated of.

[**Cicadæ captured near Edinburgh.**] G. B. BUCKTON, F.R.S. *Monograph of the British Cicadæ*, Vol. ii. Part viii. p. 194.—*Euacanthus interruptus*, *Eupteryx auritus*, *Bythoscopus flavicollis*, and *Limotettix virescens*.

A List of Earthworms known to occur in the North of England and South of Scotland, with habitats for each species. By Rev. HILDERIC FRIEND, F.L.S. *The Naturalist* (March 1892), p. 90.—*Lumbricus purpureus*, for Annan; *Allolobophora celtica*, for Langholm, are the only species for which Scottish habitats are given.

A Revision of the British species of Fresh water Cyclopidæ and Calanidæ. By GEORGE STEWARDSON BRADY, M.D., LL.D., F.R.S.

Nat. Hist. Trans. Northumberland, Durham, and Newcastle-upon-Tyne, Vol. xi. Part i. pp. 68-120. With fourteen plates.—Information concerning many species from various districts in Scotland has been contributed by Mr. Thomas Scott, F.L.S.

[*Reophax scottii* (*Chaster*) in the Firth of Forth.] Mr. G. W. Chaster in his Report upon the Foraminifera of Southport District (*1st Rep. Southport Soc. Nat. Sci.* 1890-91), at p. 57 describes *Reophax scottii*, a new species, and mentions the Firth of Forth as a habitat. The species is figured on Plate I. Fig 1.

BOTANY.

In *Transactions of the Edinburgh Botanical Society*, December 1891.

On Temperature and Vegetation in the Royal Botanic Garden (Edinburgh), during July, August, September, and October, 1891. By ROBERT LINDSAY.

On Temperature and Vegetation in the Royal Botanic Garden, Glasgow, during July, August, September, and October, 1891. By ROBERT BULLEN.

The Roots of Grasses in relation to their upper growth. By ANDREW P. AITKEN, D. Sc. (with plates II. and III.); illustrates the root growth between June 1889 and June 1890, of 14 pasture-grasses; and gives a table of the weights of the hay and stubble and of the roots, distinguishing the quantity produced in the upper 8 inches from that produced in the 16 inches below.

New Zealand Veronicas fit to be grown out-of-doors in Scotland. (In the Presidential Address to the Botanical Society of Edinburgh, November 1891, by ROBERT LINDSAY), enumerates 18 hardy species that can stand the climate of Edinburgh, and 11 half hardy, and gives hints with regard to their cultivation and value as ornamental plants.

Excursion of the Scottish Alpine Botanical Club to Tyndrum in 1891. By WILLIAM CRAIG, M.D. The localities visited were Beinn Laoigh on west, north, and east sides (very rich in Alpine plants); Crom Allt on Beinn Odhar; Lochan Bhe (in which a "very remarkable variety" of *Scirpus fluitans* was found growing entirely under water at a considerable distance from the edge); and the Corrie in Cruach Ardran.

(In *Journal of Botany*, January, February, and March 1892.)

First Records of British Flowering Plants. Compiled by WILLIAM A. CLARKE, F.L.S. "An attempt to extract from printed botanical works published in Great Britain the earliest notice of each distinct species of our native and naturalised flowering plants. The following are noted from Scotland: *R. reptans*, L., 1777, at the

west end of Loch Leven. *Caltha radicans*, T. F. Forster, in *Linn. Soc. Trans.* 1807; recorded by G. Don, as found in 1790 by himself in a ditch near the farmhouse of Haltoun. *Nuphar pumila*, Hoffm., discovered in 1809 by Mr. Borrer in a pool near the farm of Corrie Chastel, at the foot of Ben Chonachan. *Fumaria densiflora*, D.C., 1843, near Edinburgh. *Draba rupestris*, Br., "found by James Dickson in 1789 on Ben Lawers." *Erophila inflata*, Hook, f. 1830, on Ben Lawers, above the Lake."

A new British Hieracium (*H. anfractiforme*). By Rev. EDWARD S. MARSHALL, M.A., F.L.S. Description of a new species, found beside "rocky subalpine streamlets of the Western Breadalbanes, on granite and mica-slate, from 1400 to 1800 feet" (by Mr. Marshall in Glen Etive and in Corrie Ardran near Crianlarich, by Dr. Buchanan White on Ben Laoigh, and by Dr. W. A. Shoobred between Glen Lyon and Tyndrum). "Occasionally *H. anfractiforme* has a certain look of *H. argenteum*, Fr., from which, however, it differs in many essential points." "It has been well tested by two or three seasons' cultivation." (*J. B.*, January.)

Microchæte æruginea, *sp. n.* By E. A. BATTERS;—On *Rhodochorton Rothii*, Nag., from Berwick-on-Tweed. It is "closely allied to *M. tenera*, but differing from it in the greater thickness of the filaments, the shortness of the articulation, and the marine habitat." A diagnosis in Latin follows.

REVIEWS

British Fungi (*Phycomycetes and Ustilagineæ*). By GEORGE MASSEE. (L. Reeve and Co. 1891. Cr. 8vo. 232 pp. 8 plates.)

Of making of many books there is no end; yet on various great groups of British Fungi there is not only room, but very great need, for monographs. But to justify their existence such works must give proofs of care in execution and of full acquaintance with the subject treated of. It is to be regretted that the work under review is not such as might have been looked for from the author. The inclusion of so widely different groups as the *Mucoraceæ*, the *Peronosporæ*, and the *Ustilagineæ* in the same small volume is scarcely convenient. There scarcely seemed need to include the *Ustilagineæ* at all, in view of the recent excellent monograph on them by Dr. Plowright; and, in fact, there is little, if any, real addition made in the new work to our knowledge of this group in Britain.

There was room for a manual on the two other groups, had the object of the book as stated in the preface "to bring up to date the British species of Fungi included" been fulfilled. A pretty long

list of names of "literature quoted" gives promise of careful research. But it requires no great labour to detect that the references to that literature are most incomplete, and to prove that the book as it stands is utterly misleading in its profession of being up to date. Leaving it to others to indicate deficiencies for the English flora proper, we shall instance in support of the above criticism only the old genus *Peronospora* (now broken up into several genera), as regards the species recorded in the "Scottish Naturalist" some years since. As that journal appears among the "Literature quoted" we might have assumed that all records in it of species new to Britain would have been noted, yet there is no mention in the monograph of the following species recorded in the journal:—*P. obovata*, Bon., *P. Potentillæ*, De Bary, *P. Chrysosplenii*, Fckl., *P. leptosperma*, De Bary, *P. Radii*, De Bary, *P. Valerianæ*, Trail, *P. alta*, Fckl., *P. Rumicis*, Corda. Nor is there any reference to *P. Alsinearum*, Casp., and *P. Scleranthi*, Rabh., even to show that they are sunk as synonyms. As the total number of species of *Peronospora*, in the widest sense, mentioned in the book is twenty-five, the above omissions are very noteworthy. The host plants enumerated are also very defective.

Space will not permit of naming the omissions of records from Scotland in the other groups of fungi included in the work. Monographs are rendered considerably more useful when they give references to earlier notices of the species treated of in them; but this has been attempted only as regards a few writers (*e.g.* Berkeley) in this work; nor has any attempt been made to indicate distribution. The book also bears signs of want of care in the numerous printer's errors that disfigure its pages.

A Monograph of the Myxogastres. By GEORGE MASSEE. (Methuen and Co. 1892. Ry. 8vo. 367 pp. 12 coloured plates.)

It is with great pleasure that we turn to this important and careful monograph (just issued), in which the author does justice alike to himself and to his subject. There has for several years been much need of a revision of the curious organisms included in the group of Myxogastres, whether these be regarded as plants or as animals, a question, indeed, rather of words than of vital significance so far down in the scale of organised beings. Mr. Masee shows evidence of having brought to the work much personal investigation, and a thorough acquaintance with the work of others among these plants, and with the extensive materials for study contained in the Herbarium at Kew and obtained from his correspondents. The numerous excellent coloured figures from Mr. Masee's brush add to the value of the book, which will be indispensable to every student of the Myxogastres. A few Scottish localities are referred to under certain species; but we have not observed any new records among these.



The Annals of Scottish Natural History

No. 3]

1892

[JULY

ON NEW AND RARE CRUSTACEA FROM
THE EAST COAST OF SCOTLAND.

By THOMAS SCOTT, F.L.S., and ANDREW SCOTT.

PLATES VI. and VII.

Lichomolgus aberdonensis, n. sp. (Plate VI. Figs. 1-12).

LENGTH, exclusive of tail setæ, 1.46 mm. (about $\frac{1}{8}$ of an inch). The cephalo-thorax is composed of five segments, the first of which is longer than the combined length of the other four, rounded in front, and not produced into a rostrum; the fifth segment is rather longer than, and little more than half the breadth of, the preceding segment. Abdomen in both sexes composed of five segments, the first segment nearly twice the breadth of the next one, and as long as the second and third together. In the male the lateral distal angles of this segment are furnished with two small unequal spines (Fig. 12). The fourth segment of the abdomen in both sexes is shorter than either of the other segments. The whole length of the abdomen (exclusive of the caudal stylets) is scarcely half the length of the cephalo-thorax. Caudal stylets about half as long again as the last abdominal segment and furnished with six setæ, the fourth seta (counting from the outside) is considerably longer than the entire length of the abdomen and caudal stylets combined. Anterior antennæ seven-jointed, alike in both sexes, and

provided with numerous setæ; the proportional length of the joints are nearly as shown by the annexed formula:—

$$\frac{5 \cdot 5 \cdot 2 \cdot 7 \cdot 6 \cdot 5 \cdot 6}{1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7}.$$

Posterior antennæ four-jointed; the first and second joints are elongate, the third and fourth very short (Fig. 3). Mandible short and moderately stout, armed at the extremity with two processes and two spiniform setæ; one of the processes is conical and tooth-like, and serrate on the inner edge, the other is somewhat cylindrical, and rounded at the end—the margin that is opposed to the tooth-like process, and also the end, being hispid (Fig. 4). Maxillæ stout, broad, and bearing a number of terminal spiniform setæ. Anterior foot-jaws stout, with a proportionally large marginal scitiferous lobe, and several terminal spines (Fig. 5). Posterior foot-jaws two-jointed, those of the male armed with a strong, uncinatè, and sinuous terminal claw, which is considerably longer than the stout broad joint from the end of which it springs, and with which it forms a powerful grasping organ. At the base of the claw, on the inside, there is a stout, short, and blunt spine. The inner edge of the last joint of the foot-jaw is furnished with a double (? or treble) row of elongate blunt-pointed teeth. Two long stout plumose setæ spring from the inner margin, and near the distal end of the first joint. The terminal claw probably passes down between these two setæ, and forms with them an interlocking apparatus (Fig. 7). The posterior foot-jaws in the female, are also moderately stout, but the terminal claw is feeble; the last joint is not so broad, and its inner margin bears two setiferous spines instead of the double row of teeth possessed by that of the male. The first, second, third, and fourth pairs of swimming-feet are nearly alike; both branches are short (the outer being rather shorter than the inner) and three-jointed. The outer branch is armed exteriorly with a number of dagger-like spines, as shown in the figures (Figs. 8 and 9). The inner distal angle of the first basal joint of all the four pairs bears a spiniform seta. The inner distal angle of the second basal joint of the first pair bears also an elongate dagger-like spine, while a moderately long and stout seta springs from the outer margin of the same joint. The fifth pair of feet are

broad and foliaceous—more so in the female than the male, as shown in the figures (Figs. 10 and 11).

Habitat.—Aberdeen Bay. Several specimens were obtained in bottom-tow-net material collected in 1891, but only a few of them were mature.

Lichomolgus aberdonensis resembles in general form and structure the species described in the "Tenth Annual Report of the Fishery Board for Scotland" under the name of *Lichomolgus littoralis*, but differs from it in several important points, as in the proportional length of the joints of the anterior and posterior antennæ, in the form of the posterior foot-jaw and fifth pair of feet, and in the proportional length of the segments of the abdomen.

Lichomolgus arenicolus, Brady (Plate VII. Figs. 1-10).

1872. *Boeckia arenicola*, Brady, "Nat. Hist. Trans. of Northumberland and Durham," vol. iv. p. 430.

1880. *Lichomolgus arenicolus*, Brady, "Mon. Brit. Copep." vol. iii. Plate LXXXVII. Figs. 1-7.

Female.—Length, exclusive of tail setæ, 2·3 mm. Anterior antennæ not more than half the length of the first body segment, and composed of six joints, which are all more or less setiferous; the proportional length of the joints are nearly as in the formula:—

$$\frac{11 \cdot 18 \cdot 6 \cdot 14 \cdot 12 \cdot 17}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6}$$

Posterior antennæ stout, four-jointed; the first two joints short, the third about twice the length of the second, and the last about two-thirds the length of the preceding one. The last joint is armed with three stout terminal clawed spines, which are elongate, and distinctly articulated and swollen near the middle—the distal half being strongly curved and claw-like. There is a fourth terminal articulated spine, but it is more slender and less curved than the other three (Fig. 3). Mandibular stylets two, the upper one provided with a row of marginal teeth, the first two of which are large, while the others gradually decrease in size towards the distal end. The lower stylet bears a number of fine hairs on its upper margin (Fig. 4). The maxillæ consist of a broad laminar plate rounded at the end, and

furnished with a moderately long terminal spine; there is also a small marginal bifid process on the one side, while a small seta springs from the margin on the other side (Fig. 5). The last joint of the anterior foot-jaw terminates in four moderately large subequal sub-marginal spines, and a small lateral spine springs from near the proximal end of the joint (Fig. 6). Posterior foot-jaw rudimentary, moderately broad and stout, and having a very small subterminal tooth-like process (Fig. 7). The first, second, third, and fourth pairs of swimming-feet nearly alike; both branches short (the inner rather longer than the outer one), and three-jointed (Figs. 8 and 9). The armature of the inner branches differs to some extent, especially in the following manner: the last joint of the inner branches of the first pair is provided with one submarginal short and stout dagger-shaped spine, and round the distal end with five moderately long setæ, as shown in Fig. 8. In the second pair the last joint bears one terminal and two submarginal dagger-shaped spines, which are rather longer than that of the first pair, and three submarginal setæ. In the third pair the last joint bears two terminal and two submarginal spines, and two marginal setæ. In the fourth pair the last joint is armed with the same number of spines as in the third pair, but with only one marginal seta, as shown in Fig. 9. Fifth pair elongate, foliaceous, furnished with one short seta on the external margin and near the distal end; immediately anterior to the seta is a number of small marginal teeth. The somewhat truncate extremity of the foot bears three setæ, the middle one of which is very small, while the other two are moderately long and stout, and nearly of equal length (Fig. 10). Abdomen four-jointed, the first segment about twice the length of the next, and somewhat dilated; the other three segments are subequal, the last being rather longer than either of the other two. Caudal stylets rather longer than the last abdominal segment, and about three times as long as broad; each stylet is furnished with several terminal plumose setæ, and with one seta near the middle of the exterior margin.

Habitat.—Off St. Monans, Firth of Forth. One specimen only (a female) of this interesting species was obtained, and is recorded (but not described or figured) in

the "Tenth Annual Report of the Fishery Board for Scotland" (1892).

Lichomolgus arenicolus appears to be a rare species. Some important details of structure not noticed in "British Copepoda" are here described and figured, as are also several others, to illustrate the description of the species, viz.: the posterior antennæ with its remarkably articulated and clawed terminal spines, the rudimentary female posterior foot-jaw, and the fourth pair of swimming-feet, which, like the other three pairs, has both branches three-jointed, and which in this respect forms, with *Lichomolgus aberdonensis*, *Lichomolgus littoralis*, and *Lichomolgus sabellæ*,¹ a distinct group—the other species of *Lichomolgus* being distinguished from these three by having the inner branches of the fourth pair of swimming-feet one- or two-jointed. The one- or two-jointed inner branches of the fourth pair of feet constitute one of the characters of the genus *Lichomolgus*, while a second character is that of the mandible, which has the form of "a slender stylet, dilated at the base, but excessively slender and filiform beyond the middle." In *Lichomolgus arenicolus* there are two mandibular stylets, and in *Lichomolgus aberdonensis* and *littoralis* the mandible, which is moderately stout and broad, has no stylets, but is armed at the extremity with one or two tooth-like processes and a few setæ. In consequence of this divergence from some of the generic characters of *Lichomolgus*, it may become necessary to institute one, or possibly two, sub-genera for the reception of these aberrant forms, or otherwise to alter the generic definition of *Lichomolgus* so as to include them.

Should it be found desirable, for the reasons stated, to remove *Lichomolgus littoralis* and *aberdonensis* into a different genus or sub-genus, we would suggest *Platycheiron* as an appropriate generic name,—being descriptive of the remarkably broad ultimate joint of the male posterior foot-jaws of the two species referred to.

¹ A species described by I. C. Thompson in "Proc. Liverpool Biol. Soc.," vol. ii. p. 68. He also records *L. albens*, Thorell, from Liverpool Bay, but we have not as yet seen any description of this species. Another species (apparently new), having the inner branches of the first four pairs of swimming-feet three-jointed, has just been obtained by us, and will be described and figured later.

TABLE, showing some of the more important points of difference between the British species of *Lichomolgus*, including those described here, and in the Fishery Board's "Tenth Annual Report" (1892).

Name of Species.	Anterior antennae.	Posterior antennae.	Mandibular stylets.	Last joint of the posterior foot-jaw (male).	Inner branch of fourth pair of swimming-feet	Foot of fifth pair (male).
<i>Lichomolgus fucicola</i> .	7-jointed	3-jointed	One	Ovate, with a terminal falciform claw	2-jointed	Elongate, narrow, with two apical setae
<i>Lichomolgus liber</i> . .	7-jointed	(?) 5-jointed	One	Slender, with a terminal curved claw	(?) 1-jointed	A slender subulate joint, with stout basal setae.
<i>Lichomolgus thorelli</i> . .	7-jointed	4-jointed	(?) One	Broadly ovate, with curved terminal claw	1-jointed	Very small, bisetose
<i>Lichomolgus furcillatus</i> .	6-jointed	Doubtful	One	Doubtful	2-jointed	Elongate, narrow, with two apical setae
<i>Lichomolgus forficula</i> .	6-jointed	3-jointed	One	Somewhat like <i>L. fucicola</i>	2-jointed	Small, bisetose
<i>Lichomolgus concinnus</i> .	7-jointed	4-jointed	Doubtful	Doubtful	2-jointed	Somewhat like <i>L. fucicola</i>
<i>Lichomolgus arenicolus</i> .	6-jointed	4-jointed	Two	Moderately broad, with strongly curved claw	3-jointed	Long, subclavate
<i>Lichomolgus littoralis</i> .	7-jointed	4-jointed	No stylets—mandible broad, with one stout conical tooth and two setae	Broadly triangular, with long curved claw	3-jointed	Broadly foliaceous
<i>Lichomolgus aberdonensis</i>	7-jointed	4-jointed	No stylets—mandible broad, with two tooth-like processes and two setae	Broad, with long sinuous claw	3-jointed	Broadly foliaceous
<i>Lichomolgus sabelle</i>	7-jointed	4-jointed	(?)	Somewhat like <i>L. fucicola</i>	3-jointed	Small, bisetose

Thysanoessa borealis (G. O. Sars).

1882. *Thysanoessa borealis*, "Oversigt over Norges Crustaceer," Bd. I. pp. 52, 53.

This Schizopod has been obtained in various parts of the Firth of Forth, but never in quantity—one, or at most only a few specimens being taken at a time. *Thysanoessa* has the first pair of legs long, but not so long or so slender as those of *Nematocelis*, which it somewhat resembles. It is further distinguished from *Nematocelis* by the penultimate joint of the first pair of legs being provided throughout its length with stout ciliated setæ, the last joint—which is very small—being also furnished with a number of hairs. On the other hand, the first pair of legs in *Nematocelis* have both the penultimate and antipenultimate joints (which are long and slender) naked, but there is a bunch of spiniform setæ at the apex of the legs. The first legs are very easily broken, so that in handling specimens, or in collecting them, great care is required to keep the legs intact. We are indebted to the Rev. A. M. Norman for the name of the *Thysanoessa* here recorded.

Among a few specimens of Forth Schizopoda forwarded to Dr. Norman for identification, and which included the *Thysanoessa* referred to above, he observed what he considers to be a specimen of *Nematocelis megalops* (G. O. Sars); but the specimen he examined, and one or two others that seem to belong to the same species, having lost their first legs, and thus wanting the character which chiefly distinguishes them, it is perhaps better for the present to leave the claim of *Nematocelis megalops* for a place in the Forth fauna in abeyance till more satisfactory specimens turn up. Dr. Norman informs us that *Nematocelis megalops* was sent to him from Banff by Thomas Edward twenty or thirty years ago; from Aberdeen by Mr. Sim in 1872; and that it has quite recently been obtained at Redcar.

The eyes of *Thysanoessa* and *Nematocelis* have a marked constriction near the middle, which divides the eye into what appears to be a lower and upper eye, and thus imparts to them a peculiar and rather striking appearance, and which

serves to distinguish them at a glance from either *Boreo-phausia* or *Nyctiphanes*.

Explanation of Plate VI.

Lichomolgus aberdonensis, n. sp.

Fig. 1.	Adult female	× 40
„ 2.	Anterior antenna	× 95
„ 3.	Posterior antenna	× 125
„ 4.	Mandible; <i>a</i> , maxilla	× 125
„ 5.	Anterior foot-jaw	× 190
„ 6.	Posterior foot-jaw (female)	× 190
„ 7.	Posterior foot-jaw (male)	× 190
„ 8.	Foot of first pair	× 125
„ 9.	Foot of fourth pair	× 85
„ 10.	Foot of fifth pair (female)	× 125
„ 11.	Foot of fifth pair (male)	× 125
„ 12.	Abdomen of male	× 40

Explanation of Plate VII.

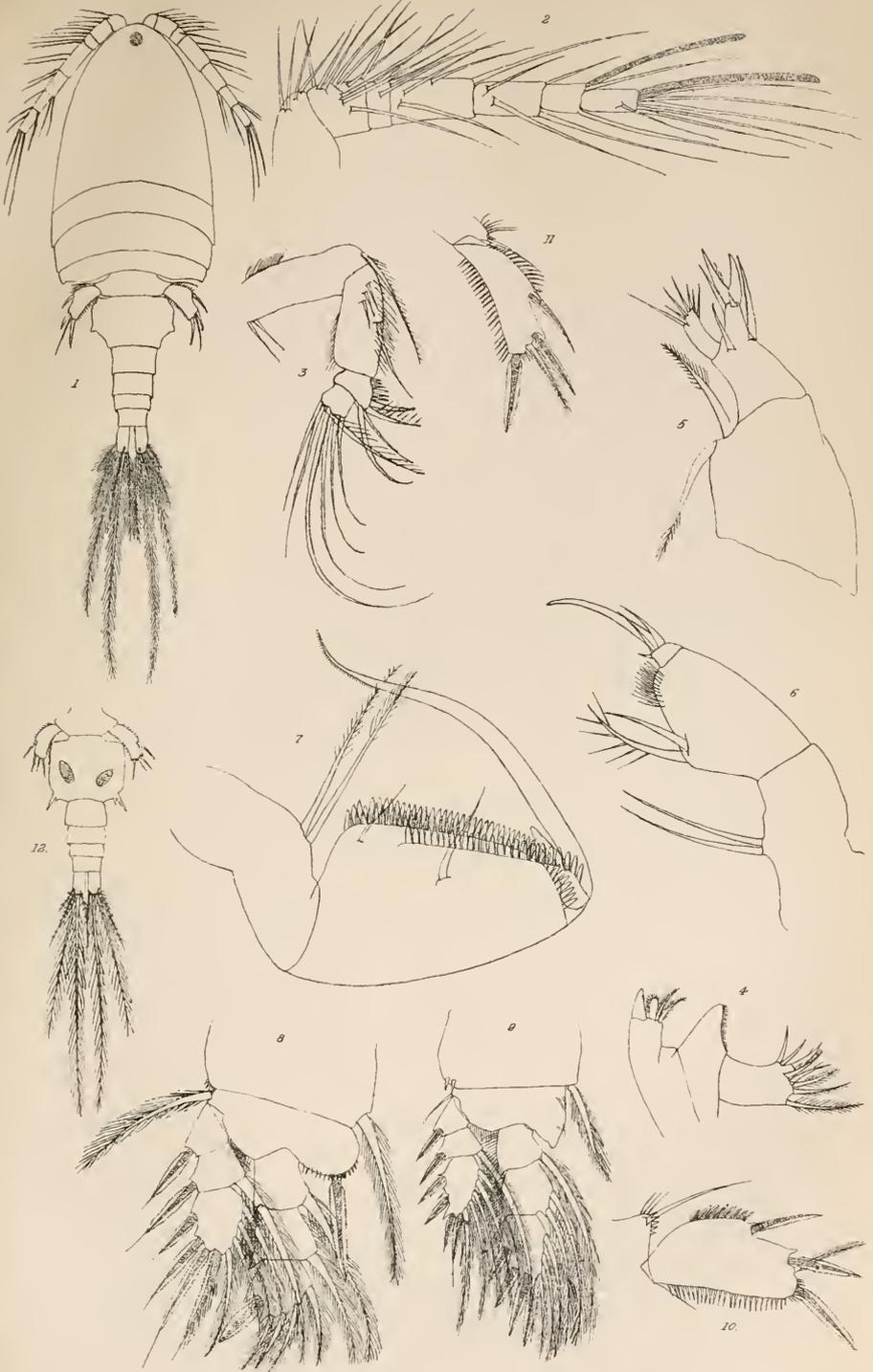
Lichomolgus arenicolus, Brady.

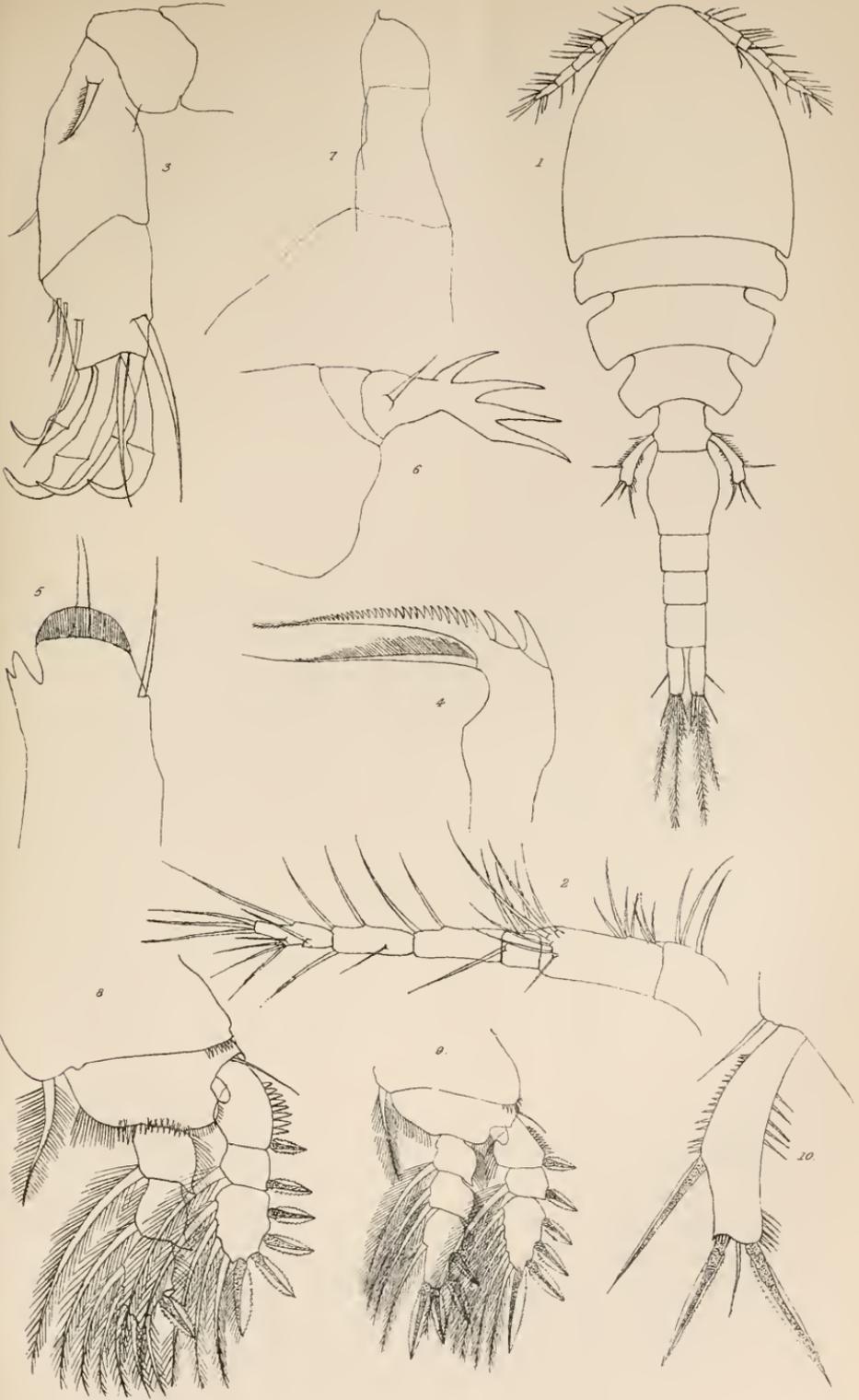
Fig. 1.	Adult Female	× 40
„ 2.	Anterior antenna	× 125
„ 3.	Posterior antenna	× 190
„ 4.	Mandible	× 250
„ 5.	Maxilla	× 280
„ 6.	Anterior foot-jaw	× 280
„ 7.	Posterior foot-jaw	× 280
„ 8.	Foot of first pair	× 125
„ 9.	Foot of fourth pair	× 85
„ 10.	Foot of fifth pair	× 190

CONTRIBUTIONS TO THE VERTEBRATE FAUNA OF SUTHERLAND AND CAITHNESS.

By T. E. BUCKLEY, B.A., F.Z.S., etc.

THE object of the following notes is to enable us to bring the Fauna of Sutherland and Caithness up to date. One bird, the Ruff, is new to the Sutherland list, and we are able to show the spread of certain other species, such as the Stock Dove, Tree Pipit, etc.





Eagles still hold their ground fairly well, but other birds of prey show a decrease ; this, however, might be expected, though it is sad to see how the Hen Harrier is rapidly approaching utter extermination.

Plantations are growing up and doing their silent work in increasing the numbers and breeding areas of certain species. When staying at Badenloch, we have been repeatedly struck, any autumn we have been there, with the attraction which a few (say three or four hundred) small firs, a garden, and an acre or two of cultivated ground, has on migrating birds. Constantly in the early October mornings we have seen flocks of small birds, such as Greenfinches, Chaffinches, etc., descend into these trees, rest for a short time, then with an unanimous twitter rise up and pursue their onward course. As a rule everything was quiet for the day by nine o'clock.

In the late W. Dunbar's possession at Brawl, was a large case, containing amongst other specimens, a Sutherland Osprey, shot in the breeding season, the two Red-necked Phalaropes mentioned in St. John's "Tour in Sutherland," and some other rarities. All in the case are supposed to be from Sutherland or Caithness, but as there seems to have been no record kept of date and locality, and seeing that one of the hawks (a species of Harrier) is undoubtedly foreign, their genuineness must be accepted with extreme caution.

In a paragraph taken from the "Scotsman" of 24th December 1887, the following is said : "Gordon of Straloch, on the authority of Mr. Timothy Pont, who was minister of Dunnet about the year 1614, and likely to be well informed, when writing of the district of Parf or Cape Wrath remarks, 'Verie great plentie of wolfes doo hant in thir desert places.'"

MAMMALIA.

Erinaceus europæus, *L.*—HEDGEHOG.—Mr. Houstoun brought four Hedgehogs, two of each sex, from Ross-shire in August 1888, and turned them into his garden at Kintradwell, from which they made their escape.

Crossopus fodiens, *Pall.*—WATER SHREW.—Under date of 8th September 1888, Mr. G. R. Lawson of Golspie writes us : "I got a pretty specimen of the Water Shrew here yesterday, and have

sent it to Joass. It was 'trapped' in a cistern which I put in recently for irrigation purposes: the cistern has at present only about one inch of water in it, so the Shrew, having fallen in, could not get out. It was sitting upon the top of a stone busily engaged in devouring the remains of a companion in misfortune.

Felis catus, *L.*—WILD CAT.—A Wild Cat was caught in a rabbit-snare at Kirkton near Golspie by Mr. S. Sherlaw, in April 1888, and another was got at Berriedale in March 1890.

Mustela putorius, *L.*—POLECAT.—In January 1888, Mr. Hogg, Edinburgh, received a Polecat from Betty-hill. Three Polecats were trapped at Syre in Strathnaver by a rabbit-catcher, in October 1888, and sent to Mr. MacLeay in Inverness.

Martes abietum, *Fleming.*—MARTEN.—In January 1888, Mr. Hogg, Edinburgh, had a male Marten sent him from Loch Laoghal. In the "Inverness Courier" of 22nd November 1889, a fine specimen of the Marten is reported to have been sent in from Lairg, to be stuffed by Mr. Snowie.

Meles taxus, *Schreb.*—BADGER.—Two Badgers were killed on Ben Bhraggie in the winter of 1879, and brought to Mr. G. R. Lawson. We understand they are preserved as far as possible.

Delphinapterus leucas, *Pall.*—WHITE WHALE.—Mr. G. R. Lawson informs us that the skeleton of the White Whale, whose stuffed skin is now preserved in the Dunrobin Museum, and which was caught at the Little Ferry in 1879, was presented by the Duke of Sutherland to the Museum of the Royal College of Surgeons.

Cervus elaphus, *L.*—RED DEER.—Mr. W. Ross, forester to the Duke of Westminster, but now (1887) pensioned off, a man of nearly eighty, told us that Red Deer frequented the neighbourhood of Cape Wrath as late as about 1830, and that it was the building of houses in or near their favourite passes that first frightened them away. When a lad of about thirteen or fourteen he killed a stag of fifteen points during the year the Cape Wrath lighthouse was being built, and not far from where it now stands. A stag was seen in the suburbs of Wick, according to "Rod and Gun" of 14th November 1889, a very unlikely locality for such an animal.

Lepus variabilis, *Pall.*—MOUNTAIN HARE.—A cream-coloured variety of this species was shot by Mr. Donald Ross, the keeper at Torish on Ben Duan, in November 1890. Varieties of the White Hare are, in our opinion, very rare.

AVES.

- Ruticilla phœnicurus*, *L.*—REDSTART.—Rather irregular in its appearance; not one was seen about Brora in 1890. The species does not seem to increase as one would be led to expect; it appears to be most partial to old birch woods, where it can find convenient holes for nesting in.
- Sylvia rufa*, *Bodd.*—WHITETHROAT.—Like the Redstart, does not appear to increase much, but we had a nest sent us from Brora in 1890.
- Sylvia atricapilla*, *L.*—BLACKCAP.—A female was shot at Kintradwell on 21st November 1889 by Mr. Houstoun and sent us for preservation; it was feeding on the berries of a Cotoneaster, and was seen for several days in company with some Tits. The female seems to be much less often obtained up in the north than the male.
- Phylloscopus sibilatrix*, *Bechst.*—WOOD WREN.—Booth says that the Wood Warbler is not uncommon near Berriedale.
- Acrocephalus schœnobœnus*, *L.*—SEDGE WARBLER.—Mr. L. Hinxman reports a nest and eggs of this species from Duartmore, Assynt, in 1887. Captain S. G. Reid also gives Loch Laoghal as a locality for this Warbler in 1886.
- Acredula rosea*, *Blyth.*—LONGTAILED TIT.—A correspondent sends us word that for some time back he has been unable to find their nests in a wood near Brora where once they were common. Long-tailed Tits were first seen at Badenloch in November 1890.
- Parus ater*, *L.*—COLE TIT.—First seen at Badenloch in November 1890.
- Anthus trivialis*, *L.*—TREE PIPIT.—Breeds not uncommonly about Brora, and we have had several eggs sent us from that locality. Like other summer migrants they are variable in putting in an appearance.
- Muscicapa grisola*, *L.*—SPOTTED FLYCATCHER.—Mr. L. Dunbar in a letter to Harvie-Brown, dated 21st August 1886, reports two Spotted Flycatchers at Thurso in June of that year.
- Hirundo rustica*, *L.*—SWALLOW.—No swallows appeared about Brora in the season of 1890. In any case these birds are not common anywhere in Sutherland, though a pair or two can be found in certain localities.
- Chelidon urbica*, *L.*—HOUSE MARTIN.—We have been informed by Mr. James Hill of Helmsdale, that numbers of House Martins build annually in a large cave which is underneath the "Green Table," half way between Navidale and the Ord. All

the nests are built on the roof of the cave, which is about fifty feet high.

- Passer domesticus*, *L.*—HOUSE SPARROW.—House Sparrows were seen at Glencassly in August 1891, though this does not by any means prove that they are permanent residents there.
- Ligurinus chloris*, *L.*—GREENFINCH.—Common about Badenloch during the autumn migration.
- Fringilla cœlebs*, *L.*—CHAFFINCH.—The first Chaffinch seen at Badenloch was a female, on the 21st July 1889; since then they have been noticed frequently on the autumn migration.
- Fringilla montifringilla*, *L.*—BRAMBLING.—Several Bramblings were seen at Badenloch on migration in October 1889.
- Loxia curvirostra*, *L.*—CROSSBILL.—Mr. L. Dunbar informs us that three Crossbills were killed near Thurso in July 1888, and sent to him for preservation. There seems to have been quite an irruption of these birds in the north about that time.
- Sturnus vulgaris*, *L.*—STARLING.—Mr. G. R. Lawson informs us that a flock of about thirty Starlings perched on the chimney and roof of the house at Griam-a-corry, Badenloch, on the 18th October 1888. The forester had never seen such a thing before.
- Pica rustica*, *Scop.*—MAGPIE.—Very rare about the east coast of Sutherland. One pair seen about the Uppat Woods for some three years back (W. Baillie); more common about Dornoch.
- Corvus monedula*, *L.*—JACKDAW.—A Jackdaw was seen at Badenloch on 21st July 1889.
- Corvus corax*, *L.*—RAVEN.—Numbers of Ravens appear above a certain hill near Kinbrace station, in the month of May, and we have often seen eight or ten together there. Where do they come from? as the Raven is a rare bird during the breeding season anywhere near there, indeed at any time, except that particular month. In a letter to Harvie-Brown from Mr. Candler, dated 22nd July 1891, the latter says:—"There is one pair of Ravens still surviving at Scourie. For eleven years they have never reared a single young bird. This year they nested in the cliffs of the Duke's Mount. The nest could not by any means be reached, but the tenant of the shooting blew nest and young birds to pieces with rifle bullets."
- Cypselus apus*, *L.*—SWIFT.—Mr. James Hill of Helmsdale informs us that a good many Swifts build under the tiled roofs of the curing yards in that town. They are very scarce about Clyne and Brora (W. Baillie), but used to breed in the old prison at Dornoch.

Caprimulgus europæus, *L.*—NIGHTJAR.—Very rare, if not altogether absent, about Brora, in 1890. (W. Baillie.)

Iynx torquilla, *L.*—WRYNECK.—A Wryneck was killed at Berriedale on the 16th of October 1889, and the following extract from a letter from the Hon. G. Lascelles to Lord Lilford, and for which we are indebted to Prof. Newton, gives the curious way in which the bird was captured:—"It was a curious thing that one of the falcons at Langwell stooped from a high pitch and cut over stone dead a Wryneck out of the heather—the only specimen that any of the men about had ever seen in that county. What was he about out on the hill? and do you think they are really very rare in Caithness?" (*In lit.* 9th November 1889.)

Alcedo ispida, *L.*—KINGFISHER.—A Kingfisher was seen on the Golspie Burn in October 1887, by Major Reid and Mr. Melville, gardener at Dunrobin. Another was seen on the Brora above the bridge, on 11th August 1890; a stiff breeze from the east had prevailed for the three previous days. (W. Baillie.)

Cuculus canorus, *L.*—CUCKOO.—We saw one at Lothbeg Burn when out rabbit shooting on the 28th October 1886.

Strix flammea, *L.*—BARN OWL.—Mr. G. R. Lawson has informed us of two other occurrences of this bird in Sutherland. Mr. Lawson himself shot one at Loch Tubernach, near Brora, in August 1880, and another was killed at Clynelish in the summer of 1887. The remains of another were picked up by Mr. John Ross, near Garsary, not long dead, in April 1890.

Asio accipitrinus, *Pall.*—SHORT-EARED OWL.—A bird of this species was shot at Dornoch in August 1889. They are very rare birds in Sutherland in the summer season, and not common at any time.

Asio otus, *L.*—LONG-EARED OWL.—A Long-Eared Owl was shot at Forss on the 14th February 1887. There is a good-sized plantation there, one of the largest in this part of Caithness, though mostly consisting of hard wood. Two Long-Eared Owls haunted the very small plantation at Badenloch for more than a year in 1889 and 1890, though they did not seem to have bred there. They were often seen hunting about the garden, and were never disturbed.

Syrnium aluco, *L.*—TAWNY OWL.—In a letter to Harvie-Brown from Mr. C. J. Holdsworth, dated 11th August 1890, the latter gentleman states that during that season he came across three young and one old Tawny Owl in the neighbourhood of Scourie.

Circus cyaneus, *L.*—HEN HARRIER.—The Hen Harrier appears to be extinct now as a breeding species in the Badenloch district, there seems to have been only one nest taken since 1886, and the bird itself is now rarely seen.

Archibuteo lagopus, *Gmel.*—ROUGH-LEGGED BUZZARD.—In the "Inverness Courier" of 8th February 1889, it is mentioned that "Messrs. H. Snowie and Son received during last week several beautiful Buzzards shot in Sutherlandshire, one of them the Rough-Legged Buzzard now becoming so rare."

Buteo vulgaris, *Leach.*—COMMON BUZZARD.—In 1887 a nest of the Common Buzzard containing young birds was reported to Harvie-Brown by Mr. L. Hinxman from Duartmore, Assynt. From the increasing scarcity of the birds, it is well, here, to place this instance of their breeding on record.

Aquila chrysaetus, *L.*—GOLDEN EAGLE.—In 1889 a Golden Eagle made its nest on a small rock in a burn in the centre of the county of Sutherland, so easily accessible that a child could have gone into it. The nest itself was very small in size, and made mostly of heather. Unfortunately, being on the march between two shootings, it was impossible to preserve it, and the eggs were taken by the neighbouring shepherd.

Pernis apivorus, *L.*—HONEY BUZZARD.—A most beautiful Honey Buzzard was shot at Balblair on the 14th October 1889. It was curiously marked and spotted on the back, the breast being nearly white.

Falco candicans, *Gmel.*—GREENLAND FALCON.—In "Rod and Gun" of 28th November 1889, it is mentioned that Mr. Ireland, head keeper of Skibo Castle, recently shot a falcon, which, with the exception of a few feathers, was pure white. Another specimen was shot by Mr. J. Macpherson, forester, Griam-a-corry, near Kinbrace, on the 27th March 1888. It was first seen eating a grouse, and the forester returned for his gun, and stalked and shot it. The bird had only one leg, the other apparently having been lost in a trap. The specimen is now in our possession.

Falco islandus, *Gmel.*—ICELAND FALCON.—A young Iceland Falcon was shot at Glutt, by Mr. M'Nicol, on the 7th October 1887.

Pandion haliaetus, *L.*—OSPREY.—Barely a year passes without an Osprey being seen in May on the Helmsdale river. We saw one at Badenloch on 17th May 1890.

Phalacrocorax carbo, *L.*—CORMORANT.—Cormorants breed abundantly on the rocks between Port Skerra and Strathy Bay.

Anser cinereus, *Meyer*.—GREY-LAG GOOSE.—The Grey-lag still keeps up its numbers about Badenloch, but does not seem to increase much, if at all. The birds have not been disturbed in any way, as far as the lessee of the place could preserve them, for more than twelve years. Foxes seem great destroyers of geese, catching the old bird in the nest, and several were in this way spoilt. So tame are the birds there, that we have walked within eighty and a hundred yards of them feeding in one of the grass parks near the house, and when they rose they only went a short distance. Let us hope the new lessee of the place will be as careful of them. The Grey-lag breeds on one of the Badcall islands, and the people there take their eggs and hatch them under hens. This year (1891) the Mathiesons (of Scourie) took eggs from one of the islands in Loch Laxford (Charles Candler *in lit.* to J. A. Harvie-Brown, 22nd July 1891). Grey-lags appear at Badenloch in February. Under date, 3rd June 1888, Mr. Wallis, Reading, writes Harvie-Brown that the geese have at last deserted Eillean Fiag in Loch Shin.

Tadorna cornuta, *Gmel.*—SHELDRAKE.—An adult female was shot at Wick, on the 3rd of April 1876 (R. W. Chase).

Dafila acuta, *L.*—PINTAIL.—A male Pintail was obtained in Durness, in April 1889, by Mr. A. Mackay.

Fuligula ferina, *L.*—POCHARD.—Booth mentions that Pochards are excessively abundant in east Loch Shin in autumn. One, a male, was obtained at Balnakiell, in February 1890, by Mr. Scott. We saw this species, in June 1889, in one of the Caithness lochs, and from the appearance of the locality we have little doubt they were breeding there; our boat was, however, too bulky to take into the reeds.

Fuligula cristata, *Leach.*—TUFTED DUCK.—The Tufted Duck is one of those birds that has spread enormously in the last three or four years. So far we have, however, no record of its breeding in Sutherland, though in one loch in the east of the county these birds are to be seen all through the late summer and autumn in numbers, the loch being full of weeds. Its shores, however, are not adapted for breeding purposes. In Caithness, we found a great many pairs breeding in a loch amongst the reeds and grass at the sides; indeed, they were far the commonest species of duck on the loch. We found several nests, two containing respectively sixteen and seventeen eggs, at which rate it would not require many birds to stock every suitable place in the county.

Somateria mollissima, *L.*—EIDER DUCK.—Two Eiders were shot in Sutherland—but no exact locality is given—on 4th January 1877; one was an adult male, the other an immature male in

first plumage. Both are in the collection of Mr. R. W. Chase. Mr. J. T. Thomson writes Harvie-Brown that he found an Eider Duck's egg, in May 1888, on one of the Badcall Islands, "Not in a nest, but a little embedded in a small portion of grass among the rocks. I say an Eider because I know no other egg like it. It corresponds with eggs of that bird taken in Norway." Seeing that the Eider Duck is such an abundant species in other parts of the west, it does seem strange it should be so rare on the Sutherland coast. Perhaps this may be the first indication of its extension there.

Ædemia nigra, L.—COMMON SCOTER.—The Scoter is increasing its range in Sutherland, and getting more numerous yearly. As we were anxious to get a nest for our Sutherland collection we wrote to a person on whose ground they bred, and he kindly sent us a nest and six eggs. In his letter, dated 4th June 1890, he remarked that there were plenty of them about, but the nest was not always easy to find, he had often seen them with eight eggs, and adds they are late in nesting. In another letter, dated 16th June 1890, the same person says, "The Scoter's nest was not by a loch side, but in a place where there is a great number of water-holes; but any of them that I have seen before were always by a loch side. There were a great many little gulls (? Black-headed Gulls) nesting where this duck had her nest. I saw two pairs of the duck on the 6th and on the 13th of May, but no nest: and when I looked again on the 21st I got her nest with one egg. On the 30th she had six eggs, but was not sitting; and on the 4th of June she had still the six eggs and was sitting on them, so I took them. The other pair left that place, but there was a pair at some more water-holes about a mile over from this one, only there were a great many little islands that I could not get into where one duck was sitting (a common Wild Duck), and I think the Scoter had her nest there. They are getting more numerous here every year and spreading more to the westward."

Columba palumbus, L.—RING-DOVE.—Wood-pigeons bred for the first time at Erribol in either 1889 or 1890.

Columba œnas, L.—STOCK-DOVE.—The eggs of this bird were taken by us on the east coast of Sutherland, for the first time on 19th May 1889, and since then they have bred regularly. Dr. Penrose informs us that when on a visit to Glencassley in August 1891, he put three or four Stock-Doves out of a rocky burn, about two miles farther up the Cassley Strath.

Turtur communis, Selby.—TURTLE DOVE.—A Turtle Dove was shot at Forss on the 27th of September 1887, by Mr. Peter Calder, the keeper, and preserved by Mr. L. Dunbar.

Syrhaptus paradoxus, *Pall.*—PALLAS SAND-GROUSE.—Sand-grouse do not seem to have visited Sutherland in the same abundance as many other parts of the country. Mr. G. R. Lawson writes us under date 12th July 1888:—"The only lot of Sand-grouse I have heard of in this county was between the Muckle Ferry and Dornoch. The Chief Constable told me on 4th inst. that they were still there. I first heard of them about a month ago." A pair of Sand-grouse was seen by John Bannerman on the Golspie Links on 14th July 1888. Other records of this species in the two counties have already been noted by Rev. H. A. Macpherson.

Caccabis rufa, *L.*—RED-LEGGED PARTRIDGE.—From a sale Catalogue of the effects of the late W. Dunbar of Brawl Castle is the following item:—"Case French or Red-legged Partridge, which the late Mr. Dunbar tried to introduce into Caithness. Some were afterwards killed on Brawl Farm." 2nd July 1888.

Perdix cinerea, *Lath.*—PARTRIDGE.—In the old Statistical Account for Scotland published in 1797, vol 19, p. 21, it is stated that "It is only of late years that this bird (the Partridge) has been seen at Halkirk, Caithness." In 1890, a covey of partridge appeared close to the foot of the Big Ben Griam, and one was shot; this is a long way from any cultivated ground. A pair of old birds was shot at Badenloch on 15th October of that year, and a few days after a single young bird. Partridge had only been seen there about twice in the previous twelve years.

Coturnix communis, *Bonnat.*—QUAIL.—A Quail was shot at Achavarasdal, Caithness, by the keeper on 16th October 1887, and was preserved by Mr. L. Dunbar.

Lagopus mutus, *Leach.*—PTARMIGAN.—A covey of Ptarmigan, two old and three young birds, were seen on Big Ben Griam in August 1888 by John Macpherson, forester. These birds are only very occasional visitors there. They are also seen occasionally on Ben Uarie, but do not breed there as far as is known: they breed, however, sparingly on Morven in Caithness.

Lagopus scoticus, (*Lath.*)—RED GROUSE.—In the spring of 1889, two grouse were seen by Mr. G. R. Lawson to fly across the Helmsdale river at Torish, and settle on a low tree. Two hens shot on 10th November 1890 only weighed 1 lb. and 1 lb. 4 oz. respectively; a young cock shot on 1st November weighed 1 lb. 9 oz., an older bird 1 lb. 13 oz., this latter weight is a good average.

Fulica atra, *L.*—COOT.—Coots were seen and shot at Badenloch for the first time in August 1889, by Mr. C. H. Akroyd.

***Scelopax rusticola*, L.**—WOODCOCK.—Immense numbers of Woodcocks came to Sutherland in the season of 1890-1.—Badenloch shooting produced twenty-seven, whereas the twelve previous years would scarcely have given seven all put together. Another small shooting gave 125: and two days' shooting by two guns and the keeper gave forty. Snipe were by no means so numerous in proportion, indeed they never are very abundant on the east coast of Sutherland.

***Machetes pugnax*, L.**—RUFF.—From Glencassly, Mr. Flower, the proprietor, writes us under date 15th September 1890:—"On the little marshy loch between Lochs Rossal and Skerrach, my nephew A. D. Flower shot a Ruff, one of a pair which he took for plovers. I have sent it to Quartermain to preserve, and he says it is a fine specimen, though of course without the distinctive plumage. I thought you would like to know, as you do not record one in the Fauna." We have also received a notice that one was shot on the Sutherland side of the Dornoch Firth by a son of Sheriff Mackenzie, though, unfortunately, no date is given.

This is a new bird to the Sutherland Fauna, though not to Caithness, from which county we have to record another specimen shot at Achavarasdal by the keeper on 20th September 1887.

***Sterna minuta*, L.**—LITTLE TERN.—A Little Tern was shot at the mouth of the river Brora, in October 1890, by Mr. G. Sutherland, innkeeper, and sent to his brother-in-law Mr. W. Gordon, Embo. It was apparently feeding on flies and moths. (W. Baillie *ex ore*).

***Sterna cantiaea*, Gmel.**—SANDWICH TERN.—A nest of the Sandwich Tern containing one egg was found by Mr. Swailes of Beverley, Yorkshire, at the Little Ferry, near Golspie, on 3rd June 1878. There was only one pair of birds, and the nest contained only the one egg. It was placed on a point to which he had to wade, and on which was some seaweed, etc. This point has since been washed away, the strong tides there often making changes at the mouth of the Little Ferry estuary, and the birds have not been noticed there since.

***Larus fuscus*, L.**—LESSER BLACK-BACKED GULL.—A male of this species was shot at Thurso by Mr. Schofield on 4th November 1885. We notice this as the late date is unusual.

***Larus marinus*, L.**—GREAT BLACK-BACKED GULL.—The Handa colony of this species has been exterminated, or rather perhaps driven out, since the raid made by the Stornoway smugglers. (See under Guillemot.)

***Larus glaucus*, Fabr.**—GLAUCOUS GULL.—An immature specimen of this bird was killed at Wick on 2nd December 1872, and

sent in the flesh to Mr. P. Henderson, Dundee. This was the season these and the Iceland Gulls were so abundant in the Firth of Forth.

Stereorarius crepidatus, *Banks*.—RICHARDSON'S SKUA.—Still only one pair of these birds breeds in a locality in the east of Sutherland. Their eggs have been taken on two occasions, and one pair is in our possession.

Procellaria pelagica, *L.*—STORM PETREL.—“On the 20th June we went to the . . . Islands. Upon the ridge of rocks on the west side of Eilean . . . (separated by a great chasm from the island) . . . my brother put his arm down a hole . . . and drew out two Stormy Petrels; there were no eggs. He showed the birds to . . . who were delighted with them and had not seen them before. Then we let the birds fly. I expect several pairs breed upon this place.” (C. Candler in letter to J. A. Harvie-Brown, 22nd July 1891.)

Puffinus anglorum, *Temm.*—MANX SHEARWATER.—In the old Statistical Account for Caithness published in 1794, Vol. 2, p. 249, it is remarked that:—“Shearwaters are reported to be found at Dunnet Head.” It has not yet been ascertained whether they breed there or not, but we have seen numbers flying about in the evening when coming in to Scrabster from Orkney, and passing Dunnet Head.

Alca torda, *L.*—RAZORBILL.—**Lomvia troile**, *L.*—GUILLEMOT.—Under date of 22nd July 1891, Mr. Candler writes as follows:—“Some few years ago a smack came from Stornoway and landed a party upon Handa. They brought with them an immense length of rope. They secured this rope on the headland on one side of the Stack, walked along the brow of the cliff paying out the rope as they went, until they reached the projecting headland on the other side of the stack. Then they hauled the rope taut, and so brought it across the summit of the stack. They took from this rock every egg they could reach, and by means of nooses on the ends of poles they snared and killed 1500 Guillemots and Razorbills. Since this date the Great Black-backed Gulls have entirely forsaken the Stack and indeed the whole island.”

Uria grylle, *L.*—BLACK GUILLEMOT.—Mr. Candler in the letter just quoted remarks that the Black Guillemot has entirely disappeared from Handa. In another locality, on one of the Badcall Islands, he found about forty pairs.

Colymbus septentrionalis, *L.*—RED-THROATED DIVER.—Mr. Candler informs us that a pair of these birds bred this year, 1891, in Handa.

ON THE FORMER ABUNDANCE OF THE QUAIL
(*COTURNIX COMMUNIS*, BONNATERRE) IN
WIGTOWNSHIRE.

By PETER ADAIR.

IT may be stated, without fear of contradiction, that this fine little game-bird, which in the early experience of many sportsmen and ornithologists was fairly common in certain localities in Scotland, has now almost disappeared. In fact, in many of its former haunts it has been a stranger for years.

In view of this, it has occurred to me that the result of observations made, and of information obtained, in a district which was once a favourite haunt of the bird might be of interest. I refer to the Upper or Rhins district of Wigtownshire, being that part of the county to the south and west of the Water of Luce, and in particular to the parishes of Inch, Stoneykirk, Kirkmaiden, Leswalt, and Kirkcolm. These parishes form almost a peninsula, watered on the east by the Bay of Luce, on the south and west by the Irish Channel, and on the north partly by Lochryan. The soil varies, but it is chiefly sandy or gravelly. Situated as the district is, the climate is mild, and snow seldom lies, except in severe and protracted storms. The principal crops are oats and turnips. Game of all kinds is abundant.

It may not be out of place to make a few remarks on the haunts and habits of the bird in the district when it was common. It was not diffused generally; but confined to certain farms, and even to favourite fields on these farms, choosing dry, well-cultivated, sandy, or sharp gravelly soil. In spring the call-note sounded from the fields of rye-grass or of oats. In early autumn the birds frequented stubble, often close to some sheltering fence. In late autumn and winter they were found principally among the turnips, particularly in those parts of the fields interspersed with patches of chickweed. At all seasons they lay close—so close indeed that in autumn I have more than once seen birds caught by dogs. When a bevy of young birds was

flushed in autumn, they generally flew away singly or in pairs. In the winter months the birds were, as a rule, dispersed singly.

I have seen the nest twice in different years, on each occasion during harvest (early September), on the same farm, Springbank, in the parish of Leswalt. On each occasion the nest was in a field of oats. These nests were very late; as I once flushed a brood of seven very small young, strong on the wing, in an oat-field on the same farm in August of 1860 or 1861.

Though the bird was undoubtedly a summer visitor, during the years of its abundance in the district numbers remained all the year, except perhaps during severe winters. In the winter months they were often shot by sportsmen, and by gamekeepers when after Partridges. I have seen a bird in the end of December, and another (flushed near Stranraer) well on in January.

That the bird was common in the district in old times is beyond dispute; but it is most difficult to get information as to its numbers. I shall accordingly content myself by stating the result of information which I have obtained from living witnesses. Old men who have resided in the district all their lives concur in stating that the bird was quite common and familiar from the earliest date to which their recollections extend, down to the time of its disappearance. But I have not been able to get particulars of the actual numbers which were killed in suitable localities during a day's sport, till about the year 1858. Mr. Skinner, who has long been gamekeeper on the estate of Balgreggan, Stoneykirk, tells me that about that year it was possible to have shot eight or ten brace in a day in certain suitable localities on that estate; that he had killed three or four brace in a day when after Partridges, and refrained from shooting more, as they were not then much valued; and that the farms most frequented were the Galdenocks, Freughs, and Mye. These farms are contiguous, and lie at a low elevation, within two or three miles of Luce Bay. Their soil is naturally dry and sandy. Mr. John Martin, who was gamekeeper at Lochnaw in the parish of Leswalt during the years of the quail's abundance, states that the bird was regularly killed in

suitable localities on that estate during the shooting season down to about the year 1873; that two or three brace were sometimes killed in a day; that the greatest numbers he had seen killed in a day were four brace; and that the farms on which the bird was most plentiful were the Dindinnies, which are situated about midway between Lochryan and the Irish Channel, and Kirronrae and Salchrie which adjoin Lochryan. The soil on these farms is principally of a gravelly or sandy character. Mr. Samuel Wither, farmer, Craigochpark, Portpatrick, informs me that when his father was tenant at Duchra the bird was common on the farm, and that numbers were shot every winter during the years of the bird's plenty. And Mr. Halliday, gamekeeper, Corsewall, Kirkcolm, says that, from information obtained by him, the bird was common in that parish thirty-five or forty years ago, and that two or three brace had then been killed in a day by a shooting party. Another haunt was the sharp gravelly ground to the south and west of Stranraer, within a radius of a mile and a half of the town.

In the last twenty to twenty-five years, however, the bird has been almost unknown in the district. I have not been able to fix the exact years in which the diminution began, but it was somewhat sudden, and the disappearance has been so complete that I have only been able to get a few records of the bird since the time when it practically ceased to inhabit the district. Mr. Weir, gamekeeper, Lochnaw (who succeeded Mr. Martin), has seen two during the last ten years, both on the farm of High Mark, Leswalt. The Logan gamekeeper informed me that the last Quail killed there was about thirteen years ago. The last bird seen by Mr. Skinner was on the farm of Culmore, Stoneykirk, in the year 1889. Mr. Martin heard and saw some in 1887, on the farms of Blair and Kilhilt in Stoneykirk. Mr. Marchbank, gamekeeper on the extensive Estate of Lochinch, informs me that a young bird was killed on the farm of Clenry in the parish of Inch in October 1890, and that this was the only one seen by him during the ten years of his residence at Lochinch. And in November of last year a bird was flushed out of a turnip-field on the farm of Kirklauchlan, Stoneykirk, which adjoins the Irish Channel. One of the strongest pieces of evidence,

to my mind, of the disappearance of the bird, is that its call is quite unfamiliar to the youth who reside in the neighbourhood of its old haunts.

I never heard a theory of the cause of the birds disappearance in the district supported by reasonable evidence. There has been no change in the climate, or in the methods of farming; and there is no reason to think that the young broods were insufficient to meet the losses sustained from sportsmen, vermin, poachers, and accident. It is to be hoped that observers, familiar with other districts at one time frequented by the bird will communicate particulars. When the facts are collected light may be thrown on the mystery.

ON THE SUPPOSED BREEDING OF THE SCLAVONIAN GREBE (*PODICIPES AURITUS*, L.) IN ROSS-SHIRE.

By A. H. EVANS, M.A., F.Z.S., etc.

BETWEEN the years 1881 and 1887 Mr. E. T. Booth in his 'Rough Notes' stated under the head of "Sclavonian Grebe" that he had seen on a certain Highland loch, where "blinding squalls, with drifting sleet and rain, prevented satisfactory identification," a bird which, if it was a Grebe at all, and not a Diving Duck, was a Sclavonian, to judge from the keeper's report.

The details are more fully given by Mr. J. H. Dixon in the carefully compiled list of birds annexed to "Gairloch and Guide to Loch Maree" published in 1886, and are as follows: "A pair of Grebes has for many years nested annually on a fresh-water loch in Gairloch parish: in some years there have been two pairs on the same loch; and sometimes another pair has nested on a loch about two miles away. Mr. E. T. Booth saw the Grebe on the former loch in 1868; he was unable to decide the species at the time, but in a letter he wrote to me on 2nd March 1885, he said that from the last description of the bird that he received he came to the conclusion that it was a Sclavonian. Mr. H. E. Dresser

saw one old and one young Grebe on the same loch on 30th June 1886. He could not get a distinct view of the bird, but he was satisfied it was either the Slavonian or the Eared Grebe. Mr. John Munro, who has annually seen and scrutinised the birds during the past twenty-one years, and has compared his impressions of them with the pictures of the several species of Grebe from Mr. Dresser's 'Birds of Europe' and other works, believes that these birds nesting in Gairloch are Slavonian Grebes."

Since this was written, however, Mr. Dixon and I have been able to examine the birds at close quarters under exceptional circumstances of calm water and bright light, and have conclusively ascertained that, although they have an appearance of considerable size,—possibly from an ocular deception due to the dearth of herbage and absence of other waterfowl for comparison,—they are undoubtedly Little Grebes. We have now visited the loch at intervals during the breeding season for three years in succession, and have constantly seen both male and female, with and without field-glasses: on two occasions I have been within twenty yards of one of the pair as it rose to the surface, while Mr. Dixon has also more than once had a clear view.

Finally, we have procured eggs from the nest, placed exactly where Mr. Booth originally saw it, in one of the two solitary patches of sedge (*Carex ampullacea*) on the loch; they are indisputably those of the Little Grebe (*P. fluviatilis*).

LOCHINVER AS A LOCALITY FOR LEPI- DOPTERA.

By WILFRID W. O. BEVERIDGE, M.B. (Edinburgh),
Surgeon-Captain, Medical Staff.

THERE are now few localities in our Islands, however inaccessible, which at one period or another have not been visited by those in search of lepidoptera. The far-reaching strides of civilisation, necessitating the formation of towns, the need of drainage, and the removal of forests and under-

wood, have driven the naturalist farther afield in order to pursue his quest; and it is with delight that we hail those few surviving localities which have remained in the same undisturbed state for generations.

Here and there such districts may yet be found; and although they may be familiar to the sportsman or botanist, they will yet prove a wide field of research to the entomologist. Many such localities exist in the northern parts of Scotland; and by careful and diligent search it is wonderful how many insects which hitherto have enjoyed the reputation of being only of southern origin have shown themselves as also occupying a more northern situation. Take for example the *Argynnis Paphia*, concerning which Mr. Newman remarks,¹ "As it occurs not uncommonly in our northern English counties, Northumberland, Cumberland, and Durham, it may be inferred that its rarity in Scotland is rather apparent than real." This butterfly I found in considerable numbers at Lochinver, which lies almost at the extreme north-west of Scotland. *Vanessa Polychloros* might also be instanced, the appearance of which in Scotland I have noted elsewhere. The *Rhopalocera*, owing to the need of a more genial climate, are not of such frequent occurrence or so numerous as in England; but Scotland lays claim to many species, such as *Erebia Epiphron*, *Erebia Æthiops*, *Satyrus Semele*, *Lycæna Astrarche* var. *Artaxerxes*, *Cænonympha Typhon*, *Lycæna minima*, whose particular haunts still afford much scope for investigation. In the north also many varieties of different species are found, nowhere better exemplified than among the *Noctuæ*. The dark varieties of many kinds are well known: and how many more have yet to be brought to light?

Such localities as Rannoch, the Orkney and Shetland Islands, Deeside and Forth districts, have long been known as almost veritable mines of entomological wealth, and by our southern brethren have from time to time been the site of valuable additions to their collections and knowledge. That such places are apt to become deteriorated by becoming too well known is only too evident, especially when they become the prey of an evil which at all times

¹ "British Butterflies and Moths," Newman, 1st Ed., p. 25.

must strike deeply at the root of all searching and thorough scientific investigation. The evil we allude to is the *collector*, a so-called naturalist! whose only aim seems to be the rapid extermination of any rare species by taking as many as possible of a *good thing*, be it in the shape of ovum, larva, or imago, utterly oblivious to those who may come after him, and, of even greater importance, entirely careless as to the habits, the manner of life, and relation to their surroundings of the insects he so ruthlessly removes. To the advancement of science he contributes nothing, and concerning its study he cares still less.

That the study of entomology can be levelled to that of a trade is much to be regretted, and indeed one is almost tempted, not from selfish motives, to keep any desirable and little known localities to oneself and our particular friends, in order that we may at least aid in the preservation and protection of the insects contained therein.

We all know that collecting is to a great extent a necessity, and when kept within decent bounds becomes a delightful and instructive pastime; but he that would derive all the enjoyment from one of the most enthralling of pursuits, must combine with it the careful investigation and minute study of all, from ova to the perfect insects. I cannot do better than quote the words of the late Rev. J. G. Wood where he says, "The habits of insects are very mines of interesting knowledge, and it is impossible carefully to watch the proceedings of any insect, however insignificant, without feeling that no writer of fiction ever invented a drama of such absorbing interest as is acted daily before our eyes, though to indifferent spectators. Thus even in the mere structure of insects there is more than enough material for the study of a lifetime."

It is to the scientific and thorough entomologist, then, that these few notes of the neighbourhood of Lochinver, such as they be, are written, with a view that he may at some future season spend as pleasant and profitable a time there as did the writer.

The village of Lochinver, in the parish of Assynt, lies on the sea, about forty-nine miles by road from Lairg.

The geological formation is of a type usually found in

such mountainous districts, being of gneiss, limestone, marble, and basaltic rock. The vegetation is also of a like type. The woods, generally extending along the banks of a loch or situated upon a hillside, are composed chiefly of birch, oak, hazel, and alder. Fir and larch are to be found in many plantations. Heather, the cross-leaved heath, crow and blaeberry, are to be found everywhere, and the royal fern flourishes on the borders of the lochs, of which there are over two hundred in the parish, and upon the numerous islets which are dotted among their waters. Sugaring is with difficulty carried on amongst the trees, partly from the closeness of trees in the woods, and also from the smoothness of their bark; but if the solution be applied to the flowers of the ragwort, which this season at any rate has bloomed in vast profusion, much success may result. Among the *Agrotis* group, which come plentifully to this flower, were observed *Agrotis tritici* and *Agrotis nigricans* as being abundant. *Agrotis obelisca*, a few specimens near the sea shore. Amongst others visiting the ragwort we noticed *Hydræcia micacca*, *Xylophasia monoglyphæ*, *Xylophasia hepatica*, *Xylophasia lithoxylea*, *Leucania conigera*, *Polia chi*, this last being also very plentiful resting by day on the stone walls, the colouring of which it so closely resembles. There appears to be great diversity in the depth of colouring in this insect. Specimens I have from farther south seem much lighter, and by comparison of a larger size. The Lochinver specimens are darker, smaller, and the markings more pronounced. [Var. *olivacea*? (Eds.)] *Aporophyla nigra* is to be taken either at sugar or resting upon the heather by day. *Anchocelis pistacina* was of frequent occurrence. Among the butterflies were found *Argynnis Paphia* before alluded to. *Satyrus Semele*, which was generally to be found resting on the stony places on the hillsides, *Erebia Æthiops*, *Cænonympha Pamphilus*, *Vanessa urticæ*, *Pieris napi*, *Pieris rapæ*, *Pieris brassicæ*, *Lycæna Icarus*, only need mentioning. Specimens of *C. Pamphilus* were large, and as a rule of a dark hue.

Among the Geometræ, and this district would seem especially rich in these, we may note the occurrence of *Oporabia dilutata*, *Larentia didymata*, *Larentia cæsiata*, *Thera simulata*, *Thera variata* var. *obeliscata*, the larva of the latter

being dislodged from the firs by sharply tapping the branches, *Hypsipetes sordidata*, *Cidaria miata*, *Cidaria truncata*, and *Cidaria populata*. Larvæ are very numerous, and any one who makes this a special study would find his time and labour well spent in this district. Among the heather *Saturnia pavonia*, as would be expected, was very common, as also the handsome larva of *Bombyx rubi*, and, in enormous profusion in September and October, the larvæ of *Spilosoma menthastri*, which appeared on every plant, showing great diversity in their colouring, from pure black to light brown. On the broom (*Spartium scoparium*) larvæ of *Chesias spartiata* and *Bombyx quercus* were found; the latter, which I have since fed on bramble, have now hibernated, constituting the variety *callunæ*, Palmer. On the brambles near the roadsides the beautiful larvæ of *Thyatira batis* were to be met with, and in several instances were also found feeding on the common stinging nettle. They passed into the pupa stage towards the end of September.

Larvæ of *Hadena pisi* were plentiful on the bracken. On the birch, the larvæ of *Lophopteryx camelina* were in great abundance; nearly every tree on the banks of Loch Assynt had an enormous population feeding in company with *Notodonta siczac*, which was almost as plentiful.

A few larvæ of *Acronycta psi* were also noted.

Many other larvæ too numerous to note in the time at our disposal were observed.

The micro-lepidoptera were plentiful, and included many rare and interesting species.

These few notes will, I hope, be sufficient on which to base a claim for Lochinver as a lepidopterous district of some importance.

The nomenclature adopted is that of Richard South's Synonymic List.

[Lochinver lies in the district of "West Ross," so named and defined in *Insecta Scotica* ("Scottish Naturalist," vol. i. p. 162). Of the entomology of West Ross a great deal has yet to be learned; and that it ought to be well worth exploring, Dr. Beveridge's observations distinctly show. For

though amongst his captives there seems to be no species of very great rarity so far as Britain is concerned, yet there are some which are not of universal distribution in Scotland, and others which were supposed not to range so far north. The late Mr. Newman's conjecture that the rarity in Scotland of *Argynnis Paphia* "is rather apparent than real" has not I think proved to be the case. It is possible that *A. Paphia*, a butterfly which cannot be mistaken for any other British one, may at one time have been more abundant in Scotland than it is now, since we know that this is the case with some other Rhopalocera such as *Pararge Megæra*, *Euchlœe cardamines*, etc. When I compiled the Lepidoptera of Scotland in "Insecta Scotica" I got records of the occurrence of *A. Paphia* in two districts only, viz. Tay (an old record) and Clyde. I note that Dr. Beveridge does not record *Argynnis Aglaia*, a widely distributed Highland species, but which is not recorded for West Ross in "Insecta Scotica." At the same time it can hardly be absent from that district. Another interesting capture is *Xylophasia hepatica*, which has not, I think, been recorded from any Scottish locality north of Rannoch—a place where, amongst many northern species, some southern ones (whose occurrence would scarcely be suspected) are found. Forms of *X. rurea* (a species not mentioned in the Lochinver list) are sometimes mistaken for *X. hepatica*. Neither *X. rurea* nor *X. lithoxylea* are down for West Ross in "Insecta Scotica," though the former must surely occur. The observation that the larvæ of *Thyatira batis* were sometimes found on nettles is I think a novel one, and is curious because there is no affinity between the genera *Urtica* and *Rubus*. *Notodonta siczac* more usually feeds on willows, poplars, and alders, than on birch. From his concluding remarks, Dr. Beveridge seems to have met with a number of other species of Lepidoptera in Assynt. It would be a valuable contribution to the entomology of Scotland if he would kindly publish a complete list in the "Annals."—F. BUCHANAN WHITE.]

PLANTS OF GLEN SPEAN, WESTERNESS.

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

(Continued from page 131.)

- Cornus suecica*, *L.*—Common on the lower slopes of Aonach Mòr, Beinn Chaoruinn, etc.
- † *Sambucus nigra*, *L.*—Had no appearance of being a native plant in Spean.
- Galium boreale*, *L.*—Also as a small rigid form on Creag Meaghaidh.
G. hereynicum, *Weigel* (= *G. saxatile*, *L.* “*Sp. Pl.*” Ed. ii., *non* Ed. i.)
- * *G. palustre*, *L.*—As *G. Witheringii*, *Sm.*, Roy, Spean.
- Asperula odorata*, *L.*—Woods by the Spean near Highbridge.
- Sherardia arvensis*, *L.*—A lax form by the Spean near Inveroy.
- Solidago Virgaurea*, *L.*, var. *S. cambrica*, *Huds.*—Aonach Mòr, etc.
- Gnaphalium uliginosum*, *L.*—The type with glabrous achenes, Roy, Moy, etc.
- Chrysanthemum segetum*, *L.*—Moy, Roy, etc. *C. Leucanthemum*, *L.*; Roy, Inveroy.
- Matricaria inodora*, *L.*—Rare. In a cornfield near Løch Laggan.
- Senecio sylvaticus*, *L.*—Local, on cottage roofs.
- Saussurea alpina*, *DC.*—Cliffs of Aonach Mòr and Beinn Chaoruinn.
- * *Centaurea Cyanus*, *L.*—Rare; Spean.
- Leontodon autumnalis*, *L.*, and var. *pratensis* (*Koch*).
- Taraxacum officinale*, *Web.*; var. *palustre* (*DC.*)
- Sonchus asper*, *All.*—Spean. * *S. arvensis*, *L.*; rare, Roy.
- * *Hieracium alpinum*, *L.*—Rare, a few plants on Aonach Mòr, by a huge rock which had been separated from a cliff in the Allt Coille an Rois at above 2000 feet. * *H. holosericeum*, *Backh.*; on a rock which is situated between a series of waterfalls at the entrance to the upper corrie of Stob Coire an Easain. *H. calenduliflorum*, *Backh.*; two or three specimens growing with the above. *H. lingulatum*, *Backh.*; with the two last species. Also on Aonach Mòr, on Beinn Chaoruinn and Creag Meaghaidh. * *H. senescens*, *Backh.*; rare; Stob Coire an Easain.

? *H. Backhousei*, *Hanb.*—A solitary specimen, in bad condition, from the rocks at about 3800 ft. on Aonach Mòr, Mr. Hanbury says is very like this species; but one specimen is not sufficient to decide by. *H. chrysanthemum*, *Backh.*; not unfrequent. Very fine specimens on Aonach Mòr, Ben Chaoruinn, and Creag Meaghaidh. * *H. anglicum*, *Fries.*; a few specimens on rocks by the Spean near Inveroy; splendid specimens in the Allt Coille an Rois. *H. vulgatum*, *Fries.*; frequent by the Spean. Near Inveroy occurred a handsome form with deeply incised leaves. *H. corymbosum*, *Fries.* (*H. Eupatorium*, Griseb.); a characteristic Hawkweed of the Spean side from near Inverlair, by the Roman Church, Roy, Inveroy, to Spean bridge. Especially abundant between Roy and Inveroy. *H. auratum*, *Fries.*; with, and almost as plentiful as, the foregoing species. * *H. boreale*, *Fries.*; near the Roman Church and near Roy.

Vaccinium uliginosum, *L.*—In the upper corries and on the rock in the waterfalls of Stob Coire.

Azalea procumbens, *L.*—On the rock in the waterfalls of Stob Coire.

Armeria maritima, *Willd.*—Aonach Mòr; not common.

† *Ligustrum vulgare*, *L.*—In several localities, but always having the appearance of a planted shrub.

Menyanthes trifoliata, *L.*—Laggan, Moy, etc.

Myosotis maritima, *Fries.* (*M. cæspitosa*, Schultz).—Spean, Gairloch.

* *Calystegia sepium*, *Br.*—Glen Roy, perhaps a garden escape.

Scrophularia nodosa, *L.*—Inveroy.

Veronica humifusa, *Dickson.*—Aonach Mòr, Stob Coire, etc.

V. alpina, *L.*; Aonach Mòr. *V. scutellata*, *L.*; always as the glabrous form. Near Roy Bridge occurred a very broad-leaved form which at first sight looked like *V. Anagallis*.

Bartsia Odontites, *Huds.*; var. *O. verna*, *Reichb.*—Gairloch, rare.

Pedicularis sylvatica, *L.*; also var. *alba*.—On the moorland above Lianachan.

Rhinanthus Crista-galli, *L.*; and the * var. *angustifolia*, *Gr. & Godr.*—Near Inverlair and Moy.

Mentha hirsuta, *Huds.*—Roy. * *M. arvensis*, *L.*; Roy, etc.

* *Thymus Serpyllum*, *L.*

Galeopsis Tetrahit, *L.*—Common, especially as the var. *bifida* (*Boenn.*).

G. speciosa, *Mill.*; rare, Spean.

Lamium purpureum, *L.*—Rare, Spean.

Littorella juncea, *Bergh.*—Gairloch.

Scleranthus annuus, *L.*—Roy.

Atriplex patula, *Sm.*—Roy, rare. *A. angustifolia*, *Sm.*

* *Polygonum lapathifolium*, *L.*

Oxyria digyna, *Hill.*—On the rock of Aonach Mòr, etc.; also on the shingle at the mouth of the Spean, near Gairloch.

* *Rumex conglomeratus*, *Murr.* * *R. acutus*, *L.*; not unfrequent above Roy. * *R. domesticus*, *Hartm.*; rather frequent. * *R. conspersus*, *Hartm.*; Inveroy, Roy, etc. When at Roy I made out a Dock to be *R. propinquus*, *Aresch.*; but I cannot identify it among my dried specimens. An *obtusifolius* specimen appeared to have also an *acutus* parentage.

Mercurialis perennis, *L.*—Highbridge.

* *Ulmus campestris*, *L.*—(*U. montana*, *Sm.*)

† * *Humulus Lupulus*, *L.*—Near Roy Bridge.

Betula alba, *L.* * *B. carpatica*, *Wald. et Kit.*; var. *odorata*, *Bechst.*—The Birches were usually barren.

* *Quercus Robur*, *L.*—(*Q. sessiliflora*, *Salisb.*; *Q. fœmina*, *Mill.*, 1762).

† *Fagus sylvatica*, *L.*—As a planted tree.

† * *Salix alba*, *L.* † * *S. purpurea*, *L.* *S. lapponum*, *L.*—Corrie of Stob Coire an Easain. *S. lapponum* × *aurita*; with above.

† * *Populus alba*, *L.*—Planted. † * *P. canescens*, *Sm.*

Listera cordata, *Br.*—On a rock in waterfall from Stob Coire.

* *Orehis incarnata*, *L.* *O. latifolia*, *L.*—Inveroy.

Habenaria albida, *Br.*; Roy. *H. viridis*, *Br.*; Aonach Mòr. *H. bifolia*, *Br.*—Inveroy.

Iris Pseudacorus, *L.*—Lianachan.

Juncus bufonius, *L.*; var. *fasciculatus*, *Koch.* *J. trifidus*, *L.*—Common on the higher hills.

J. lamprocarpus, *Ehrh.*; and * var. *nigritellus*, (*Don*). *J. sylvaticus*, *Reich.*; and * var. *multiflorus*, *Wahl.*

J. triglumis, *L.*—Rather rare on Aonach Mòr and Stob Coire.

Luzula spicata, *DC.*—A curious form with lax spikelets, the terminal one consisting of barren flowers, so that the plant assumes the aspect of *Carex ustulata*, as one saw it on the rocks above through the driving mist, occurred on Stob Coire an Easain. *L. erecta*, *Desf.*; * var. *congesta*, *Sej.*; * var. *pallescens*, *Hoppe.*

Sparganium minimum, *Fries.*—(*S. natans*, L., herb. et auct. plur.)
Gairloch.

Scirpus pauciflorus, *Lightf.*—Near Inveroy. *S. cæspitosus*, L.;
as type, and viviparous on moorland above Lianachan. *S. seta-*
ceus, L.; by the Spean near Inveroy.

Eriophorum polystachyon, L.; and var. *minus*, *Koch.*—Beinn
Chaoruinn.

Rhynchospora alba, *Wahl.*—Coneachan, etc., locally common.

Carex dioica, L.—Apparently rare, but perhaps gone over. *C. pauci-*
flora, *Lightf.*; rather frequent on one moorland above Lian-
achan. *C. canescens*, L. (= *C. curta*, *Good.*); near Roy;
also * *C. alpicola*, *Wahl.*; Roy; the former on south side of
Spean nearly opposite Roy. *C. rigida*, *Good.*; which I should
certainly keep separate from the next species, *C. Goodenovii*,
Gay, which occurs in several forms. *C. flacca*, *Schreb.*:
"Fl. Lips." (1771); common and very variable. (In Richter's
"Plantæ Europææ," p. 160, the author writes *C. glauca*, *Murr.*
"Prod. Fl. Goett." p. 76 (1770). If this were a correct citation
the name *C. glauca* would take precedence, but it is not so;
on the page cited, Murray quotes Haller's description but gives
no name to the variety. It is given by Scopoli as *C. glauca*
in ed. ii. of Fl. Carn. 223). *C. pilulifera*, L.; typical, also
in a bracteate form on Creag Meaghaidh.

C. pallescens, L.—The usual British form (*C. undulata*, *Kunze*)
according to my observation is that in which the lowest bract is
transversely crimped at the base. In several specimens met
with in the Spean valley, as at the bridge near the Roman
Church, the bracts were free from this wrinkling. *C. vaginata*,
Tausch., very rare; Stob Coire.

C. Hornschuchiana, *Hoppe.*—Common.* *C. xanthocarpa*, *Degl.*;
near Inveroy. Corrie of Stob Coire. *C. flava*, L.; type
on Stob Coire and Aonach Mòr, etc.: * var. *Æderi*, *Lilj.*;
Roy, Moy, etc.

C. rostrata, *Stokes.*—Near Roy and by Loch Laggan, etc. *C.*
saxatilis, L.—On the moist grassy slopes of the Corries of
Aonach Mòr, Stob Coire, Beinn Chaoruinn, and Creag Mea-
ghaidh.

* *Phleum pratense*, L.—Roy; also var. *nodosum*, L.—Inveroy.
* *P. alpinum*, L.; rare, Stob Coire an Easain.

Agrostis vulgaris, *With.*; var. * *A. nigra*, *With.*—Roy. *A. canina*,
L.; rare; Aonach Mòr.

Deschampsia cæspitosa, *Beauv.*; var. *alpina*, *Gand.*—Aonach
Mòr, etc.

D. flexuosa, *Trin.*; var. *A. montana*, *Huds.*—Stob Coire.

* *Avena pubescens*, *Huds.*—On shingly bank of river at Gairloch.

Arrhenatherum bulbosum, *Presl.*—This was the prevailing form above Roy and Spean. My experience leads me to believe that this is distinct from *A. avenaceum*, *Beauv.* It keeps true in cultivation.

Poa alpina, *L.*—Aonach Mòr, but not seen on Beinn Chaoruinn or Stob Coire. This Westernness *Poa* differed from the plants of the Cairngorms in being more tufted and in its smaller size. The culms too were more drooping. I have had a similar form sent me from Canlochan as *P. laxa*. Prof. Hackel confirms the name.

* *Bromus racemosus*, *L.*—Roy.

Brachypodium gracile, *Beauv.*—Spean.

* *Agropyrum repens*, *Beauv.*—Roy, rare and as var. *barbatum*, *Duval Jouve.*

CRYPTOGAMS.

Hymenophyllum unilaterale, *Bory.*—Side of Spean near High-bridge.

Cryptogramme crispa, *Br.*—Aonach Mòr, etc.

Asplenium Trichomanes, *L.*—Spean bridge, with *A. Ruta-muraria*.

Athyrium alpestre, *Milde.*—Aonach Mòr, Stob Coire, etc.; *A. flexile*, *Syme.*—Aonach Mòr.

Cystopteris fragilis, *Bernh.*—Roy bridge.

Polystichum Lonchitis, *Roth.*—Aonach Mòr.

Lastrea Oreopteris, *Presl.*; *L. Filix-mas*, *Presl.*; *L. spinulosa*, *Presl.*
L. dilatata, *Presl.*; *L. æmula*, *Brack.*—Near Roy.

Phegopteris Dryopteris, *Fée.*; *P. polypodiodes*, *Fée.*

Botrychium Lunaria, *L.*—Stob Coire (E. R.), near Inveroy.

Equisetum arvense, *L.*; *E. silvaticum*, *L.*; *E. palustre*, *L.*; *E. limosum*, *L.*—Lianachan; var. *E. fluviatile*, *L.*—Gairloch;
* var. *polystachyum*, *A. F. Brückner* in "Fl. Nesl. Bod." (1803), p. 63.—Gairloch.

Selaginella selaginoides, *Gray.*—Spean side, etc.

Lycopodium Selago, *L.*: *L. annotinum*, *L.*—Stob Coire, Aonach Mòr, etc.; *L. alpinum*, *L.*—Common; * var. *decipiens*, *Syme.*—Stob Coire. It may be well to add a little explanation to the note on *L. complanatum*, which appeared in the "Journal of Botany" (1891), pp. 178-179, by Messrs. Groves, so that its Scottish name may be now corrected.

The name *L. complanatum*, which I adopted for the Gloster plant, was only chosen after consultation with some of our leading botanists. Mr. Carruthers kindly drew up the description which was published in the November number of the "Journal of Botany" for 1882. On page 381 in the same year, and in the "Proceedings of Linn. Soc." 1883, p. 2, Mr. J. G. Baker is stated to have exhibited a specimen collected by Professor Lawson in Skye, as true *complanatum*, to a meeting of the Linnæan Society. An editorial note in the "Journal of Botany," 1882, p. 381, states that a Forfar specimen was also found to be *complanatum*. In the supplement to his "Manual" Professor Babington quotes Hants, Gloster, Worcester, Ross, and Skye, for *complanatum*; while in the third edition of the "Students' Flora," 1884, Sir J. D. Hooker treats the Linnæan *complanatum* as an aggregate species, with two sub-species: viz. (1) *L. complanatum* proper "from Gloster and Worcester . . . leafy branches, longer, less crowded; leaves dimorphic, central ones on the flattened stem more erect and narrower than the lateral; spikes usually several, peduncled." (2) *L. alpinum*, L.—"Leafy branches, shorter, more crowded, not flattened; leaves uniform; spikes solitary, sessile." This latter description of the leaves, branches, and spike, would exclude the Gloster plant, since the leafy branches are long and lax, and conspicuously flattened, the leaves are dimorphic, and in my specimen the three fruiting peduncles bear respectively two, three, and four sessile spikes. The wording of the description of *complanatum*, i.e. "spikes usually several, peduncled," is not free from ambiguity. It may be read "spikes pedunculate, usually several," but this does not suit the British specimens, since these have sessile spikes. It probably intends "spikes usually several, usually peduncled." This would admit the Gloster plant, but as certainly alters the specific character given by Linnæus. It was this presumed alteration of the description given in the "Species Plantarum," and the doubt which existed in my own mind of our having the true *complanatum* in Britain, which led me to write *L. complanatum*, L. 'Hook. fil.,' when recording the occurrence of the flattened form of *L. alpinum* from the Cairngorms, etc., in the "Journal of Botany," 1888, p. 26, and still more recently as *L. alpinum*, L.; var. *decipiens*. Dr. Boswell wished me to let him have the Gloster specimen to figure in "English Botany"; and in December 1882 he wrote me thus: "I do not think the plate in last number of Journ. Bot. represents the *complanatum*; but I am in correspondence with Messrs. Newbould and Baker about it. But for Mr. Baker's decided opinion upon the Gloster and Skye plants I would have no doubt about supposed *complanatum* being really *alpinum*." Professor Babington, in February 1883, on receipt of a specimen from Ross-shire wrote: "I see the name is confirmed by Mr. Baker. I also have a bit of Professor Lawson's Skye species named by him. It seems

somewhat different, having a very much broader and flatter appearance; more so than any of my Continental examples. But that is apparently only an apparent difference, and may result from the way in which it was preserved." On the 3rd June 1883 Dr. Boswell wrote that he did "not believe the Gloster plant had anything to do with *L. complanatum*. I have named it in "E. Bot.," plate iii., *L. alpinum*, var. *decipiens*. The New Forest plant is more likely to be *complanatum* var. *Chamæcyparissus*; the Skye plant may be *complanatum*, *L. genuinum*, but I must wait further evidence before I admit *complanatum* as British." In the twelfth volume of "E. Bot.," the plate 1834*, drawn from my Gloster specimen, is labelled *L. alpinum*, L., var. *decipiens*, but it is a *nomen solum*, no reference to description of it being given in the text; but the plate is not so characteristic of the plant as is the one which appears in the "Journal of Botany," since the flattened character of the branches is not well shown, nor are the parent bracts on the spikes properly expressed. On the same "E. Bot." plate is a drawing of a barren fragment labelled *L. complanatum* var. *anceps*, which appears identical with Professor Lawson's Skye plant; but I have failed to obtain any account of its history. Messrs. Grove consider the Skye plant only larger *alpinum*. It has the branches much broader than any specimen of pedunculate *complanatum* that I have seen, but in the leaf-character it is more like that species than is even my barren Gloster plant; this itself having teeth much less saw-like than have the creeping, flattened specimens of *L. alpinum* from Scotland and the Lake district; indeed leaf specimens alone would be very difficult to distinguish from those of a specimen of pedunculate *complanatum* from North America, which led me to think the two were not dissimilar. Probably Sir Joseph Hooker is right in placing *L. alpinum* as a subspecies of *L. complanatum*, that is, in a Benthamian sense; this was the view taken by such a high authority as Milde. Personally I think they should be kept distinct, as under:—

† Cones usually several, peduncled—

L. complanatum, *L.*—"Sp. Pl." Ed. 1104, et Herb. ! "Flora Danica" 2671; branches prostrate, flabellate. Var. **L. Chamæcyparissus**, *A. Braun.*—In Döll. "Rhein. Fl.," p. 36; "Fl. Danica," pl. 2672; branches erect, fastigiate.

†† Cones usually solitary, sessile—

L. alpinum, *L.*—"Sp. Pl." 1104. Leaves nearly uniform, branches not flattened. Scottish Lakes, Wales, Lincoln. Var. **decipiens**.—"E. Bot.," pl. 1834* (*sine descriptione*). Distinguished from *alpinum* by its larger size, by its flattened spreading branches, with the central leaves on the flattened stem more erect than the lateral. Scotland, Westmoreland, Cumberland, Gloster, Worcester.

With Messrs. Groves, I consider that restricted *complanatum* has not yet been found in Britain.

A note on specimens of *Ranunculus acris*, L., may be added. I sent several forms collected on the Glen Spean Hills, and also from the Cairngorms, to Dr. Wettstein, who kindly went over them with Professor A. von Kerner. They were then sent to Herr Freyn. They agree in naming them *R. vulgatus*, Jord.; which is placed under *R. Steveni*, Andr., in the "Schedæ ad Floram Exsiccata Austro-Hungaricam," 1888. Herr Freyn says that the three montane forms "have very slight covering of hairs, and such forms have not been noticed before. In habit they remind us of the northern forms of *R. acris*. The rhizome is also very weak as compared with that of typical *vulgatus*, no doubt in consequence of the rude, damp climate."

ON SOME SCOTTISH PLANTS OBSERVED JULY 1891.

By Rev. E. S. MARSHALL, M.A., F.L.S.

THE following notes give some results of a week passed in East Ross, Tain being my headquarters, and of nearly a week's botanising in the Tyndrum neighbourhood. Another week was spent at Killin; but about this I shall say little, as Messrs. E. F. and W. R. Linton, with whom all my expeditions there were made, are publishing a short account of the few novelties met with.

Ben Chaisteil, near Tyndrum, has a bad botanical reputation, fully deserved, I should say, as far as Perthshire is concerned; the Argyle cliffs are, however, decidedly rich. A furious thunderstorm, and my own indifferent climbing powers, prevented my working them thoroughly; but the number of interesting plants seen there induces me to recommend it strongly to the attention of future visitors. Probably not more than a third of the likely ground was searched by me.

Plants marked with an asterisk are, to the best of my belief, new records for the various Watsonian vice-counties—87, West Perth; 88, Mid-Perth; 98, Argyle; 106, East Ross.

I am greatly indebted for his generous assistance to Mr.

Arthur Bennett. Messrs. Beeby, Druce, Fryer, Groves, Hanbury, Linton, Moyle Rogers, Dr. Focke, and Dr. Buchanan White, have also helped me.

Thalictrum minus, *L.* (aggregate).—A curious plant, for which as yet I have no name, occurs in good quantity on some of the Ben Chaisteil rocks (98). ***T. majus**, *Crantz.*—With the other, but very scarce; I secured only one specimen, but saw several well out of reach. A strongly marked and handsome form, upon which Mr. Bennett writes: "Your specimen exactly agrees with some thus named by Mr. N. E. Brown, and agrees well with Jacquin's plate 'Fl. Austr.,' vol. v. t. 420, in herb. Kew!"

Ranunculus trichophyllus, *Chaix.*—Ditches near Tain, and in Loch Eye (106). Smaller and more slender than the usual English form. ***R. Lingua**, *L.*—Abundant in a mill-pond between Fearn and Balintore (106); also in a ditch about half a mile beyond, towards the latter place. Not recorded north of Elgin in "Topographical Botany," Ed. 2. ***R. Steveni**, *Andrz.*—About Tain (106); apparently not uncommon.

Nasturtium officinale, *R. Br.*; var. **siifolium**, *Reichb.*—Well marked; in ditches near Tain.

Cardamine hirsuta, *L.*—Cliffs south of Balintore. This is, I think, rarer in the north than *C. flexuosa*, With.

Draba incana, *L.*—Very fine, upon the lower cliffs of Ben Chaisteil, rocks of Stob Garbh, at the head of Inverlochlarig glen, and facing Am Binnein (87).

Cochlearia officinalis, *L.*—Salt-marsh, Tain; typical. ***C. danica**, *L.*—Plants growing in wet ground, near the top of Corrie Dubh Ghalair, alt. 2700 feet, and on Meall Ghaordic, alt. 3000 feet (88), are so named by Dr. Lange. They are, if rightly determined, off type in having the rosette-leaves entire, in this respect recalling the figure of *β integrifolia*, Drejer, in "Fl. Danica." They also differ somewhat in habit from the normal coast plant, and have larger flowers.

C. alpina, *Watson.*—Very luxuriant upon the shingles of the Fillan, about two miles above Crianlarich. I incline to consider this specifically distinct from *C. officinalis*, and am growing them for purposes of comparison. The alpine forms of scurvy-grass occurring in North Britain need to be thoroughly studied afresh, especially under cultivation; but the task will require much time and patience. I believe that we have at least one plant which fits neither *officinalis*, *danica*, nor *alpina*, as commonly understood. I formerly supposed this to be the

true *C. grœnlandica*, from which, however, it greatly differs. Brought from Ben Lawers in 1887, it has grown in my garden ever since; doubtless it occurs also on other high mountains. It does not agree at all well with the specimens of *C. arctica*, Schlecht., which I have seen, nor with Fries's description of that plant. The very numerous and crowded leaves which are produced in early spring under cultivation suggest *C. conferta* as an appropriate name, should it eventually prove to be an undescribed species.

**C. grœnlandica*, *L.*—Sandy ground, west shore of Inver Bay, near Tain (106); locally abundant. A small and characteristic form; confirmed by Dr. Lange. I hope to treat this more fully elsewhere. It was found by Mr. Hanbury and myself, in July 1890, at Lochinver, West Sutherland (*108), and recorded as *C. danica*. New to the mainland of Britain, but found by Mr. Beeby in Shetland in 1886.

Sisymbrium Sophia, *L.*—Coast, Balintore; looking like a native.

**Senebiera didyma*, *Pers.*—Damp ground, Balintore; only a few plants. Doubtless introduced.

**Lepidium Smithii*, *Hook.*—Bank near the station, Kildary (106). Like the following, it is recorded from East Inverness.

**Teesdalia nudicaulis*, *R. Br.*—Near Tain (106); apparently very scarce, but it may have been mostly withered up.

**Viola canina*, *L. (pro parte)*.—With the last.

**Polygala vulgaris*, *L.*—By the Carron river, near Bonar Bridge (106). Banks of the Fillan, above Crianlarich. *P. serpyllacea*, *Weih.*—Rather common on the heaths about Tain and Nigg.

**Cerastium semidecandrum*, *L.*—Sandhills east of Tain; much scarcer than *C. tetrandrum*.

Arenaria serpyllifolia, *L.*, var. *leptoclados*, *Guss.*—Plentiful and characteristic on the railway-bank at Kildary.

A. sedoides, *Schultz.*—Associated with *Cochlearia alpina* on the shingles of the Fillan, below 600 feet; several vigorous plants in flower. Seed evidently washed down from Ben Laoigh in both cases.

Lepigonum rubrum, *Fr.*—On the railway at Kildary. Very rare, I believe, so far north.

Hypericum quadratum, *Stokes.*—Lane at Kildary; only a few plants.

**Geranium pratense*, *L.*—Between Fearn and Balintore, sparingly, but probably wild; not previously recorded north of Banffshire.

Trifolium hybridum, *L.*—Well established by roadsides, etc., about Tain and Nigg. **T. agrarium** (*106) also occurs at both places in clover fields—introduced with the crop.

Oxytropis uralensis, *DC.*—Reported as extinct in East Ross in “Journal of Botany” for 1889, p. 361. I found it in fair quantity at one spot near Balintore, but withhold precise details for obvious reasons.

***Rubus fissus**, *Lindley.*—Near Bonar Bridge and Tain (106). **R. plicatus**, *Wh. and N.*—Bonar Bridge, Tain, Nigg, Kildary. In the first-named locality, besides the type, occurs a variation which Dr. Focke calls “forma *cordifolia*.” **R. villieaulis**, *Koehl.*—The most abundant bramble of East Ross; very unlike the southern plant so named. **R. mucronatus**, *Blox.*—Common in East Ross in a small and neat form. Typical, but rare, near Killin (*88); also seen, but not collected, at Callander Station, which I suppose to be in v.c. 86, Stirling. ***R. radula**, *Weihe.*—Kildary (106). Two other brambles noticed here merit attention, but were too young at the time of my visit for safe determination. ***R. corylifolius**, *Sm.*—Kildary; between Balintore and Nigg; between Loch Eye and Tain (106). Typical, or nearly so.

***Geum rivale** × **urbanum** (*G. intermedium*, *Ehrh.*)—By the stream at Kildary, very scarce; associated with *urbanum*.

Rosa involuta, *Sm.*—Kildary (?); a form with remarkably pinnate sepals, which the Rev. W. Moyle Rogers agrees with me in placing here; other friends have referred it to *mollis*, *tomentosa*, and *involuta* × *mollis*. Balintore; another puzzling plant, strongly sweetbriar-scented, and very tall and straggling for this species, but confidently named as above by Mr. Rogers. Var. **Sabini**, (*Woods*).—Near Tain; a marked and handsome form, several bushes growing together. **R. rubiginosa** *L.*—It is difficult to see why H. C. Watson so decidedly rejected this as a native of Scotland, since it is considered to be wild in southern Scandinavia. I cannot doubt its being indigenous in East Ross, having met with it not only at Kildary, near houses, but also between Fearn and Balintore, at least half a mile from human habitations. Mr. C. Bailey has also recorded it, under more suspicious circumstances, from Strathpeffer (“Bot. Exch. Club. Report” for 1890). Tain was the only place where I observed it in a garden. **R. canina**, *L.*, var. **andegavensis**, *Bast.*—Cliffs near Balintore; also by the Fillan, between Crianlarich and Tyndrum (a glaucous form); var. **verticillacantha**, *Mérat*, Strathcarron, near Bonar Bridge; var. **celerata**, *Baker*, Tain; var. **Borreri**, *Woods*,—apparently common in East Ross; not always easy to separate from some forms of *tomentosa* when dried.

- Saxifraga nivalis*, *L.*—Cliffs of Stob Garbh (87); scarce.
- Epilobium obscurum*, *Schreb.*—Near Bonar Bridge.
- Apium inundatum*, *Reichb.*—Abundant at the west end of Loch Eye; it also occurs in ditches near Tain.
- Egopodium Podagraria*, *L.*—Beside a brook by the road, about three-quarters of a mile east of Nigg Station; looking more like a native than I remember to have seen it previously.
- Myrrhis Odorata*, *Scop.*—Plentiful by the river at Kildary, and long established there, if not truly wild. Evidently only an escape at Tain and Bonar Bridge.
- Anthriscus vulgaris*, *Pers.*—Coast at Balintore, apparently native.
- Galium erectum*, *Huds.*—Grassy roadside bank between Balintore and Nigg Station. Mr. Bennett, who named it, tells me that it was reported long since from near Bonar Bridge, but was rejected by Watson as “insufficiently vouched.” It looked as much at home as *G. Mollugo* does by the highways in Surrey.
- Eupatorium cannabinum*, *L.*—Very sparingly, below the cliffs south of Balintore.
- Anthemis arvensis*, *L.*—Near Tain; perhaps only a colonist.
- **Hieracium pratense*, *Tausch.*—I noticed this species flowering on the railway embankment at Dunphail (v.c. 95, Elgin), but not in time to secure a specimen. As it is a native of Norway, I do not understand upon what grounds Watson assumed it to be an introduction in Scotland generally; with regard to this particular station I can, of course, come to no conclusion at present. **H. holosericeum*, *Backh.*—A few specimens were gathered on Stob Garbh (87). *H. lingulatum*, *Backh.*—Ben Chaisteil; Stob Garbh. *H. iricum*, *Fr.*—Ben Chaisteil. **H. strictum*, *Fr.*—Carron river, near Bonar Bridge (106). **H. commutatum*, *Becker (H. boreale, Fr., pro parte)*.—Railway between Loch Eye and Tain (106). I had not found it before in Scotland, but have a specimen of Mr. Beeby’s collecting from near Aberdeen.
- **H. Langwellense*, *F. J. Hanbury.*—Carron river, scarce; gathered for *H. anglicum* (106). Mr. Bennett’s record of that species (p. 125) must be expunged. *H. cæσιο-murorum*, *Lindeberg.*—By the Fillan, above Crianlarich (88); certainly not a hybrid, I should say. *H. Sommerfeltii*, *Lindeberg.*—Meall Ghaordie (*88), in fair quantity; abundant on Ben Chaisteil (*98), and over one range of rocks on Stob Garbh (*87). This Breadalbane form, which is exactly alike in all three stations, differs from the type in having pure yellow (not fuliginous) styles; a similar variation is found in the case of *H. corymbosum*. **H. onosmoides*, *Fr. (teste Hanbury)*.—Plenti-

- ful among sandhills, south of Balintore (106). **H. auratum*, *Fr.*—Carron river (106).
- Trientalis europæa*, *L.*—Strathcarron. No personal authority given in "Top. Bot." for v.c. 106.
- **Anagallis tenella*, *L.*—Plentiful at one spot, near the north-west end of Loch Eye.
- **Erythræa littoralis*, *Fr.*—On the west side of Inver Bay (106), in profusion; a small form—one to three inches high—agreeing well with the description of var. *minor*, Hartman, in Lange's "Haandbog i den danske Flora." No *E. Centaurium* was observed.
- **Myosotis palustris*, *With.*, var. *strigulosa*, *Reichb.*—Plentiful at Kildary (106).
- Scrophularia nodosa*, *L.*—By the river at Kildary there grows a curious form, unusually tall and branching, and with the staminodes entire, not notched or emarginate, as Hooker, Babington, and Lange concur in describing them. Mr. Beeby has found the same peculiarity in a Scandinavian specimen; and it seems to differ from the assumed type much as *S. cinerea*, Dumort, does from the assumed type of *S. aquatica*. Which is Linné's type cannot well be ascertained, the specimen in his herbarium being in fruit only.
- Bartsia alpina*, *L.*—Rather frequent on Ben Chaisteil, where I understand that Professor Balfour found it many years ago.
- Melampyrum pratense*, *L.*, var. *hians*, *Druce.*—In shade, near Bonar Bridge.
- Rhinanthus minor*, *Ehrh.*—The remarkable plant with narrow leaves, and frequently with numerous long patent or ascending branches, which Mr. Hanbury and myself reported last year in "Journal of Botany," and which grows abundantly on heaths near Tain, has been named var. *angustifolia*, *Koch*, by Dr. Lange.
- **Utricularia neglecta*, *Lehm.* (?)—Very sparingly, in a small pool at the west end of Loch Eye (106). A slender plant, with rather large bladders, which is certainly neither *minor* nor *vulgaris*, and must, I believe, be referred to this species, though the leaves are shorter and less finely capillary than usual. It was not in flower. I have seen what appears to be typical *neglecta*, collected near Melrose by Mr. W. B. Boyd.
- Pinguicula vulgaris*, *L.*; var. *bicolor*, *Nordstedt.*—Perthshire, cliffs of Ben Laoigh; exactly like the Ben Nevis plant which I published under this name in 1889. It has the corolla much flattened, with very pale lilac or white lips, and appears to shade off gradually into the type.

- Lycopus europæus**, *L.*—Mill-pond between Fearn and Balintore.
- Stachys palustris** × **sylvatica** (*S. ambigua*, Sm.)—Shingles of the Fillan river, growing close to *S. palustris*; fairly intermediate.
- Plantago maritima**, *L.*—A plant which occurs in wet ground on Ben Laoigh, and which I suspected to be *P. serpentina*, Vill., was again examined *in situ* by Mr. Cosmo Melville and myself, and we came to the conclusion that it was only one of the alpine states of the common species.
- Chenopodium album**, *L.*, var. **paganum**, *Reichb.*—Balintore.
- ***Salsola Kali**, *L.*—Coast near Tain, Balintore, and Kildary (106).
- Polygonum aviculare**, *L.*, var. **littorale**, *Link.*—On shingle near Balintore. I notice that Lange retains this as a distinct species.
- ***Salix phyllicifolia**, *L.*—Banks of the Carron (106). **S. Arbuscula** × **herbacea** (*S. simulatrix*, B. White).—Ben Laoigh; a form approaching *herbacea*. Ben Chaisteil (*98); very near *Arbuscula* indeed. **S. cinerea** × **phyllicifolia** (*S. Wardiana*, Leefe).—By the Benmore burn, just below the railway-bridge, two miles east of Crianlarich.
- Orehis incarnata**, *L.*—A few plants were noticed on a heath near Nigg.
- Habenaria albida**, *R. Br.*—Ascends to 1800 feet on Ben Chaisteil.
- ***H. chloroleuca**, *Ridley.*—Strathcarron (106).
- ***Typha angustifolia**, *L.*—Very abundant beside a loch, close to the railway, about two miles south of Bonar Bridge Station (106). I have noticed it there for two years in succession, and feel quite sure about the species, though I have not gathered it. Evidently wild.
- Sparganium ramosum**, *Curtis.*—Mill-pond between Fearn and Balintore. A sterile state found near Crianlarich much resembles *S. neglectum* in *facies* when growing; it seems to be the var. **microcarpum**. **S. minimum**, *Fr.*—In the Fillan, between Crianlarich and Tyndrum.
- Alisma Plantago**, *L.*—Mill-pond between Fearn and Balintore.
- ***Potamogeton prælongus**, *Wulf.*—Loch Eye (106). **P. pectinatus**, *L.*—With the last; queried in "Top. Bot."
- ***Ruppia rostellata**, *Koch.*—Tain (106); infested with a globular growth, probably the fungus lately mentioned by Mr. Beeby as found by him in Shetland on **R. spiralis**.
- Carex remota**, *L.*—Strathcarron and Kildary. I believe that this



- is uncommon in the Northern Highlands. **C. pilulifera*, *L.*—Heaths about Tain (106). **C. distans*, *L.*—Base of the cliffs south of Balintore (106); typical and fine. A very reduced state, from one to four inches high, which I had not previously met with, was found in a salt-marsh near Inver Bay. **C. extensa*, *Good.*, var. *pumila*, *Anderss.*—On the west side of Inver Bay, abundant and very marked; prostrate, with stems only from one to three inches long. I could not find the type. *C. rostrata*, *Stokes.*—An alpine state, plentiful in bogs on Meall Ghaordie, above 2800 feet, is named by Mr. Bennett var. *brunnescens*, *Anderss.*
- Phalaris* †*arundinacea*, *L.*, var. *pieta*, *L.*—Mill-pond between Fearn and Balintore; native. I have seen it wild also in Caithness and at Braemar.
- **Milium effusum*, *L.*—Very scarce indeed, on the wooded banks of the Carron river; an unexpected find (106).
- Deschampsia flexuosa*, *Trin.*, var. *montana*, *Huds.*—Ben Chaisteil; Stob Garbh. A marked form of this species, which I gathered on Meall Garbh, Ben Lawers, in 1887, seems to me exactly like authentic specimens of var. *Voirlichensis*, *Melwill.* It was sent to Professor Hackel, who did not, however, separate it from the type.
- **Trisetum flavescens*, *Beauv.*—Tain (106).
- Avena pratensis*, *L.*, var. *longifolia*, *Parn.*—Frequent on the cliffs of Ben Chaisteil.
- **Catabrosa aquatica*, *Beauv.*—Tain (106).
- Poa glauca*, *Sm.*—Stob Garbh (87). **P. nemoralis*, *L.*—Ben Chaisteil (98); a glaucous alpine form, which may be var. *glaucantha*, *Reichb.*
- Glyceria maritima*, *Wahl.*, var. *hispida*, *Parn.*—Muddy ground, Tain, with the type.
- **Bromus sterilis*, *L.*—Tain (106). *B. commutatus*, *Schrad.*—Tain, Nigg, and near Bonar Bridge. Mixed with the type, near Tain, grows a form with hairy flowers, which may be var. *pubescens* of the "London Catalogue."
- Hymenophyllum unilaterale*, *Bory.*—On the cliffs of Stob Garbh (87), in small quantity.
- **Asplenium Adiantum-nigrum*, *L.*—Cliffs south of Balintore (106).
- **Athyrium Filix-fœmina*, *Roth.*—Strathcarron (106). *A. alpestre*, *Milde.*—Stob Garbh (87).

Equisetum arvense, L.; var. *alpestre*, Wahl.—Ben Laoigh, and near the top of Corrie Dubh Ghalair, Glen Lochay.

Lycopodium alpinum, L.; var. *decepiens*, Syme (*L. complanatum*, auct. angl., non L.)—At the very low elevation of about 200 feet, fruiting freely, on a heathery bank above the Carron river (106).

THE DESMIDIEÆ OF EAST FIFE.

By JOHN ROY, LL.D.

THE following short list has been made from material gathered by Mrs. Farquharson, F.R.M.S., towards the close of last year.

The district is evidently not rich in Desmids, for though my valued friend collected indefatigably all about St. Andrews, from Blackhills to Newport, and inland as far as Cupar (Tent's Moor proving by far the most productive), yet the number seen is comparatively small. There are no new species to record, but some of those noted are scarce elsewhere. *Cosmarium microsplinctum*, Nord., forma *parvula*, Wille, is believed to be new to Britain, and the following are very rare: *Cosmarium præmorsum*, Breb.; *Cosmocladium constrictum*, Archer; *Xanthidium Brebissonii*, Ralfs., β *basidentatum*, Börg.; and *Docidium Farquharsonii*, Roy. The interest of the list lies in the fact that it relates to a district of which, from a Desmidian point of view, nothing was previously known.

DESMIDIEÆ, Kütz.

Hyalotheca, Kütz.

<i>Hyalotheca dissiliens</i> , Sm.	Tent's Moor.
„ „ β <i>bidentula</i> , Nordst.	Tent's Moor.
„ „ γ <i>tridentula</i> , Nordst.	Peat End.

Desmidium, Ag.

Desmidium Aptogonum, Breb. Tent's Moor.

Sphærozozma, Corda.

Sphærozozma excavatum, Ralfs. Tent's Moor.

Micrasterias, Ag.

- Micrasterias denticulata*, Breb. Tent's Moor.
 ,, *rotata*, Grev. Tent's Moor.
 ,, *papillifera*, Breb. Tent's Moor.
 ,, *truncata*, Corda. Tent's Moor.
 ,, *crenata*, Ralfs. Tent's Moor.

Euastrum, Ehr.

- Euastrum verrucosum*, Ehr. Tent's Moor.
 ,, *oblongum*, Grev. Tent's Moor.
 ,, *ampullaceum*, Ralfs. Tent's Moor.
 ,, *ansatum*, Ralfs. Tent's Moor.
 ,, *pectinatum*, Breb. Tent's Moor.
 ,, *rostratum*, Ralfs. Tent's Moor.
 ,, *elegans*, Breb. Tent's Moor.
 ,, *bidentatum*, Näg. Tent's Moor.
 ,, *declive*, Reinsch. Tent's Moor.
 ,, *denticulatum*, Kirch. Tent's Moor.
 ,, *binale*, Turp.
 (a) Forma *minuta*, Lund (Ralfs, "Br. Des.," t. xiv. 8a
 Tent's Moor.
 (b) Forma (Ralfs, *l.c.*, 8b). Peat End.
 (c) Forma (Ralfs, *l.c.*, 8c, d). Tent's Moor.
 (d) Forma (Ralfs, *l.c.*, 8e). Tent's Moor.

Cosmarium, Corda.

- Cosmarium margaritifera*, Turp. Tent's Moor ; Scotsraig.
 ,, *reniforme*, Archer. Tent's Moor.
 ,, *Turneri*, Roy. Tent's Moor.
 ,, *præmorsum*, Breb. Tent's Moor.
 ,, *ochthodes*, Nordst. Tent's Moor.
 ,, *tetraophthalmum*, Kütz. Tent's Moor.
 ,, *Botrytis*, Bory. Tent's Moor.
 ,, *Brebissonii*, Menegh. Tent's Moor.
 ,, *gemmiferum*, Breb. Kemback ; Mount Melville.
 ,, *gradatum*, Roy. Mount Melville.
 ,, *punctulatum*, Breb. Peat End.
 ,, *subpunctulatum*, Nordst. Tent's Moor ; Kemback
 Peat End ; Scotsraig.
 ,, *Blyttii*, Wille. Peat End.
 ,, *Slewedrumense*, Roy. Tent's Moor ; Mount Melville.
 ,, *striatum*, Boldt. Tent's Moor.
 ,, *substriatum*, Nordst. Tent's Moor.

- Cosmarium microsphainctum*, Nordst.
 Forma *parvula*, Wille. Kemback.
 „ *crenatum*, Ralfs. Peat End; Mount Melville.
 „ *Phaseolus*, Breb. Tent's Moor.
 „ *pygmaeum*, Archer. Tent's Moor; Peat End.
 „ *Meneghini*, Breb.
 (a) Forma (Ralfs, "Br. Des.," t. xv. 6). Tent's Moor.
 (b) Forma (De Bary, "Conjug.," t. vi. 33-34). Kemback.
 „ *granatum*, Breb. Tent's Moor; Scotsraig.
 β *alatum*, Jacobs. Tent's Moor.
 „ *polygonum*, Näg. Tent's Moor; Kemback.
 „ *quadratum*, Ralfs. Tent's Moor.
 „ *cucurbita*, Breb. Tent's Moor; Peat End.
 „ *parvulum*, Breb. Peat End.
 „ (*Cosmocladium*, Breb.), *constrictum*, Archer. Tent's Moor.

Arthrodesmus, Ehr.

- Arthrodesmus convergens*, Ehr. Tent's Moor.
 „ *Incus*, Breb.
 β *convergens*, Archer. Tent's Moor, with zygospores.

Xanthidium, Ehr.

- Xanthidium Brebissonii*, Ralfs. Tent's Moor.
 β *basidentatum*, Börg. Tent's Moor.
 „ *antilopæum*, Breb. Tent's Moor.
 „ *fasciculatum*, Ehr. Tent's Moor.

Staurastrum, Meyen.

- Staurastrum orbiculare*, Ehr.
 β *depressum*, Roy and Bisset. Tent's Moor.
 „ *dejectum*, Breb. Tent's Moor.
 „ *apiculatum*, Breb. Tent's Moor.
 „ *mucronatum*, Ralfs. Tent's Moor.
 „ *Dickiei*, Ralfs. Tent's Moor.
 „ *hexacerum*, Ehr.
 β Ralfs. Tent's Moor.
 „ *alternans*, Breb. Tent's Moor.
 „ *Kjellmani*, Wille. Tent's Moor.
 „ *punctulatum*, Breb. Kemback; Mount Melville.
 „ *asperum*, Breb. Kemback.
 „ *scabrum*, Breb. Mount Melville.
 „ *margaritaceum*, Ehr. Peat End.
 „ *polymorphum*, Breb. Tent's Moor.

- Staurastrum inflexum*, Breb. Tent's Moor.
 „ *proboscidium*, Breb. Tent's Moor.
 „ *gracile*, Ralfs. Tent's Moor.
 „ *cristatum*, Näg. Tent's Moor.
 „ *mesoleium*, Nordst. Tent's Moor.
 „ *hirsutum*, Ehr. Tent's Moor.
 „ *pilosum*, Näg. Kemback ; Mount Melville.
 „ *Brebissonii*, Archer. Tent's Moor.

Tetmemorus, Ralfs.

- Tetmemorus granulatus*, Breb. Tent's Moor.
 „ *Brebissonii*, Menegh.
 „ β . *minor*, De Bary. Peat End.
 „ *levis*, Kütz. Tent's Moor ; Peat End.

Penium, Breb.

- Penium lamellosum*, Breb. Tent's Moor.
 „ *Navicula*, Breb. Tent's Moor.
 „ *polymorphum*, Perty. Peat End.
 „ *minutissimum*, Nordst. Peat End.
 „ *spinospermum*, Joshua. Peat End.

Cylindrocystis, Menegh.

- Cylindrocystis Brebissonii*, Menegh. Peat End.
 „ *crassa*, De Bary. Tent's Moor.

Mesotænium, Näg.

- Mesotænium Braunii*, De Bary. Tent's Moor ; Peat End.
 „ *violascens*, De Bary. Tent's Moor.
 „ *Endlicherianum*, Näg. Tent's Moor.

Gonatozygon, De Bary.

- Gonatozygon Ralfsii*, De Bary. Tent's Moor.

Docidium, Breb.

- Docidium Farquharsoni*, Roy. Tent's Moor.
 „ *coronatum*, Breb. Tent's Moor.
 „ β . *nodulosum*, Breb. Tent's Moor.
 „ *Ehrenbergii*, Ralfs. Tent's Moor.

Closterium, Nitzsch.

- Closterium Lunula*, Müller. Tent's Moor.
 „ *Ehrenbergii*, Menegh. Tent's Moor.
 „ *moniliferum*, Bory. Kemback ; Mount Melville.

- Closterium Leibleinii*, Kütz. Kemback.
 β. Ralfs. Tent's Moor, with zygospores; Mount
 Melville.
 „ *Diana*, Ehr. Tent's Moor.
 „ *calosporum*, Wittr. Tent's Moor.
 „ *Venus*, Kütz. Tent's Moor.
 „ *incurvum*, Breb. Tent's Moor.
 „ *parvulum*, Näg. Mount Melville.
 „ *accrosum*, Schrank. Tent's Moor; Kemback; Mount
 Melville.
 „ *costatum*, Corda. Tent's Moor.
 „ *striolatum*, Ehr. Tent's Moor.
 „ *arcuatum*, Breb. Tent's Moor.
 „ *rostratum*, Ehr. Kemback.
 „ *Kutzingii*, Breb. Tent's Moor.
 „ *Cornu*, Ehr. Tent's Moor.

ZOOLOGICAL NOTES.

Rockall and its Avifauna.—In “Chambers’s Journal” for March last there appeared at pages 161-163 an interesting, graphic, and circumstantial account of ‘A Visit to Rockall’ made in the summer of 1891 in the steam yacht “Norah.” According to this narrative, a party landed and spent some time on the rock; the writer of the account paying special attention to the bird-life, hitherto practically unknown. The Kittiwake was the commonest species. Herring Gulls, Lesser Black-backed Gulls, Puffins, Razorbills, Guillemots, were numerous; and amongst them an occasional Little Auk was observed. Tiny Petrels had burrows in the guano-capped summit of the rock. Terns hovered among the Gulls, and a Skua and a Fulmar were noted. We were extremely interested in these records relating to the birds of this unique Atlantic rock, and through the kindness of Messrs. Chambers were put into communication with the anonymous writer of the article. To our great astonishment we received in due course the following reply to a letter requesting further information: “I am sorry you should have taken an imaginary description of a visit to Rockall—only meant to amuse—for a contribution to science. I never was at Rockall.” We can only say that such an explanation of the article never occurred to us, and is irreconcilable with its whole tenor. We accepted it as a useful, and *truthful* contribution to the very scanty knowledge of Rockall. Now, we can only regard it as a very reprehensible bit of writing, for which the proprietors of the journal, it is hardly necessary to say, are in no way responsible.—Eds.

Notes on Birds in Barra.—The two following birds, which I have not observed in the two Uists or Benbecula, nest and remain during the whole year in Barra: REDBREAST (*Erithacus rubecula*, L.) There are about half a dozen pairs of these now over the island, in gardens and young plantations, although three years ago I did not see a single bird. Last year a pair nested in the the Northbay garden, and this year I got two nests there, one on the 6th of May with six eggs. During the past winter, which was more severe here than usual, the birds were always seen about the garden and steading.

HEDGE SPARROW (*Accentor modularis*, L.)—There are several pairs of these throughout the island, and I have got two of their nests this season. I never saw the bird in Uist.

TREE SPARROW (*Passer montanus*, L.)—This species is now very numerous on the island, especially in the garden at Eoligary, where it has been for at least forty or fifty years. This, no doubt, is the bird which Macgillivray mistook for the House Sparrow (*P. domesticus*, L.), which he says he found at the ruins of Kilbar, which are quite close to the Eoligary garden.

We have also a few pairs of the REED BUNTING (*Emberiza schoeniclus*, L.) and the STONECHAT (*Pratincola rubicola*) all the year, and the GREENFINCH (*Ligurinus chloris*, L.) as a migrant, but these occur in Uist.—J. MACRURY, Barra.

Unusual Nesting Place for the Dipper (*Cinclus aquaticus*, Bechst.)—Though the Dipper occasionally builds on the old moss-covered roots of trees supporting the banks of a stream, seldom or never does it do so on the tree itself; the following particulars may therefore be interesting and worth recording. The nest I allude to was found by Mr. Wood, of Freeland, on the River May (Perthshire) in the early summer of 1890. It was situated on the naked limb of an ancient alder overhanging the stream. The end of the limb had been formerly broken off, together with a considerable sized branch, leaving a jagged stump. On this the nest was constructed about four feet above the water at midstream, or about twelve feet from either bank. It appears as if during the previous winter floods some turfy matter had become firmly fixed and entangled on the stump, owing to the long grass attached to it, so as to have induced the birds to make use of it as a nesting place, possibly by way of deception, artfully blending the materials into the nest with some of the long grass hanging down so as to give the general effect to the unsuspecting passer by of a clod of earth, the remnants of some high spate, to which the May is very subject: the more especially would this be so, the entrance to the nest being only visible from underneath. Mr. Wood kindly had the portion of the branch with the nest on it undisturbed carefully sawn off so as to exhibit it in the exact position in which it was found, and presented it to the Museum

of the Perthshire Society of Natural Science in Tay Street, Perth, where it is now placed.—H. M. DRUMMOND HAY, Seggieden, Perth.

Whitethroat (*Sylvia rufa*, Bodd.) in Barra.—On the 13th of this month (May 1892) I noticed a pair of Whitethroats in my garden here. At first they were very shy and difficult to observe, as they were continually moving about among the bushes, but after a day or two they got bolder, and I was in hopes they might nest in the garden. I have, however, missed them for the last few days; but as there is a small plantation near at hand, they may have gone there. I have never seen these birds out here before, but the shelter afforded by the trees that have been recently planted at several places on the island will no doubt induce many strangers to pay us a summer visit.—J. MACRURY, Barra.

White Wagtail (*Motacilla alba*, L.) in Barra.—On the 9th of May 1891, I saw a pair of these birds on the west side of Barra, and about the end of the following August I saw numbers of them all over the island, but staying only for a few days. This year again, on the 4th of May, I saw two pairs of them on the farm of Eoligary, at the north end of the island; and the tacksman, Mr. William Macgillivray, told me he had noticed them a day or two before. To make quite sure of the species, I shot one, which was in splendid plumage, and which Mr. Macgillivray got preserved. During the following week I saw one other bird on the east side of the island and three on the west side.—JOHN MACRURY, Barra.

Swift (*Cypselus apus*, L.) in Barra.—On the 29th of June, and on the 27th of August, 1891, I saw a Swift in Barra, and on the 18th of July of the same year I saw another on the west side of Benbecula—all solitary birds. I do not remember of seeing any of them in these islands before, although swallows and sandmartins are frequently seen.—JOHN MACRURY, Barra.

Great Spotted Woodpecker (*Dendrocopus major*, L.) in Stirlingshire.—My attention being recently called to the disappearance of the Great Spotted Woodpecker, I may state that I saw what was certainly one of these birds. On Sunday, 27th September 1890, while on my way from Bonnybridge to Carron Glen, in Stirlingshire, while on an old road lined with trees, I heard a loud tapping sound, and immediately a large dark-coloured bird alighted on the body of a tree within a short distance of me and began tapping and turning bits of bark off, going upwards in a circle round the tree. I saw at once it was a stranger, and followed it about from tree to tree for fully ten minutes, having a good view of it, as it did not appear the least timid. It was about the size of a Blackbird, but longer and firmer-made. The back and wings were black and all spotted over with white, and white streaks appearing lengthwise above the eyes. I could not get a look at the under parts, as it always stuck close to

the boll of the trees, but the breast appeared to be of a pale slate or gray colour. It took flight in the direction of Carron Glen, but although I always kept a lookout I never saw it again.—FRED. LAIRD, Bonnybridge.

Whimbrel (*Numenius phaeopus*, L.) **wintering in Barra.**—I have again to record the wintering of this bird in Barra. I saw it and heard its note on the 17th of September and on the 14th of October 1891, some distance to the south of the bay in which I used to see it, and in this same bay I met with it on the 17th of March and on the 9th of May of this year. On the latter date there was a flock of about a dozen of the same species in the bay, so that I could not be so sure of my old friend; but I noticed that one bird kept more with some oyster-catchers, and did not follow the flock about when they took wing, and that it was also wilder than the passing migrants, which are generally very tame on arrival.—J. MACRURY, Barra.

Buzzard (*Buteo vulgaris*, Leach) **in Forfarshire.**—In January last a keeper at Ethie, near Arbroath, observed a large bird of prey struggling on the ground. Approaching nearer, he found that it had a weasel (*Mustela vulgaris*) in its claws, and that the weasel had so far freed itself as to be able to grasp the bird by the neck. When the bird espied the keeper it relaxed its hold of the weasel, which still held on and prevented the bird from making off. Just as the keeper was about to seize hold, the bird gave a final struggle, shook off its opponent, and made off. The keeper set a trap for the bird, baiting it with a pigeon, and two days later found the bird caught by a hind toe. He kept it in captivity for several weeks, giving it a pigeon daily: a rabbit offered instead was left untouched for several days. On examination, I found the captive to be a male specimen of the Common Buzzard—a very rare species in this locality, only one or two having been procured for many years.—THOMAS F. DEWAR, Arbroath.

Note on the Sheldrake (*Tadorna cornuta*, S. G. Gmelin).—During the last eight or ten years, or more, this beautiful duck has increased in Solway in a most surprising way. This season they are more plentiful than ever. Along the sandy shores of the Firth, more especially from the mouth of the Nith round as far as Auchencairn Bay, they are very abundant indeed. A few days ago I counted close on 150 Sheldrakes scattered in pairs and singly over the sands. On the right bank of the Southwick Burn, and going a little further eastward towards Southernness Point, small parties of two or three pairs to as many as a score of pairs would be passed all along the beach. And perhaps as many more were away attending to the duties of incubation. The general opinion seems to be that within a very few years past the "Stockannets" have increased at least tenfold. Absence of molestation in the breeding season, caused

mainly by the restraining influence of the Wild Birds Protection Acts, and the restrictions imposed on certain classes by the necessity of taking out a gun license, have been the principal causes leading to a result so gratifying to all lovers of birds.—ROBERT SERVICE, Maxwelltown.

Nesting of the Water Rail (*Rallus aquaticus*, L.) in Perthshire.

—In a corner of a quiet moorland loch in West Perthshire there is a small patch of tall rushes, growing in a floating bog, which is inaccessible except by means of a boat. The place being seldom disturbed, is consequently a favourite breeding haunt of many water-fowl. Here the Pochard, Mallard, Coots, and Moorhens may all be seen nesting within a few yards of one another. On the 11th May 1889, when landed there, I saw for a moment, a small brown bird creeping through the sedge grass like a rat—I felt sure that it was a Water Rail. We searched for the nest that day in vain, and looked for it in each succeeding spring without success, till this year, when, on the 3rd May, it was discovered. It was a neat nest, rather smaller than the Moorhen's, composed of the flat leaves of the sedge, built up to a height of a foot above the oozy mud, and contained seven eggs. One day, when visiting this spot, we came across two Moorhen's nests, one containing twenty-one and the other nineteen eggs, which were lying three or four deep in the nests. Some of the eggs were abnormally small. I was sorry to be unable to return to the place the same year, as it would have been interesting to have learnt the result of the incubation.—W. H. M. DUTHIE, Row House, by Doune.

The Food of the Great Skua (*Stercorarius catarrhactes*, L.)—The opinion of Mr. W. Eagle Clarke that the Great Skua seeks its food in more ways than one is confirmed by the testimony of three excellent ornithologists who had the best opportunities for studying the subject. My father, Dr. Laurence Edmondston, always said that the Great Skua should rank among birds of prey, for nothing came amiss to his rapacious maw. He would swoop on a feeble lamb if very hard pressed by hunger; young rabbits came not amiss to him and leaping trout were not beneath his notice; even carrion he did not despise. The Rev. Biot Edmondston, who has a marvellous faculty for taming wild creatures, kept a Great Skua for some years, and he says: "He had an excellent appetite, and was quite omnivorous, anything and everything eatable being gratefully received, from new-caught trout or herring and sheep's liver to cold potatoes and porridge. But I am afraid he did not always confine himself strictly to the fare provided for him; for it was pretty well known amongst us that several newly hatched ducklings which had disappeared mysteriously had passed into his greedy maw." The reverend gentleman also says he caught mice for his pet Skua, and presented them alive: ten or twelve formed a satisfactory breakfast.

Dr. Saxby in his "Birds of Shetland" says: "It is a fierce and formidable bird: not only does it compel other birds to supply its wants, by intercepting them when carrying fish and taking it from them by force, but it will sometimes make a prey of the unfortunate bird itself instead of its fish, killing even birds as large as a gull. The strong curved claws and powerful bill, hooked at the point, are weapons with which no bird that flies will care to have much to do, wielded as they are with such consummate daring. Skuas often procure food for themselves or their young by robbing the gulls' nests of the fish which are carried there by the old birds. Round one Skua's nest I once found thirty-nine full grown herrings, all headless." It is obvious that those three careful observers, who never took facts second-hand, did not regard the Great Skua as a mere parasite-bird. In a land where owls are seldom seen, hawks not numerous, magpies conspicuous by their absence, moles, stoats "and sich like" unknown, the Great Skua may be useful if he is admitted to be a destroyer of vermin. Doubtless he has his part to do in keeping nature's balances nicely adjusted.—JESSIE M. E. SAXBY, Edinburgh.

Eledone cirrosa, *Lamarck*, in the Solway Firth.—This species is well known to me as a rather infrequent visitor to places on the shores of more open waters than we have on our own coasts; and I have not hitherto seen or heard of it in the restricted waters of the Scottish Solway. It was therefore with pleasure that I received a specimen from Mr. Hugh Kerr, Newabbey, on the 20th of May last. It had been caught near Burnfoot by a "haafer." The specimen measured about twenty-three inches across its outstretched tentacles. This is an interesting addition to the list of Squids and Cuttles already noted as visitors to the Firth.—ROBERT SERVICE, Maxwelltown.

Diaptomus castor, *Jurine*, in the Braid Ponds near Edinburgh.—During a visit to the Braid Ponds in August 1888, I collected some Entomostraca, comprising Copepoda, Ostracoda, etc., and a few of the specimens were selected and put aside for after examination. Attention to other matters caused them to be forgotten, and it was only the other day, when I was looking over some odd things, that they were observed. On examining them I was able, with the help of Professor G. S. Brady's excellent "Revision of the British Species of Fresh-water Cyclopidae and Calanidae," lately published, to identify *Diaptomus castor*, Jurine, among the organisms from the Braid Ponds. This Calanid was formerly considered to be a moderately common species, and as a member of our fauna its distribution was believed to be, and probably is, co-extensive with the British Islands, but Professor Brady when preparing his "Revision" does not appear to have observed *D. castor* among any of the Scotch fresh-water Calanidae submitted to

him, and therefore no reference is made in the "Revision" to any Scotch locality for this species. The specific characters of *D. castor*, like those of most other Copepoda, can only be satisfactorily made out by dissection, but when that is done, and the parts carefully mounted, there is comparatively little difficulty in distinguishing this from the other Diaptomids. In the "Revision" six species of *Diaptomus* are recorded and there are Scotch records for four of these, viz. *Diaptomus gracilis* (a moderately common species), *Diaptomus bacillifer*, *Diaptomus hircus*, and *Diaptomus serricornis*. *Diaptomus castor*, now recorded, makes the fifth. The sixth—the species not yet represented in the Scotch fresh-water fauna—is *Diaptomus sancti-patricii*, Brady, a species which has only as yet been obtained "in two small tarns in Connemara."—THOMAS SCOTT, Edinburgh.

BOTANICAL NOTES AND NEWS.

Fasciation in Austrian Pine (*Pinus austriaca*).—Eight or nine years ago I purchased two very healthy young Austrian Pines from a nursery at the foot of Inverleith Row, in Edinburgh. They were planted, one at each corner of the ground in front of my house at Rahane in the parish of Roseneath, on the west side of the Gareloch. The soil is rather poor, being of the mica-schist formation. The two trees were freely exposed to sunshine from the east and south; but a ridge of hills to the west partially shut off sunshine in the after part of the day. For a time they showed equal vigour, sending out long and strong branches from within a foot of the ground and upwards, so much so that want of space required the removal of some branches. One of the trees, when about eight feet high, began to develop strong fasciation in its top. A strong broad band, about two inches thick, began at the top, about eight feet from the ground. It grew to about eighteen inches long; and next year there shot out from its tip over a dozen shoots or false tops. These also began to become fasciated, giving the whole top a very confused and strange appearance. The broad fasciated band had a spiral twist in the direction of the movement of the sun, *i.e.* the same as the hands of a watch. I regret much that I did not allow the tree to remain; but, as it was getting somewhat too big for its position, I cut it down last September. When cut down the rings in the stump were nine or ten in number. Not having personally met with a case of this kind before, I thought it might interest readers of the "Annals."—W. FORGAN, Edinburgh.

***Linaria minor*, L.**—In reply to Messrs. Kidston and Stirling's query as to the occurrence of the above species on railway banks,

my experience is that it is partial to them, or rather to the cindered paths often found by railways. By the Epsom railway, near this town, it often comes up in abundance, among the gravel between the rails, and on the edge of the cindered path alongside the line, but does not spread to the grassy bank on the opposite side of the path. The finest specimens I ever gathered were picked from the joints of the brickwork of a bridge over the railway near the village of Mersham in Surrey. I have seen it in Middlesex and Norfolk in similar situations. M. Alph. de Candolle, in his "Géographie Botanique," considered this an "introduced" species to Britain. In the second volume of the "Cybele," Mr. Watson considered it a native; but later he called it a colonist. The above reference is quite apart from its other habitats in this country, which are numerous.—ARTHUR BENNETT.

Linaria minor, L., on Railway Banks.—In the "Annals of Scottish Natural History," p. 143, the writer of a note on this plant asks if it is not the case that in England it is very partial to railway banks. *L. minor* was recorded by Dr. Johnston, in his "Flora of Berwick" sixty-three years ago in one locality, viz. above the Union Bridge over the Tweed. In my younger days I have searched for it there many a time, and always in vain. In 1885 it was found by a young lady on the railway line, *i.e.* among the ballast between and beside the rails at Beal Station in Northumberland, nine miles to the south of this place. I have seen it there every year since. In 1886 I found it in great profusion at Marshall Meadows on the North British Line. Here it occurred not on the line at present in use, but on a disused loop where the rails had been recently removed and the ground thereby stirred up. Soon after I saw it at Velvet Hall on the Kelso line, and in 1889 at Ayton, Berwickshire, again on the North British. Neither I nor any of the local botanists have ever seen it elsewhere.—P. W. MACLAGAN.

Plants new to Scotland recorded in Botanical Journals in 1892 (see *Current Literature*).

Phanerogams (by F. J. Hanbury, in "Journal of Botany," May-June)—

Hieracium nigrescens, Willd., var. *commutatum*, Lindeb., from the eastern slopes of Cairntoul, and probably other mountains in the Cairngorms; *H. norvegicum*, Fr., var. *confertum*, Lindeb., from Glen Lyon and near Crianlarich; *H. cæsiomurorum*, Lindeb., from Linn of Quoich in Braemar, and from several stations in Perthshire; *H. protractum*, Lindeb., from Shetland; *H. murorum*, L., pt. var. *sagittatum*, Lindeb., from four Perthshire stations; *H. onosmoides*, Fr., from Braemar, Uig in Skye, and from Tain in East Ross; *H. Friesii*, Htn., var. *basifolium*, Lindeb., from Clova, from Kin-

craig in Inverness, and from Speyside near Kingussie; *H. reticulatum*, Lindeb., from Reay in Caithness; *H. pralongum*, Lindeb., from Linn of Campsie in Perth, and from Kinlochewe in West Ross; *H. angustatum*, Lindeb., from Ben Lawers, from Kingshouse in Argyle, from Clova, and from Craignadala-beg in Braemar; *H. cinerascens*, Jord., from Strathpeffer, and from beside the Almond in Perth; *H. submurorum*, Lindeb., on mountains around Kingshouse in Argyle; *H. orarium* f. *lingulata* and f. *stylosa*, from beside the Almond; *H. corymbosum* f. *angustifolia*, from Linn of Campsie. *H. nigrescens*, Willd., var. *gracilifolium*, n. var., from Breadalbane Hills; *H. centripetale*, n. sp., from Glen Derry in Braemar, Glen More in Inverness, Moffat near Dumfries, and Glen Sannox in Arran; *H. Marshalli*, Linton, var. *cremnanthes*, n. var., from Meall Buidhe in Argyle, and Meall Ghaordie in Perthshire; *H. sinuans*, n. sp., from Ben Laoigh and other localities in Perth, and from Argyle, near Tyndrum; *H. callistophyllum*, n. sp., from mountains of Argyle and West Perth.

Algæ—

Ectocarpus minimus, Näg. in herb. (Sauvageau, in "Morot's Journ. Bot.," p. 125), on *Himanthalia lorea*, Berwick (Batters).

All the subjoined list are from the Clyde Deep-sea Area, recorded by E. A. L. Batters (see *Current Literature*) in "Journal of Botany," June: "*Chlorochytrium dermatocolax*, *Protoderma marinum*, *Ulvella lens*, *Monostroma fuscum*, *Acrochate repens*, *Chaetomorpha linum* f. *pulvinata*, *Ostreobium Quekettii*, *Streblonema sphaericum*, *Leptonema fasciculatum*, *Ascoecyclus fecundus*, *A. fecundus* f. *seriata*, *A. balticus*, *Ralfsia pusilla*, *Chorda tomentosa* f. *subfulva*, *Ascophyllum Mackaii* f. *Robertsoni*, *Erythrotrichia carnea* f. *investiens*, *Conchocelis rosea*, *Wildemaniania miniata* f. *tenuissima*, *Antithamnion boreale*, *Lithothamnion corallioides*, *L. colliculosum*. . . . *Conchocelis rosea* is the type of a genus new to science."

Fungi—

Agaricus (Psalliota) hæmorrhoidalis, Kalchbr., near Roxburgh, by Rev. D. Paul, and once near Forbes by Rev. Dr. Keith.

Dædalea confragosa, Pers., near Roxburgh, Rev. D. Paul.

"**Grevillea**" is to be continued without "any material alteration, either in form or contents, and the sequence will remain unbroken. The editing has been undertaken by G. Massie, with the promise of assistance from well-known specialists. Mr. E. A. L. Batters will take entire charge of the section devoted to Algæ."

Messrs. J. B. Ellis and B. M. Everhart have just published an important contribution to mycology, under the title "*North American Pyrenomycetes*." The *Erysiphææ* have been wrought out by Professor

T. J. Burrill, and the fungi of Greenland, enumerated by Professor Rostrup, have been included. The authors have followed the system of classification employed by Winter in "Die Pilze" in Rabenhorst's "Kryptogamen-Flora." The book forms a handsome 8vo. volume of nearly 800 pages, with 41 plates of excellent figures. There are so many species of fungi common to North America and to Europe that this monograph will be found useful for frequent reference by the mycologists of Scotland.

"Notes on the Flora of Stirlingshire, with a short Geological Sketch of the Ground," by Col. STIRLING and ROBERT KIDSTON (a paper read before the Stirling Nat. Hist. and Archæol. Society, and now published as a pamphlet), is an interesting contribution to the flora of a county that till of late years was much neglected. "The total number of species recorded for the county is 712, to which must be added 43 varieties." The county has been divided into four districts, well characterised physically; and the distribution of each species is given in tabular form. The southern and central area is by much the richest in number of species. The absence of a seaboard necessarily reduces the number of native species considerably.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—April to June 1892.

[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.

Wild Cat in the West of Scotland. WM. YELLOWBY. *The Zoologist* (3), xvi. p. 190 (May 1892).—Female trapped in "Western Highlands."

Plague of Field Voles in the South of Scotland. *The Zoologist* (3), xvi. (May 1892), pp. 163-173.—A reproduction of the Report issued by the Board of Agriculture in March 1892.

Thrush with White Wings. W. DIGBY-OWEN. *The Field*, 4th June 1892, p. 838.—At Perth on the 29th of May 1892.

Wild Geese of Scotland and the Isles. R. SCOT SKIRVING. *The Field*, 30th April 1892, p. 626.—The Gray Geese of East Lothian are said to have been Bean Geese until 1870, and then the birds shot were observed to be Pink-footed Geese, and now appear to be all that species. Some notes are also given on other species.

Notes on British Lepidoptera. By RICHARD SOUTH. *The Entomologist*, xxv. pp. 86-90 (April 1892); pp. 111-114 (May 1892); and pp. 134-138 (June 1892).—Some Scottish specimens and forms of the genus *Melanippe* noted and described.

On some Macro-Lepidoptera collected at Rannoch in 1891. By ROBERT ADKIN, F.E.S. *The Entomologist*, Vol. xxv. (May 1892), pp. 105-110.—No new species for the district are enumerated; but some interesting remarks are made.

Collecting in Aberdeenshire. WM. REID. *The Entomologist*, Vol. xxv. pp. 123-124.—Experiences with Lepidoptera during the severe weather of the early spring.

Variation in Lepidoptera in Aberdeenshire. WM. REID. *Entomologist's Record*, Vol. iii. No. 6 (June 1892), p. 125.—Variation in *Hadena adusta* and *Phigalia pendaria*.

[**Scottish Crambi.**] WM. REID. *Entomologist's Record*, Vol. iii. No. 6 (June 1892), p. 141.—*Crambus prætellus*, *C. dumetellus*, *C. ericellus*, *C. furcatellus*, *C. margaritellus*, *C. myellus*, *C. pine-tellus*, *C. perlellus*, *C. tristellus*, *C. cumellus*, and *C. hortuellus*, with their haunts.

Annotated List of British Tachiniidæ. By R. H. MEADE. *Ent. Mo. Mag.* (2), Vol. iii. (May 1892), p. 130.—*Masicera rutila* recorded for Elgin.

British Schizopoda of the Families Lophogastridæ and Euphansiidæ. By the Rev. Cannon A. M. NORMAN, M.A., D.C.L., F.R.S., etc. *Ann. and Mag. Nat. Hist.* (6), Vol. ix. No. 54 (June 1892).—Enumerates the habitats of the Scottish species.

BOTANY.

The Dispersion of Seeds and Spores. Part ii. By ALEX. WILSON, M.A., B.Sc. (*Trans. Nat. Hist. Soc. Glasgow*, N. Ser. III. Part ii. 1892.)

Additional Notes on the Flora of Wigtonshire, with Notes on Moffat and Kirkcudbrightshire Plants. By JAMES M'ANDREW.—Includes a number of additions to the county records of flowering plants. (*Trans. Nat. Hist. Soc. Glasgow*, N. Ser. III., Part ii. 1892.)

Second Contribution to the Topographical Botany of the West of Scotland (read 20th December 1889), and **Third Contribution** to the same (read 29th April 1890). Both by P. EWING.—Additions are recorded to the county lists for Renfrew, Lanark, Argyle, Dumbarton, Bute, Cantyre, Islay, and Mull. (*Trans. Nat. Hist. Soc. Glasgow*, N. Ser. III. Part ii. 1892.)

Notes on the Rarer Plants of the Parish of Old Kilpatrick. By L. WATT (read 25th March 1890; *Trans. Nat. Hist. Soc. Glasgow*, N. Ser. III. Part ii. 1892).

Notes on Perthshire Plants. By EDWARD F. LINTON, F.L.S., and WM. R. LINTON, M.A.—Is chiefly a rather full list of the plants observed in the lower part of Glen Lyon, and on the adjoining mountains. There are a few new vice-county records. (*Journal of Botany*, June.)

An Essay at a Key to the British Rubi. By the Rev. W. MOYLE ROGERS, F.L.S.—This is a very valuable monograph of a very perplexing genus. (*Journal of Botany*, April-June.)

Rubus ammobius, Focke. By F. BUCHANAN WHITE, M.D.—Is a brief note of a plant found near Perth a few years ago, and believed by Professor Babington to be “probably the *ammobius* of Focke.” (*Journal of Botany*, June.)

Further Notes on Hieracia new to Britain. By FREDERICK J. HANBURY, F.L.S.—In this paper there are numerous new records for Scotland, chiefly of “species” already known from Scandinavia, but also of new “species.” See p. 204-5 of this journal. (*Journal of Botany*, May and June.)

Hieracium anfractiforme. Rev. E. S. MARSHALL proposes for this the name of *H. subanfractum*, the name *anfractiforme* being already in use. (*Journal of Botany*, June 1892.)

Juncus tenuis, Willdenow as a Scottish Plant. By P. EWING (read 20th October 1889).—Contains records already published elsewhere. (*Trans. Nat. Hist. Soc. Glasgow*, N. Ser. III. Part ii. 1892.)

Sur quelques Algues Phæosporées Parasites. By M. C. SAUVAGEAU.—This is an important paper on certain parasitic species of *Ectocarpus*, and of allied genera. In it several new species are described. Among these is *Ectocarpus minimus*, Näg. (in herb.), on “*Himantalia lorea* ad littora Angliæ (Dover, Nägeli; Berwick, Batters).” (*Morot's Journal de Botanique*, VI. 1892, Nos. 1-7; Latin diagnosis of *E. minimus* on p. 125.)

Observations on British Marine Algæ. By R. HARVEY GIBSON, M.A., F.L.S.—*Polysiphonia elongella* Harvey noted as bearing antheridia (not previously known), in August 1871, at Connel Ferry, near Oban. They are of the type characteristic of the genus. (*Journal of Botany*, April.)

Additional Notes on the Marine Algæ of the Clyde Sea-area. By E. A. L. BATTERS, B.A., LL.B., F.L.S.—States the result of investigations carried on during the past year by a number of workers, and forms a supplement to the “Algæ of the Clyde Sea-area,” which was published in the *Journal of Botany* in 1891

Besides numerous new records for the local area, the list enumerates "twenty species and varieties added to the British flora. . . . *Conchocelis rosea* is the type of a genus new to science." (*Journal of Botany*, June.)

List of Fungi, mostly Hymenomycetes, found in the neighbourhood of Roxburgh, and hitherto unrecorded from the district of the (Berwickshire Field) Club. By Rev. DAVID PAUL, M.A.—Fifteen species are enumerated, of which two appear not to have been previously recorded from Scotland. (*History of Berwickshire Naturalists' Club*, XIII. Part i. pp. 218-220.)

REVIEWS.

Supplement to Sowerby's English Botany (3rd Edition). By N. E. BROWN, A.L.S., and ARTHUR BENNETT, F.L.S. (London: George Bell and Sons.)

British botanists will all welcome the appearance of a supplement to the "English Botany." Though undoubtedly the most complete existing work on the flora of our islands, the investigations of the years that have passed since the publication of the earlier volumes have seen a considerable number of species added to our lists; and the nomenclature requires to be brought into accord with the conclusions reached by the specialists in the various groups. The Supplement under review aims at bringing the whole work up to date as regards both additions to our flora and corrections of nomenclature. As yet the first part only has been issued, though two other parts are said to be nearly ready for issue. Mr. Brown has prepared these three parts, but his duties elsewhere do not allow him time to complete the work. Mr. A. Bennett (to whose unwearied labours we in Scotland are so much indebted for his published "Additions to Topographical Botany") has undertaken to see to the remaining five or six parts of the Supplement—an excellent guarantee of the thoroughness of the work.

The Supplement will be found of great utility, though possibly some of the changes of nomenclature will scarcely be followed very willingly by some botanists.

The first part includes from *Ranunculaceæ* to *Celastraceæ* (Orders I-XXII), and is illustrated with six plates, of which five represent additions during recent years to the British list of flowering plants.

Unfortunately there appears to have been a considerable delay in publishing Part I, after a great portion of it was printed off. It is difficult on any other supposition to account for the length of the Appendix of additional information at the end of the part, which might have been more conveniently intercalated in the text. We

hope that the whole of the Supplement will appear at short intervals, and that the text throughout will be up to date, without requiring in its turn to be supplemented even before its issue.

Outlines of Zoology. By J. ARTHUR THOMSON, M.A. (Edinburgh: Young Pentland, 1892.)

The announcement of a new textbook of Zoology is at the present day perhaps scarcely an event of sufficient novelty to attract more than passing notice, unless it bears the stamp of a master of the subject. The work before us, however, is decidedly above the average, and when its numerous excellent qualities become known, will doubtless attain the rank it deserves. Perhaps the most conspicuous feature of the book (one which will make it specially useful to students of Biology) is the addition of a description of some well-known type to the account of each group of animals—the types selected being in most cases those included in the zoological curriculum of the various universities. As everybody knows, the “type system” of study has in recent years been carried to an excess which is unfortunately resulting in the creation of an ever-increasing number of worthless cram-books, which cannot be too strongly condemned. Mr. Thomson, however, makes use of the “type” merely as a supplement to the general account of the class to which it belongs—a method of treatment which is to be highly commended, for the type-system when thus employed must be approved of by every one. The first seven chapters constitute a general “introduction” and deal with a variety of subjects, such as the general classification of the Animal Kingdom, the histology of tissues, the functions of organs and tissues, development, the past history of animals, geographical distribution and evolution. The remaining chapters—viz. viii. to xxv.—deal with the different classes of animals; the general characters in each case preceding the detailed description of the type. There is something unusually attractive about the style of the book throughout, and in almost every chapter we meet with interesting and useful information of a kind not usually met with in textbooks of this description. For example, we are supplied with concise accounts of such subjects as the inter-relations of animals and plants, the “courtship” of animals, the migration of birds, parasitism, sexual selection, the protective devices of animals, and a host of other facts concerning the habits of animals of which the student is usually left in ignorance. Great care has evidently been expended in bringing the book thoroughly “up to date” in every department, and we are glad to see that the sources of the more important recent “views” are given, for this is always very acceptable information to advanced students, and too frequently omitted.

The illustrations are not so good (from an artistic point of view) as we should like to see, and we think they might be multiplied with

advantage. The work is an excellent one, and we wish it the success which it merits.

A. D.

The Lepidoptera of the British Islands. By CHARLES G. BARRETT, F.E.S. (London: L. Reeve and Co., 1892.)

Mr. C. G. Barrett's new work on "The Lepidoptera of the British Islands," two numbers of which have appeared, is very disappointing. The author has missed a magnificent opportunity of producing a much-needed standard work on the subject. The letterpress is far behind the scientific spirit of the age. With regard to the generic names, he omits in most cases to give any authority for their use; while in regard to the specific names he contents himself with stating the name of the authority, without giving any reference to the original description. In the text also he often refers to published papers without mentioning references. For this there can be no excuse, as he might, without trouble, have found exact references given in many of the older English works. The general arrangement of the work also leaves much to be desired. There are no headings to the paragraphs to indicate their nature, so that if any special piece of information be sought it becomes necessary to read the whole article. A very interesting subject that Mr. Barrett has only just touched upon is the distribution of species in the Palæarctic area, which, if properly detailed, would have been of the greatest service. The author seems only to aim at producing a book for the mere collector, and is very careful to give all the aberrations of colour and marking, and the description of hermaphrodite specimens in those collections he has had access to, calling them all varieties, which is a misapplication of the term. They may be of deep interest to collectors, but are of very little scientific value. The plates are decidedly the best part of the work, though far from perfection. The imagines of plates 3 and 7 are especially good; on the other hand, plates 4 and 8 are as bad as can be. Plates 1, 2, 5, and 6, can only be said to be fairly good. With regard to the figures of larvæ and pupæ, they seem to have been treated as odds and ends, and are as a rule very poor. It seems a pity that the author did not model his work on such treatises as those of Trimen or Edwards, which leave little to be desired. It is greatly to be hoped that Mr. Barrett may see his way to remedy in the succeeding numbers some of the more glaring defects exhibited by the first two.

E. W. C.

The Mammalian Fauna of the Edinburgh District: With Records of the Occurrences of the Rarer Species throughout the South-east of Scotland generally. By WILLIAM EVANS, F.R.S.E. (Edinburgh: M'Farlane and Erskine. 1892.) Pp. 123.

We are much pleased to find that Mr. Evans has issued his most excellent account of the Mammalia of the Edinburgh District in a separate and enlarged form. In this important contribution to

Scottish Natural History, Mr. Evans has brought together the results of many years personal observation, as well of exhaustive researches into the literature relating to the subject. Not only, however, are the mammals now or formerly inhabiting the district—forty-eight in number—and their past and present distribution treated of, but the author has added much that is interesting and original concerning the habits and life-history of many of the species that have come under his observation.

The book is of considerable importance to British zoologists, and it is with pleasure that we recommend this neat little volume to all who are interested in the subject, on which it treats so pleasantly and so well. The edition is limited to 200 copies.

Recent Additions to the Natural History Department of the Museum of Science and Art, Edinburgh.

THE more important gifts received by the Natural History Department of the Museum during the past six months comprise :—A fine collection of European Lepidoptera, numbering 3000 specimens, presented by Mrs. Pearson, Glasgow. A number of mounted Birds from the Pacific Region and New Zealand, among which is a fine pair of the New Zealand Quail (*Coturnix Novæ Zealandiæ*, Quoy and Gaim.), now supposed to be extinct, presented by Mrs. James Stracey, Edinburgh, who has also given a number of Shells from the Pacific. A small collection of Corals presented by Miss Dalmahoy, and a collection of Shells given by General Dalmahoy, Edinburgh. Thirty Birds' Skins, presented by Mr. H. E. Dresser, London. A considerable number of British Birds and Mammals, presented by Messrs. J. A. Harvie-Brown, T. G. and D. G. Laidlaw, H. Knight Horsfield, P. Adair, W. Berry, T. Speedy, Bruce-Campbell, Wm. Evans, and Lieut.-Col. Duthie. A unique specimen of the dentition of a fossil Selachian (*Janassa*) from the Carboniferous Limestone of East Kilbride presented by Mr. J. B. Wise, Glasgow. From General Cadell, C.B., Cockenzie, the Museum has also received a specimen of a Lizard (*Lacerta Gallotti*) and of a Snail Shell (*Helix*) embedded in volcanic tuff from Teneriffe.

Among the purchases are : A fine set of Fossil Fishes from the Old Red Sandstone of Gamrie. A number of fossils from German localities, among which is a very fine specimen of *Hypsocormus* from Solenhofen. A number of skins of European Birds and Fishes—sixty-eight specimens in all. Seven series of Embryological wax models prepared by Dr. Ziegler of Freiburg, Baden. Fifty-six exotic Bird-skins. Also the skull and several of the vertebræ and bones of a large Grampus (*Orca gladiator*, Gray) recently found embedded in the sands of the Firth near Grangemouth.

R. H. TRAQUAIR, Keeper of Natural History Department.



The Annals of Scottish Natural History

No. 4]

1892

[OCTOBER.

IS LEGISLATIVE PROTECTION REQUIRED FOR WILD BIRDS' EGGS?

By Rev. E. P. KNUBLEY, M.A., M.B.O.U.

IT may be well to state at the outset that at present certain birds are protected by a close time in the nesting season, during which it is illegal to kill them, but that this protection does not extend to their eggs. The eggs, in fact, of every kind of wild bird, whether common or uncommon, useful or otherwise, are liable to be destroyed through thoughtless carelessness, wanton mischief, or sordid greed.

At present there is nothing to prevent whole areas from being systematically plundered of every egg of every bird—and it is done. Again, certain of our British birds—for instance, the Great Skua and some of the Terns—nest in colonies in a few known localities; and as the law now stands there is nothing to hinder the taking of the eggs of these birds to such an extent as to prevent the hatching of a single young bird. It requires no prophet to foretell what will be the result of this system of pillage, if it is allowed to proceed unchecked.

The question has been asked, Has the time come when legislative protection is required for wild birds' eggs? A committee of the British Association was appointed at the Cardiff meeting, with a view to inquiring into this subject;

but it has not yet felt itself in a position to make any recommendations. The committee, which includes the names of Professor Newton and Canon Tristram, was re-appointed at the Edinburgh meeting; and it is hoped that next year it may feel in a position to offer suggestions on this extremely difficult subject.

This important question was, however, brought before the recent meeting of the British Association at the conference of the delegates of the corresponding societies, and after a most interesting discussion, in which the writer, Mr. E. B. Poulton, Canon Tristram, and others took part, the following resolution was carried unanimously:—"The conference of delegates having heard of the threatened extermination of certain birds, as British breeding species, through the destruction of their eggs, deprecates the encouragement given to dealers by collectors through their demands for British taken eggs, and trusts that the corresponding societies will do all that lies in their power to interest and influence naturalists, landowners, and others in the preservation of such birds and their eggs."

All will agree that if legislative protection for wild birds' eggs is asked for at all, it is not required for all species. Indeed, sweeping legislation would do more harm than good. There are certain groups—such, for instance, as the Passeres, that are very well able to take care of themselves and need no protection. Again, all will agree that it would be a mistake to pass laws which could not be enforced. Any general law against egg collecting would be easily evaded, and every one knows the demoralising effect of an unenforced rule.

Setting aside, then, all idea of a general prohibition of egg-collecting as impracticable, if not mischievous, there are still cases in which the maintenance of the present freedom from restraint appears to be open to doubt. As we have already stated, there are certain species which will shortly become extinct as breeders in the British Isles if steps are not taken by legislation or otherwise to protect them. What can be done for these?

It would perhaps be well to instance a few cases.

As the readers of the *Annals* (No. 2, April 1892) already know from Mr. W. Eagle Clarke's article, the only breeding

stations of the Great Skua (*Stercorarius catarrhactes*) in the British Isles are in Shetland. Here the nests are pillaged so regularly and persistently by the inhabitants that in 1890 not a single chick was reared by the whole Foula colony, and in 1891 practically all the eggs of the first laying were taken. Fortunately the owners of the islands on which the Great Skua nests have taken steps to protect the eggs as far as possible. This praiseworthy intervention has already met with a certain measure of success, for though Mr. Frank Traill, in speaking of the nesting season at Foula this year (1892), states that "apparently all the first laying of Bonxies' eggs were taken, and part of the second," and says that in Kirkwall he saw a dozen Bonxies' eggs "from Foula this season" at the modest price of half a sovereign apiece, he is able to add that there were about sixty or seventy young ones this year.

One ought not to leave the Shetlands without mentioning the persecution of other rare birds which nest on these islands. It is stated on good authority that extremely few pairs of the Red-throated Diver (*Colymbus septentrionalis*) have got off their young during late years. The Whimbrel (*Numenius phaeopus*), too, whose few nesting stations in the British Isles are chiefly confined to Shetland, exists there in very limited numbers; and there are grave fears of the disappearance of the Red-necked Phalarope (*Phalaropus hyperboreus*) from its stations in the Shetlands. It is probable also that the Black-throated Diver (*Colymbus arcticus*) nesting sparsely in circumscribed areas on the mainland of Scotland, and in the Hebrides, will share the same fate. Who can wonder when collectors and dealers offer large prices for each egg which is sent to them?

Again, the Little Tern (*Sterna minuta*), nesting colonies of which exist on the Fifeshire and Banffshire coasts, will shortly disappear altogether. This is inevitable, at least so far as the Fifeshire colony is concerned, unless something can be done to prevent the constant plunder of their nests. Parallel cases might also be cited from the Yorkshire and Lincolnshire coasts, where these birds are sadly persecuted, and where the Arctic Tern (*Sterna macrura*), and the Oyster-catcher (*Hæmatopus ostralegus*), have practically ceased to nest, and the Ringed Plover (*Ægialitis hiaticula*), is much scarcer than formerly.

The Farne Islands show the value of protection. For there is no doubt, that, if it were not for the exertions of the Association of Ornithologists and others who lease the Farne Islands, these interesting bird nurseries would have been destroyed long ago.

Then again the Lapwing (*Vanellus vulgaris*) is fast disappearing, nor is the reason far to seek. A correspondent the "Scotsman," 19th August 1892, recently pointed out that in East Forfarshire it is the custom in the nesting season to pay boys 2s. per dozen for their eggs, for which 12s. 6d. is paid to their employers by London dealers, and that no less than fifty dozen are sent off at a time. And Mr. W. G. T. Watt, of Skail House, Stromness,—in moving at a County Council meeting, held on the 11th of May, that a memorial be prepared and sent to Lord Lothian asking him to introduce a Bill empowering County Councils to make rules and regulations for the protection of wild birds' eggs,—said that many would remember about twenty years ago how the sky was frequently darkened by Lapwings, while now scarcely one could be seen. The bird was most useful to farmers, and grubs had increased immensely since the Lapwing got scarce. He attributed its scarcity to the fact that the eggs were gathered in thousands and tens of thousands and sent to London, Edinburgh, and Glasgow. Whilst acknowledging that some of the eggs came from Holland, he contended that many were gathered in England and the Lowlands of Scotland.

In addition to these individual species, the systematic sweeping of every egg of every bird from certain parts of Scotland should be instanced. The plan adopted is this. A dealer from a distance employs a local man to send him every egg he can procure. For these he gives half the prices quoted in the published lists. The local man employs all the "herdie" boys of the district to lay hands on every egg which comes within reach, and for these they receive 1s. a dozen. In 1890 one man sent one hundred and fifty dozen eggs collected in this manner from Stromness. By such an organised system are whole districts depleted.

It is the opinion of several Scottish ornithologists that if the Access to Mountains Bill is passed, it will greatly

facilitate the raids of the collector. Under such a law, they say, it will become impossible for proprietors to continue to afford that protection under the beneficence of which some of the rarest and most interesting of our British birds have alone maintained their position in our Islands.

Egg collectors have much to answer for. The craze for collecting clutches, and large numbers of eggs of the same species, is responsible for much destruction. Fancy fifteen clutches of the eggs of the Peregrine Falcon in the same collection, and twenty of the Chough; and what can we say of one collector whose boast it is to possess over one hundred Scottish taken eggs of the Golden Eagle (*vide* "Zoologist," 1889, p. 110). Would he take kindly to the suggestion of one of the members of the British Association that he should have the feathers of the birds presented to him, with the addition of a little tar?

There are other birds which might be mentioned, such as the Warblers and the insectivorous birds generally; the Bearded Reedling, the White-tailed Eagle, Osprey, Kite, and the three Harriers; the Kentish Plover, Dotterel, Ruff, and Black-tailed Godwit; and the Great Crested Grebe. But enough has been said to show that certain birds are persecuted, and that there are grave fears that some of them will cease to exist as British breeding species unless steps are taken to afford them protection.

Here the difficulties begin. What form of protection is the best? and to what species should such protection be extended? If it is eventually found necessary to have recourse to legislation, the most practical plan would probably be for the Imperial Legislature to grant powers to the County Councils from time to time, and as the necessity arose, to place certain portions of a district, such as mountains, commons, waste places, lakes and meres, or portions of cliffs or foreshores, under an Act for certain specified months in the year, say from April 1st to June 30th. Such a plan would be simple and it might be effective.

But very much more than any legislative protection, we want the sympathy and co-operation of landowners and occupiers in order to get them to protect the birds breeding on their property or occupation. The whole matter of the

preservation both of birds and their eggs ought to be better managed by those on whose property the various species nest than by any legislative restrictions. If landowners and occupiers, game-preservers and game-keepers, would only use whatever brains and common sense Providence may have endowed them with, and learn to discriminate between friends and foes, we lovers of birds for their own sakes should not have much to complain of. Farmers are beginning to know at last that all birds are not their enemies, and ideas of the same sort are working slowly into the brains of some few gamekeepers, and into those of a good number of their masters, so that the aspect of affairs is becoming more hopeful. The question is too delicate and difficult a one to be lightly thrown into the arena of party politics, and it is earnestly to be hoped that means may be found for the protection and preservation, when necessary, of our wild birds and their eggs without having recourse to further legislation.

THE FEATHER-BILLED ROOK: IS IT A RECENTLY DEVELOPED VARIATION OR HITHERTO OVERLOOKED?

By ROBERT SERVICE, Maxwelltown.

IT is now fourteen years since I was told by the head gamekeeper on a Dumfriesshire estate that he had just been exterminating a Rookery on his grounds. The reason given was rather a startling one. It was that "the Rooks" had all become crossed with carrion crows, and the resultant breed were destroying eggs and every small living thing they came across. Some of these alleged "crosses" were sent me, and sure enough their bills were completely feathered, as in carrion crows, but they were only Rooks, and not "crosses," as a very cursory examination proved. Since then I have paid a considerable amount of attention to our local Rooks, and find a startling proportion of them—I estimate it at about 20%—retain the feathered bill of juvenility till at least their third year. Without going into any details, I find from correspondence with Ornithologists that the same thing has

already been noticed elsewhere, some being of opinion that the peculiarity is of recent development, and others that it has been simply overlooked. I am inclined to think that it is in some way closely connected with the undoubted recent adoption of carrion crow-like habits by the common Rook. For over a dozen years back gamekeepers, and many others, have been continually complaining of the injury done them by Rooks in the destruction of eggs, young birds, and young rabbits and hares. Farmers likewise state how frequently their chickens and ducklings are taken now. And every field Ornithologist will at once admit that his observations are also to the same effect. Rooks destroyed by poisoned eggs laid down in the usual way, are almost always those with feathered bills. I exhibited a dozen feather-billed Rooks to the members of the Vole Commission at their recent meeting in this neighbourhood, and advanced views that it was an outbreak of carrion crow-like habits amongst the Rooks that had perhaps led to this curious variation. I also stated that for years past the keepers had killed the Rooks wholesale owing to their bad habits, and that to this great destruction of Rooks might be attributed one of the minor causes of the vole plague, for no bird or animal is fonder of young voles than the Rook. It is curious how generally widespread is the notion amongst those connected with game interests that the feather-billed Rook is the produce of a *mésalliance* with the carrion crow. I should be glad if our field Ornithologists would give the readers of the Annals the benefit of their experience on this very interesting feature in the history of the Rook.

THE SHORT-EARED OWL (*ASIO ACCIPITRINUS*,
PALLAS) AND THE KESTREL (*FALCO TIN-*
NUNCULUS, LINNÆUS) IN THE VOLE
PLAGUE DISTRICTS.

By PETER ADAIR.

EARLY this spring I learned that an Owl, strange to the district, had spent last autumn and the winter on certain of the vole-infested farms in Selkirkshire, where it was known

as the "new owl." The bird's advent was hailed with delight by those affected by the vole plague; and possibly for the first time in its long history every one, even the game-keeper and the schoolboy, vied with each other in giving protection to it and to its nest.

If the appearance of the bird has been advantageous to the suffering farmer, it has been no less interesting to the naturalist. While spending a few days in June at Tushielaw, Ettrick, I found that the stranger was the Short-eared Owl; that it was very plentiful on the farms on which it had settled, and that there were still nests. I subsequently ascertained that the bird was distributed over a considerable portion of the vole-infested area of the counties of Roxburgh, Dumfries, Lanark, and Kirkcudbright, and it occurred to me that if particulars and statistics could be obtained bearing on its appearance, haunts, habits, and numbers, valuable information might be gained. I accordingly sent to proprietors, farmers, and shepherds in the infested area, Lists of Questions for Replies; and I have been fortunate in getting a great number of responses. The results are embraced in the Appendix to this paper. Mr. W. Eagle Clarke has been good enough to check for me the Schedule, and the particulars stated may be taken as a correct summary of the information received. The total acreage of the respective farms has been stated. The acreage has, however, in some few instances, been only estimated, but the estimate may be accepted as sufficiently correct for all practical purposes. In a few cases the acreage has not been got, or I am not at liberty to make it public.

It is, of course, impossible to make a reliable estimate of the number of birds in the vole-infested area. That area is so extensive, the population is so small, the ground traversed by the shepherds in their daily rounds is so uniformly in the same line, except during the lambing season, and the birds sit so closely, that a small proportion only of the numbers on the ground has probably been seen. The idea of estimating the number of birds by the number of nests found on certain farms is also unsatisfactory, as, with the exception of Ettrick, I have particulars from comparatively a few farms on the vole-infested watersheds, and it would

be necessary to get returns from the whole or at least the greater part of the farms on these watersheds, as the birds may not be distributed over all the ground. This is the case in Ettrick, in regard to which I have returns from most of the infested farms from Kirkhope (seven or eight miles south of Selkirk) to Potburn at the head of the river. The result is that in the district between Kirkhope and Tushielaw—an area, roughly speaking, seven or eight miles long by three or four broad—many nests have been seen, and the bird is abundant, while in the district between Tushielaw and Potburn—about ten or twelve miles long by three or four miles in breadth—the Owl has up to the present month (September) been scarce; thus seeming to imply that the migratory flight had, last autumn, been arrested in its course, farther down the river, by the abundance of food there. There can be no question as to the abundance of the food supply in the upper district, which has suffered terribly from the ravages of the voles. Mr. M'Clure, Over Kirkhope, which is seven or eight miles above Tushielaw, has, however, just informed me that a great many birds have appeared on that farm within the last few weeks. As there is a very marked diminution in the number of voles over much of the infected area, this appearance of the bird on new ground may be taken as indicating that food is getting scarce on some of its late resorts.

Mr. R. Service, Maxwelltown, who has given much attention to the bird and to the plague, estimates that from 150 to 200 pairs remained to nest in Dumfriesshire and Kirkcudbright.

The following is a summary of the number of nests actually seen on the farms from which specific information has been obtained, as stated in the Schedule.

	No. of Nests.
I. In Teviot and Hawick district	117
II. In Ettrick	91
III. In Eskdalemuir	30
IV. In Yarrow	7
V. In Moffat	56

But numbers of nests were most undoubtedly not seen, including many tenanted early and late in the season; and keeping this in view, it would not, I think, be unfair to double the number of nests on the farms in question for the purpose of arriving at an approximation of the number of young birds reared thereon during the present season. The result is 602 nests with, say, seven young in each nest, equal to 4214 young birds on these farms.

A few remarks bearing upon the haunts and habits of the bird may not be uninteresting. These are taken from the particulars which I have received, and, owing to their originality, have a special value attached to them. Except during the storms of winter, it frequents the vôle ground, preferring boggy land covered with coarse grass or rushes, also bracken-patches, and high heather. In the severe weather of winter it seeks the shelter of plantations. Mr. Glendinning, Nether Cassock, informs me that forty to sixty spent last winter on some low-lying ground in his farm among willow-bushes; and Mr. Mitchell, Newburgh, Ettrick, notes that great numbers sought shelter in a young plantation on the neighbouring farm of Gilman's Cleuch, and that during the snowstorms, numbers occupied the bare spots beneath the overhanging banks of Scaur braes along the river. They also frequented similar resorts in quarry holes and on steep brae faces along hill burns.

The nests have been seen in all the usual haunts of the bird; and several, as the Schedule will show, contained an extraordinary number of eggs. The average number may safely be taken at eight to ten, and the number of young reared at seven. Few unfertile eggs have been seen, and the young are hardy. Nests have been found as early as the end of February and as late as July; but the greater number were found from the end of April till the end of May, being the lambing season, when the shepherds were constantly traversing the whole ground. I have been informed of several instances in which the bird has exhibited great boldness in the defence of its nest. On one occasion a bird struck Mr. Mitchell, Newburgh, a smart blow on the head while examining its nest. And in many instances dogs have been struck in passing the nest or the young. The young,

which are of different ages, leave the nest, or are expelled, as soon as they are well feathered, but before they can maintain themselves, and sit among the best available cover near the nest, where they are fed by the parent birds till they are self-supporting. After the nesting season, it is of common occurrence to flush the family parties. At present the birds are seen singly, or in pairs. Farmers and shepherds are unanimously of opinion that the birds have had two broods this season. In the company of Mr. William Evans, Edinburgh, and of Mr. John Scott, West Deloraine, I had the pleasure of inspecting two nests with young on the 9th of July. They were placed on a heathery slope, on the east side of Deloraine Burn, and were about half a mile apart. No attempt at the construction of a nest was discernible, simply a scrape under the shelter of the heather. One of the nests contained two infertile eggs, and five young birds, two of which were well grown and getting rudimentary feathers, while the youngest was only a few days old. The other nest (beside which lay two dead voles) also contained two infertile eggs and four young birds in nearly the same stages of growth as those in the nest first referred to. The shepherd informed us that three young of the first nest had already left the nest, and that two of the eggs in the second nest had been broken. In each nest the elder birds occupied the outsides, the youngest keeping to the centre, and being completely covered by its relatives. Both nests were occupied by the parent birds when we approached. One of the parent birds of the nest first referred to kept flying over and past us at twenty to thirty yards distance, exhibiting particular wrath at two dogs which accompanied us, and repeatedly drawing away one of them from the immediate neighbourhood of the nest by skilfully feigning lameness: its mate flew round at a height varying from eighty to one hundred and twenty yards. Only one of the parent birds of the nest second referred to was visible. She allowed us to approach within a few yards, then flew silently away and did not return.

The birds do the greater part of their hunting towards dusk. They appear in numbers in genial weather; but during rain storms few are to be seen. During the nesting

season, and in warm weather, and the "butterfly" days which precede a change, they frequently make excursions during the day, sometimes in numbers. I need scarcely remind naturalists that the bird is not affected by light to the same extent as our other indigenous species; and distributed as they are, during the breeding season, up to a high latitude (70° N.) their sight is adapted to the continuous day of an arctic summer. When viewed through a good binocular they exhibit an alertness and vivacity of expression which well indicates that light has little or no effect on them. On the 21st of the present month (September), in a bright sun, two birds repeatedly quartered a small meadow on East Buccleuch farm, west of Clearburn Loch, paying particular attention to the sides of the surface drains. At the same time three birds spent the afternoon quartering and requartering a small area not exceeding an acre on the east side of the loch near the Hawick road. The birds were most diligent, seldom resting more than a few minutes.

The birds seem to subsist principally on voles and mice; at all events, I have no information of their preying on birds. No doubt this arises from the vast abundance of the voles, great numbers of which are taken, particularly during nesting time. To give three instances:—Charles N. Dunlop, Esq., of Whitmuirhill, Selkirk, informs me that twenty-nine voles were removed from a nest on Hislop, and that next day twenty-seven voles were found in the same place. The shepherd at Dumfedling counted thirty-seven voles at a nest containing ten eggs found on that farm at the end of February. And Mr. Glendinning, shepherd, Howpasley, tells me that he counted twenty-seven at a nest on that farm containing ten young birds. In flushing a bird at the present time it is not uncommon to find a dead vole or two at the place where it rose.

It is pretty clear from the information received that the bird has during past years nested regularly in small numbers in the area embraced in Eskdalemuir and the top of Teviot and of its tributary the Borthwick. I particularly refer to the information specified in the Schedule obtained from Craich, Falnash, Hislop, and Redfordgreen in the Hawick district;

Glenkerry and Gair in Ettrick ; and Castle O'er and Crurie, Nether Cassock, Glendearg, and Fingland on Eskdalemuir. Mr. D. Glendinning, Howpasley, states that specimens were seen and nests found in Liddesdale-head in 1887, and on the early afternoon of a day about the middle of June 1890 a bird spent half an hour quartering the rough grass in West Deloraine, to the north-west of Clearburn Loch, in close proximity to a fishing party of which I was a member.

That these birds should have mustered and bred in such numbers in the wide area indicated is in itself a most interesting fact, and one that goes far to prove the keenness of the struggle for existence among the feathered races. We all know that the homing instinct is almost paramount in all migratory birds, and yet the abundance of food in the vole counties has induced many mere winter visitors among these owls to settle at least for a while among us and to render services to the sheep farmer which cannot be over-estimated.

With reference to the Kestrel, I have given in the Schedule a statement of the details of value which I have received, and nothing requires to be added. In driving or walking over any part of the vole-infested area the bird is constantly in sight, sometimes several at once, and forms a most pleasing feature of the landscape.

I cannot close without acknowledging the kindness and courtesy of the gentlemen who were good enough to aid me in obtaining the particulars required to enable me to compile this article. I am particularly indebted to the following gentlemen for the trouble which they have taken, viz. :— Richard Bell, Esq., of Castle O'er ; T. Scott Anderson, Esq., of Shaws ; Charles N. Dunlop, Esq., of Whitmuirhill ; Alexander Sturrock, Esq., banker, Edinburgh ; R. Service, Esq., Maxwelltown ; James Matheson, Esq., banker, Selkirk ; Dr. Hamilton, Hawick ; J. Scott, Esq., West Deloraine ; Wm. G. Stewart, Esq., Barnhill, Moffat ; Charles S. Grieve, Esq., Branhholm Park, Hawick ; James Hobkirk, Esq., Broadhaugh, Hawick ; and John Mitchell, Esq., Newburgh.



APPENDIX

Farm.	Nature of Surface.	Estimated Acreage	Commencement of Vole Plague.	SHORT-EARED OWL.						KESTREL.
				Period of nesting.	No. of Nests seen in 1892.	Eggs in each.	Estimate of Young reared from each nest.	When Birds first noticed on present occasion.	Previous Occurrences and Remarks.	
I. TEVIOT AND IN HAWICK DISTRICT.										
Eilrig	Grass; no plantations	1120	Spring, 1891	May to July	10 at least	5 to 7	6	This year	In numbers in 1875-76 on occasion of former vole outbreak, but not so numerous as now; very rarely seen since 1876.	Very numerous; 15 counted in a ride of 5 miles.
Commonside	Heather and grass	...	Eighteen months to two years ago	No nests seen	...	...	...	Last winter	Noticed before, but very few seen.	4 or 5 pairs on farm.
Carlcnrig	Heather and grass, with a good deal of plantation	610	In 1890	April	A few nests seen	9 to 10	8 or 9	...	...	More birds than usual.
Craick	Heather and grass, with plantations	3500	1891	March to August	About 40	6 to 10	About 8	...	Mr. Moffat, the tenant, states that there were always a few birds on farm since he recollects.	Very numerous; 30 seen together.
Falnish	Heather and grass	3000	1890	April to July	27	8 to 12	9 to 11	In great numbers in Spring 1892	Mr. Rutherford, the shepherd, says that the bird has been on the farm since 1880, and that there has been a nest yearly.	...
Hislop	Rough grass and bent with a little heather. No plantation	1500	1891	...	18	6 to 11	9 to 11	Great increase last two years	Mr. Charles W. Dunlop of Whitnairhill, who has been tenant of shootings in the district including	...

Howpasley . . .	Heavy bog and grass with some heather. No plantation, but strip at farmhouse (grass)	3800	1890 and 1891	March to July	16	7 to 13, common number 11	Average 10	... In 1891	Seen occasionally; did not nest on farm till 1890. Increase.	this farm, informs me that the bird has been on the ground for the past 15 years at least: that he has seen it yearly for 9 or 10 years; that the nest has been found regularly on this farm every year during that period, though sometimes only a single nest; and that the birds leave the ground before winter, and return in spring.
Redfordgreen, West		200	Since 1890	April to June	6	10	10, only one unfertile egg seen	In 1891	Mr. Walker states that there has always been one or two birds on his farm.	
IL. ETRICK.		...	Dec. 1891	...	3 or 4	...	...	January 1892	Occasionally seen.
Kirkhope . . .	Mostly heather; two acres birch	3200	Four years ago	...	5 or 6	8	...	...	Occasionally.
The Shaws . . .	Mostly grass, but patches of lea heather; about 20 acres plantation									
Gilman's Cleuch	Grass; about six acres planted	1300	Nearly two years ago	April (end) to June	8	8 to 10	9	Spring of 1891	Never seen before.	
Deloraine, West	Grass and heather.	2500	Nearly two years ago	March to August	13	8 to 10, very frequently 10	8	Autumn 1891	...	

APPENDIX—Continued.

Farm.	Nature of Surface.	Estimated Acreage.	Commencement of Vole Plague.	SHORT-EARED OWL.					KESTREL.	
				Period of nesting.	No. of Nests seen in 1892.	Eggs in each.	Estimate of Young reared from each nest.	When Birds first noticed on present occasion.	Previous Occurrences and Remarks.	Remarks.
Whitelaw Shield.	Grass with heather	400	Nearly two years ago	March to June	7	8 to 11	8	Autumn 1891	...	Increase.
Newburgh . . .	Grass; small wood at house; small open crow wood on hill	700	Nearly two years ago	February to June	6	8 to 10	8	Autumn of 1891	...	Great numbers; 6 nests in old crow wood.
Crosslee . . .	Heather and grass; young fir wood at house. Small open wood at roadside	1700	...	February to June	9	8 to 10	8	Autumn of 1891	...	Numbers.
Tushielaw and Cacrabank . .	Grass; two small plantations	1700 700	Nearly two years ago	..	...	...	...	A number of birds on farm	...	Numerous; 7 or 8 seen together. Several nests on farm.
West Buccleuch	Grass	3000	About two years ago	April to June	14	5 to 9, one 12	6 to 8	Great increase with voles	Mr. James Greeve informs me that he has seen the bird on his farm for forty years. It was numerous on previous visit of voles some 16 years ago.	Increase in summer.
East Buccleuch.	Grass, with some heather	3300	About two years ago	March to June	10 on Hen-woodie Hirsel alone	10 to 11	9 or 10	July 1891, Increase noticed July 1891	Seen at least for 30 years; called "heather owl" because they built on the ground. Numerous 16 or 17 years ago.	Some birds on farm.
Ropala wshiel .	Heather and grass; no plantations	...	1891	End of April to July	10 to 12	8 to 10	6 to 8	Spring 1892	...	Few birds on farm.

	900	Two years ago	March to May	4	8 to 10	...	Alter voles appeared two years ago	...	A number of birds on farm.
Annelshope . . .	Grass; one small plantation at house	Two years ago	March to May	4	8 to 10	...	...	...	Much more numerous than formerly
Wardlaw . . .	Grass; with plantations	Two years ago	May to July	A few nests	6 to 10	8	...	...	Great increase, 14 seen at same time.
Ramsay Cleuch .	Grass; with plantations	Spring of 1891	May to July	A few nests	6 to 10	...	...	None seen.	A number.
Midgehope . . .	Grass; with some wood	Since Autumn of 1890	April to June	5	8 to 11	All	Since autumn of 1890	...	A great number.
Glenkerry . . .	Grass; with seven acres plantation	Increased since 1888	...	1 or 2	6 to 8	...	...	Mr. William Grieve the farm manager, informs me that the nest has been seen yearly, among rough grass and rushes.	Plentiful.
Gair	Grass; no plantation	Autumn of 1890	...	...	...	...	...	Mr. Alexander Laidlaw, the tenant, states that a few birds had always been observed on the farm, but that they had not increased with the late increase of voles. The nest had been seen in former years; one or two during the season, with 8 to 10 eggs in each nest.	Plentiful.
Dalglish . . .	All grass, no plantation	Two years ago	...	...	...	...	...	Bird has been seen on farm.	A number last year; few this year.
Ettrickhall . .	Grass	1891	..	...	...	...	...	Few birds.	Great increase since vole plague began.
Shorthope . . .	Grass.	1891	...	...	...	...	...	Few birds.	Great increase since vole plague began.

APPENDIX—Continued.

Farm.	Nature of Surface.	Estimated Acreage.	Commencement of Vole Plague.	SHORT-EARED OWL.						KESTREL.	
				Period of nesting.	No. of Nests seen in 1892.	Eggs in each.	Estimate of Young reared from each nest.	When Birds first noticed on present occasion.	Previous Occurrences and Remarks.	Remarks.	
Scableuch . . .	Grass.	600	Since 1891	...	...	...	...	...	A number of birds on farm; but no nests seen. Thinks they must have nested. No birds reported before August 1892.	3 or 4 pairs on farm.
Over Kirkhope .	Grass; small plantation	1800	Two years ago	...	...	...	...	...	No birds reported.	Increase. A number of pairs on farm.
Braedgarhill, .	Chiefly grass, a little heather	1355	Two years ago	...	...	...	...	...	No birds seen.	Increase. Two last year.
Potburn . . .	Grass; with small plantation	2800	...	...	...	...	...	...	...	Increased.
III. ESKDALE-MUIR.											
Castle O'er and Cruic.	Almost all grass 92 acres plantation	2700	...	First seen 29th February last	3	12, 7, and 5 eggs	All reared	Early in 1892	Mr. Bell of Castle O'er reports having seen nests on neighbouring farms in 1864, and in the early years of the seventies.	A number.	
Nether Cassock and Glendearg	Grass and heather, 2 acres in plantation	...	...	March to May	10 to 12	9 to 14	...	Autumn of 1891	Mr. A. Glendinning reports that before 1891 a pair or two, were to be found on his farm; that he saw the nest 25 years ago.	2 or 3 pairs.

NEW SCOTTISH FOSSIL REPTILES.

[AT the recent meeting of the British Association in Edinburgh, Mr. E. T. Newton, F.G.S., F.Z.S., communicated a preliminary notice "On some Dicynodont and other Reptile Remains from the Elgin Sandstone," in which he described some very remarkable forms new to science. The detailed description of these specimens is nearly completed, and will, it is hoped, be shortly published. The following is an abstract of Mr. Newton's communication to the Association.—EDS.]

At the Aberdeen meeting of the British Association in 1885 Dr. Traquair called attention to the skull of a Dicynodont which had been discovered in the Elgin Sandstone of Cutties' Hillock (= New Spynie). Since that time several other specimens have been obtained from the same place, some of which are the property of the Elgin Museum, while others belong to the Geological Survey of the United Kingdom. These specimens are now being worked out by the author, and this communication is a preliminary note on the interesting results which have been obtained.

All the reptile remains obtained from Cutties' Hillock are in the condition of hollow casts, the bones themselves having been dissolved away; this, it will be remembered, was the case with some of the examples of *Stagonolepis* from the Elgin Sandstone, described by Prof. Huxley, and the method of taking casts from the hollow cavities, which was adopted in that case, has been found of great advantage in the present instance. The blocks when brought from the quarry were more or less split open, exposing portions of the specimens. In some cases these cavities were traced out and developed with the chisel, while in others they were farther split open, thus allowing casts to be taken. In many cases these casts had to be made in several parts and afterwards fitted together. The time and labour involved in this task have been repaid by the restoration of the skulls and parts of skeletons of several *Dicynodonts* and one or two other equally remarkable forms of reptiles.

In most of these specimens, including that noticed by

Dr. Traquair, the skulls are similar in form, although differing in minor details, and have a general resemblance to the South African *Dicynodon* and *Oudenodon*, some of them having small tusks in the maxillary bones. With most of these skulls parts of the skeleton have been found. Two or three show the position of the vertebral column and ribs, but up to the present no definite centra have been traced; besides this there is evidence of scapula, clavicle, humerus, radius, and ulna, the humerus having the characteristic anomodont expansion of the two extremities. In two specimens the ilia are preserved. These forms appear to be distinct from *Dicynodon*, and probably represent at least two or three species.

Another skull presents most of the characters of *Ptychognathus*, but has a short muzzle and no teeth. The last, and by far the most remarkable skull of this series, is about six inches in length, and has the outer surface completely covered in by bony plates, the nostrils, eyes, and pineal fossa being the only apertures. The chief feature of this skull is the extreme development of horns upon the face and cheeks, there being about thirty of these formidable defences, varying from a fourth of an inch to nearly three inches in length, besides some smaller bosses. The dentition is pleurodont, and resembles very closely that of the living *Iguana*; the palate is lacertilian, but with the pterygoids united in front of the pterygoid vacuity. This skull reminds one very strongly of the living *Moloch* and *Phrynosoma*, but it probably finds its nearest ally in the *Pareiasaurus* from the South African Karoo Bed.

A NEW FOSSIL FISH FROM DURA DEN.

By R. H. TRAQUAIR, M.D., F.R.S.

Keeper of the Natural History Collections in the Museum of Science
and Art, Edinburgh.

SOME years ago, while looking over the magnificent collection of Dura Den fishes in the Museum at St. Andrews, Professor Heddle drew my attention to a specimen which, though bearing some resemblance in form to a *Glyptolæmus*, seemed

to him to differ essentially in the squamation, and was therefore probably new to science.

The form of the fish is long and narrow, and shows posteriorly two dorsal fins, behind the second of which the specimen is unfortunately broken off. Its measurements are,

From tip of snout to just behind origin of second dorsal,	$10\frac{1}{2}$	inches.
" " anterior margin of orbit	$\frac{3}{4}$	"
" " anterior margin of clavicle	3	"
" " origin of first dorsal fin	$7\frac{1}{2}$	"
" " origin of second dorsal fin	$9\frac{3}{4}$	"
Depth at shoulder and also at middle of body	$1\frac{1}{2}$	"

So far as exhibited, the external cranial bones are finely rugose-granulated on their surfaces; the circular orbit is very distinctly marked, and is $\frac{5}{16}$ inch in diameter. The gape is wide but only a few small conical teeth are exhibited. The opercular bones are wanting, a palatopterygoid bone of the usual Rhizodont shape being brought into view. There is also exhibited a clavicle of the same general form as in *Rhizodopsis*, etc. There are some remains of pectoral rays, but the ventral, anal, and caudal fins are not preserved.

The scales are unfortunately badly preserved; only enough is seen to show that they were thin and rounded, and that they exhibited the usual fine, concentric, and radiating markings of the scales in the Rhizodont family.

The head, the scales, the fins, all show that the fish belongs to the family Rhizodontidæ, but its generic position is not so clear owing to its deficient preservation. Unfortunately, with the single exception of the Canadian genus *Eusthenopteron*, very little is known of the Upper Devonian Rhizodontidæ in general, as their remains have hitherto occurred only in the most fragmentary condition, like the Russian remains named by Pander *Polyplacodus*,¹ and those from Clashbennie in Scotland, named by Agassiz *Bothriolepis favosus*, and now provisionally referred by Mr. A. Smith Woodward to Newberry's genus *Sauripterus*.²

There is, however, in the collection at St. Andrews,

¹ It has been usually supposed that Pander's *Polyplacodus* is synonymous with Agassiz's *Cricodus*, but I have already, in the first number of this Journal (p. 35), shown that *Cricodus* was founded on a tooth of Dendrodont structure.

² Cat. Foss. Fishes, British Museum, Pt. 2, p. 365.

another specimen of a Rhizodont fish from Dura Den, showing the hinder part of the body and tail; the caudal fin being well preserved and rhombic-diphycercal in its contour, which is thus conformed as it is in the Lower Old Red Sandstone genus *Gyroptychius* of M'Coy. There seems every reason for believing that this specimen is both generically and specifically identical with the one described above, as showing the head without the tail, though it may be doubted if the form of the tail alone is sufficient, considering the bad condition of the scales, to justify the reference of the species to the genus *Gyroptychius*. For the scales of *Gyroptychius* have a peculiar long ridge on the under surface which cannot be seen in the specimens under consideration.

The reference of this Dura Den Rhizodont to a genus can therefore meanwhile only be provisional, but as it closely resembles *Gyroptychius*, so far as its state of preservation allows us to judge, I propose to include it in that genus under the name of *Gyroptychius Heddlei*.

I have, in conclusion, to thank the Committee of the St. Andrews Museum for facilities kindly allowed me for examining and describing the fossil.

ADDITIONS TO THE AUTHENTICATED COMITAL CENSUS OF THE LAND AND FRESHWATER MOLLUSCA OF SCOTLAND.

WM. DENISON ROEBUCK, F.L.S.,

Hon. Sec. and Recorder to the Conchological Society of Great Britain
and Ireland.

I HAVE some further notes to submit in continuation of my paper in the "Annals of Scottish Natural History" for April 1892, pp. 104-107, mostly the result of the work of my friends Mr. William Evans, F.R.S.E., and Rev. George Gordon, LL.D.

6. *Helix rufescens* on Stirling Castle Rock.—This is an addition to the Stirlingshire list, and an important extension to the north-east of the Scottish range of the species. Mr. Evans collected

it on the 28th April last, in fair quantity, and sent them to me for examination, along with numerous examples of *Clausilia rugosa*, and odd ones of *Helix hispida*, *H. nemoralis* var. *libellula* 1 (23) (45), *H. rotundata*, *Vitrina pellucida*, *Zonites cellarius*, and *Z. nitidulus*.

7. **Mollusca in South Perthshire.**—Mr. Evans spent some little time last April in the neighbourhood of Callander, and to very good purpose. The following is a list of species I received from him, those marked * being additions to the records for the vice-county.

Arion ater.—Callander, one, small.

* *A. subfuscus*.—Callander, several.

* *A. hortensis*.—Callander, numerous.

A. circumscriptus (= *A. bourguignati* of my former papers).—Callander, a few.

* *A. minimus*.—Callander, a few.

* *Limax arborum*.—Callander, one, small.

Agriolimax agrestis.—Callander, common.

* *A. lævis*.—Port of Menteith, one.

Vitrina pellucida.—Callander, Bracklinn Falls, and Loch Lubnaig, a few.

Zonites cellarius.—Callander and Loch Lubnaig, several.

Z. alliarius.—Callander, Loch Lubnaig, Bracklinn Falls, Banks of the Keltie near Callander, and Callander Crags, numerous.

Z. nitidulus.—Port of Menteith, Loch Lubnaig, and Callander, not uncommon.

Z. purus.—Bracklinn Falls and Loch Lubnaig, a few.

Z. radiatulus.—Bracklinn Falls and Callander, several.

Z. excavatus.—Callander Crags, two.

Z. crystallinus.—Loch Lubnaig and banks of the Keltie near Callander.

Z. fulvus.—Port of Menteith, Bracklinn Falls, banks of Keltie, and Callander, common.

* *Helix lamellata*.—Banks of the Keltie near Callander, a few.

* *H. nemoralis*.—Var. *rubella* at the Pass of Leny, and vars. *rubella* and *libellula* at Callander, several.

* *H. fusca*.—Callander, a few.

H. rotundata.—Loch Lubnaig, Bracklinn Falls, and Callander, common.

Pupa umbilicata.—Callander, a few.

Vertigo edentula.—Bracklinn Falls and Callander, a few.

Clausilia rugosa.—Callander, a few.

* *Zua lubrica*.—Loch Lubnaig, and an irrigated meadow at Callander, a few.

Carychium minimum.—Pass of Leny, one.

* *Planorbis albus*.—Callander, one.

* *Pl. contortus*.—Callander, several.

Limnæa peregra.—Loch Lubnaig, one.

* *L. palustris*.—Irrigated meadow at Callander, several.

L. truncatula.—Irrigated meadow at Callander, a few.

* *Ancylus fluviatilis*.—Burn near Callander, one, large.

* *Pisidium fontinale*.—Loch Lubnaig and Callander, numerous.

P. pusillum.—Callander, numerous.

These additions bring up the total number of species fully authenticated for the vice-county to 39.

8. **Mollusca in Mid Perthshire.**—Another place to which Mr. Evans devoted attention during April and May was the immediate neighbourhood of Loch Tay, in the mid division of Perthshire, from which he sent me the following species, those marked * being new species-records for the vice-county :—

* *Arion subfuscus*.—Drummond Hill, common.

* *A. minimus*.—Between Fearnan and Kenmore.

* *Limax cinereo-niger*.—Drummond Hill, five obtained.

* *Agriolimax lævis*.—Fearnan and Lawers, both on Loch Tay side, a few.

Vitrina pellucida.—Fearnan, several.

Zonites cellarius.—Fearnan, and Drummond Hill between Fearnan and Kenmore, numerous.

Z. alliarius.—Fearnan, a few.

Z. nitidulus.—Fearnan, and Drummond Hill, numerous.

* *Z. radiatulus*.—Fearnan, a few.

* *Z. excavatus*.—Fearnan, one, juv.

Z. crystallinus.—Fearnan and Drummond Hill, a few.

Z. fulvus.—Fearnan, a few.

Helix lamellata.—Drummond Hill, several.

* *H. aculeata*.—Drummond Hill.

H. nemoralis.—Drummond Hill, vars. *rubella* and *libellula*, a few.

H. hortensis.—Drummond Hill, one.

H. arbustorum.—Lawers, a few.

H. hispida.—Fearnan, numerous.

H. rotundata.—Fearnan, a few.

* *H. pygmæa*.—Drummond Hill, a few.

Bulimus obscurus.—Pass of Lyon near Fearnan, several.

* *Pupa ringens*.—Drummond Hill, a few.

* *P. umbilicata*.—Fearnan, numerous.

* *Vertigo edentula*.—Drummond Hill.

Clausilia rugosa.—Drummond Hill, a few.

Zua lubrica.—Drummond Hill, a few.

* *Carychium minimum*.—Fearnan, and Drummond Hill, a few.

* *Ancylus fluviatilis*.—Fearnan, a few.

* *Pisidium fontinale*.—Curling-pond at Fearnan, a few.

These additions bring up the total number of species on authenticated record for the vice-county to 44.¹

9. **Mollusca in Elginshire.**—In August 1891 Mr. Evans sent me the following species from Castle Roy, close to Nethy Bridge, which is politically in Inverness-shire, but really in Elginshire according to the Watsonian system of vice-counties which is followed in botanical and conchological work.

Arion circumscriptus (= *A. bourguignati* of my former papers), *A. minimus*, *Limax arborum* var. *nemorosa*, *Agriolimax agrestis*, *Vitrina pellucida*, *Zonites alliarius*, *Helix pulchella*, *Vertigo pygmæa*, and *Zua lubrica*, none of them being additions to the list.

From Grantown, about the same time, Mr. Evans sent me *Arion circumscriptus*, *A. minimus*, **Limax maximus* var. *fasciata*, *Agriolimax agrestis* var. *sylvatica*, *Vitrina pellucida*, *Zonites alliarius*, and *Zua lubrica*, the one marked * being the only additional species for the county, whose list now includes 53 species.

The Rev. Dr. Gordon has lately forwarded me examples of *Limnæa peregra* from Balnakeith near Forres, Elginshire, and of *Agriolimax agrestis* from Clunymore, alt. 700 feet, in the neighbouring county of Banff.

10. **Helix caperata in North Aberdeenshire.**—Rev. Dr. Gordon sent me in May last three small examples of *Helix caperata* from Inverugie, an addition to the very scanty list of species we have seen from this vice-county, which is apparently one of the least worked parts of Scotland.

ENTOMOLOGISING IN AYRSHIRE.

By GEORGE W. ORD.

THE Girvan district of Ayrshire does not appear to have been much worked by entomologists, so that the following notes on insects, taken during a fortnight's visit (27th June to 11th July) last year, may not be without interest. The weather was not of the best, as we had only three days of decent sunshine, and on this account our list, especially as regards butterflies, is perhaps smaller than it might otherwise have been. Our total captures of Macro-Lepidoptera numbered 83 species, of which 11 were Butterflies, 5 Bom-

¹ The occurrence of *Limax cinereo-niger* is of exceptional interest, as I have never seen the species from a locality so far south in Scotland before, and I have not seen it from the Lowlands or the western counties at all.

Annals

of

Scottish Natural History.

THE enclosed Plate, illustrating Mr. Calman's Paper on "New or Rare Rotifers," was unfortunately omitted by the Binder from Part 4. Kindly have it inserted *to face page 240*.

These additions bring up the total number of species on authenticated record for the vice-county to 44.¹

9. **Mollusca in Elginshire.**—In August 1891 Mr. Evans sent me the following species from Castle Roy, close to Nethy Bridge, which is politically in Inverness-shire, but really in Elginshire according to the Watsonian system of vice-counties which is followed in botanical and conchological work.

Arion circumscriptus (= *A. bourguignati* of my former papers), *A.*

¹ The occurrence of *Limax cinereo-niger* is of exceptional interest, as I have never seen the species from a locality so far south in Scotland before, and I have not seen it from the Lowlands or the western counties at all.

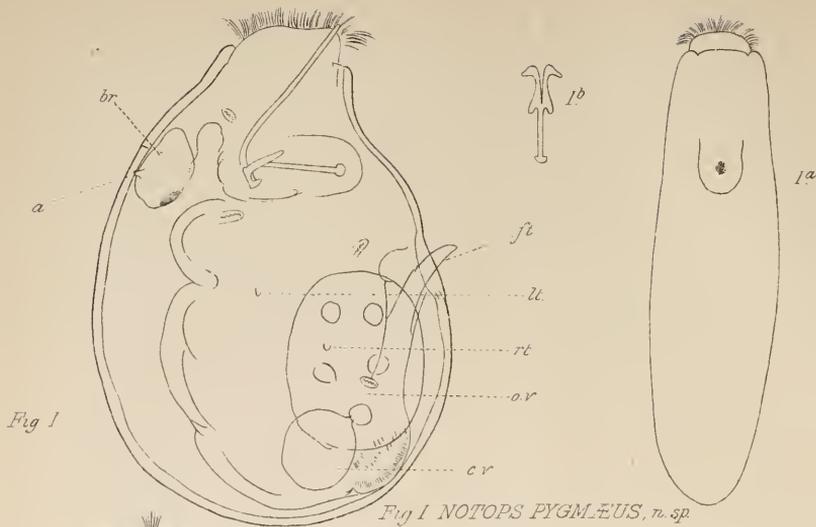


Fig 1 NOTOPS PYGMEUS, n. sp.

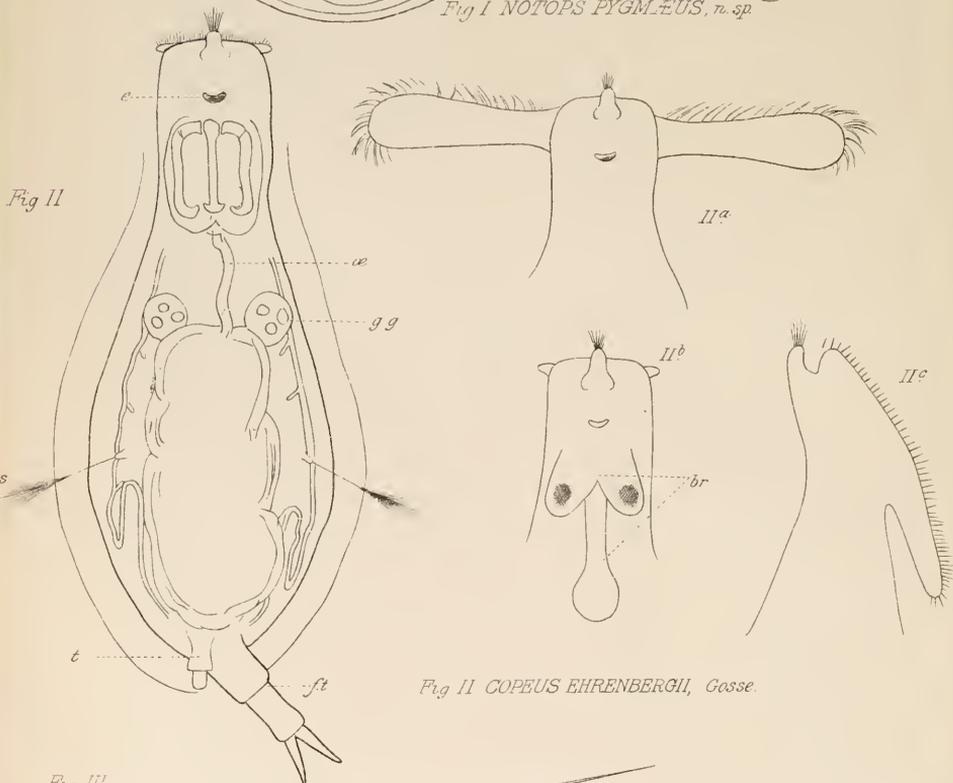


Fig 2 COPEUS EHRENBERRGII, Gosse.

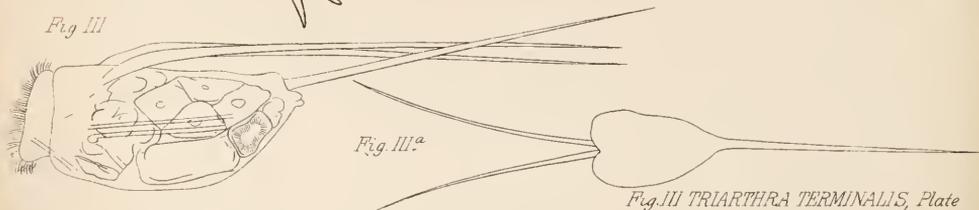


Fig 3 TRIARTHRA TERMINALIS, Plate

byces, 40 Geometræ, and 27 Noctuæ. The most notable butterflies were *Satyrus Hyperanthus*, L., *Lycæna Alsus*, Fab., and *L. Artaxerxes*, Fab., the first being very abundant on the damp ground along the Ballantrae Road. *L. Alsus*, we got plentifully on one small bank half a mile south of the town of Girvan, but it was seen in no other locality, so its range must be very restricted. Even on the spot mentioned it appeared to be confined to a small plot some twelve yards square, for within that radius three-fourths of our specimens were taken. *L. Artaxerxes* does not appear in the "Fauna and Flora of the West of Scotland" published by the Natural History Society of Glasgow, but, previous to our visit, it had been recorded for Ayrshire by Mr. Birchall ("Newman's History of British Butterflies," p. 128). It appeared to be common enough on the hills in the Girvan district. *Satyrus Semele*, L., and *Thanaos tages* were the only other butterflies taken which are worthy of mention.

Of the Bombyces the only species of any rarity was the Cinnabar Moth, *Euchelia jacobææ*, L. Only one imago of this insect was taken, but the eggs and young larvæ were exceedingly abundant on Turnberry Sands. We brought a number of these to Glasgow and obtained a fair series of perfect insects from them.

The district appeared to be very rich in Geometræ, and to this family belong the bulk of our captures. Among the less common species were, *Venusia cambricaria*, Curt., *Cleora lichenaria*, W. V., *Acidalia fumata*, Steph., *Abraxas ulmata*, Fab., *Lomaspilis marginata*, L., *Emmelsia affiniata*, Steph., *E. alchemillata*, L., *E. decolorata*, Hub., *Eupithecia pygmaæta*, Hub., *Thera firmata*, Hub., *Coremia propugnata*, W. V., *Cidaria corylata*, Thunb., *Cidaria silaccata*, W. V., *Eubolia palumbaria*, W. V., *Tanagra charophyllata*, L., etc., many of these being in great abundance. In Penwhapple Glen, for instance, the most abundant insect was *Abraxas ulmata*, a very rare insect in most parts of Scotland. It is to be found by day at rest on elm leaves, and is very conspicuous. It does not appear to be so obnoxious to birds as its relative the common Magpie Moth, *Abraxas grossulariata*, L., as we found the dry bed of the stream literally strewn with wings and other relics of the departed.

Our captures of Noctuæ included *Thyatira batis*, L., *Cymatophora duplaris*, L., *Leucania pallens*, L., *Axylia putris*, L., *Agrotis exclamationis*, L., *Noctua umbrosa*, Hub., *Euclidia mi*, L., etc. Sugaring did not pay very well, few insects ever approaching it. Many interesting insects belonging to other orders were also obtained, the most local being a female Glow-worm, *Lampyris noctiluca*, L.

ON CERTAIN NEW OR RARE ROTIFERS FROM FORFARSHIRE.

By W. T. CALMAN, University College, Dundee.

PLATE VIII.

Notops pygmæus, n. sp.

A MINUTE rotifer, which appears to be new, has occurred several times in the water supplied to Dundee from the Monikie reservoirs. It is at once remarkable for its brilliant colour. Through the thick but clear and transparent skin, the body of the animal appears of a light red colour, in the midst of which lies the stomach of a deep blue; and these colours are perfectly constant in numerous specimens that I have seen over a period of six years. The HEAD is completely retractile within the lorica, and the oral edges of the latter are curved inwards over it when it is withdrawn. The FRONT possesses apparently a single ring of cilia, near the ventral side of which the mouth opens. The foot may be retracted within or protruded from a long tubular sheath which passes obliquely backwards from its orifice. For some little distance from the orifice this sheath is thickened, and this portion of it survives with the rest of the lorical skin when the animal is treated with caustic alkali. Close to the orifice, a short rounded diverticulum is given off from the sheath. The FOOT is soft and flexible, and I have not seen more than a single pointed toe. The STOMACH is very large and studded with large oil-globules. Its upper portion fills the space between the great mastax and the sheath of the foot; below it curves round ventrally, and is succeeded by a narrower intestinal

portion of a lighter colour (devoid of the peculiar blue), lined with cilia, which in all probability opens at the base or inner extremity of the passage above described as the sheath of the foot. Close to the same point appears to be the orifice of the rather large contractile vesicle. Of the NEPHRIDIA, four ciliated funnels ("vibratile tags") on each side were seen, but no "convoluted tubes" could be observed. The BRAIN is large, oval, colourless, and transparent, though at the same time minutely granular. The EYE, which is of moderate size and brightly red, is situated (as for instance in *Mastigocerca carinata*), on the internal lower edge of the brain. The TROPHI are, compared with the animal's size, very large, and are peculiar both in shape and in position. The incus is forcipate, and lies, when the animal is extended, almost transversely to the length of the body, the fulcrum pointing in the direction of the foot. Both fulcrum and rami are long; at their junction with one another two lateral alulæ present themselves; they lie in the same plane with the rami, to which plane the fulcrum on the other hand is somewhat inclined in the direction of the foot. From the rami, a very long curved object runs towards the mouth, and can be protruded therefrom. That it has something to do with the malleus or mallei cannot be doubted; but there is no sign of division into uncus and manubrium, and I am even unable to say whether it be single or double. It may represent a single malleus, the other (small and unsymmetrical in for instance the Rattulidæ) being here perhaps quite absent; and the existent single one showing as a protrusible style. Just over the hinder part of the brain, but some distance to the right of the middle line, is placed a very minute *antenna* bearing apparently only a single bristle. On the sides of the body are the lumbar sense organs, also very minute, consisting of short rounded tubercles, probably setigerous, although this could not be satisfactorily determined. That on the right side is placed nearer the ventral and posterior edge of the body than that on the left. This unsymmetrical arrangement of the three setigerous sense organs is noteworthy. The total length of the animal when fully expanded is about $\frac{1}{250}$ of an inch, the breadth about $\frac{1}{350}$.

The only known species which at all resembles this is

a minute form recently described by Rousselet¹ as *Notops minor*, n. sp. Of this species the details given are as yet few. The two forms are similar in size, but the foot in Mr. Rousselet's species seems to be much nearer the posterior extremity: the two toes are conspicuous: and the blue colour of the stomach, so constant and characteristic a feature of ours, is not observed.

**Copeus Ehrenbergii, Gosse = Notommata Copeus,
Ehrenberg.**

In Messrs. Hudson and Gosse's "Rotifera" (vol. ii. p. 28), Mr. Gosse notes that this rotifer, the first and typical species of his genus *Copeus*, has apparently not been re-observed since its description by its discoverer, though several other closely allied but distinct species are now known: of these the nearest ally appears to be *Copeus labiatus*, Gosse, which indeed Mr. Gosse at first referred to the true *Notommata copeus* of Ehrenberg. I have found in the neighbourhood of Dundee several specimens of a form which appears to be identical with that figured by Ehrenberg, and removes accordingly any doubt as to the validity of the original species.

According to Dr. Hudson ("Rotifera," App. p. 19), *Copeus Ehrenbergii* is (from its description) so like *C. labiatus*, when its auricles are withdrawn, that it might easily be mistaken for that animal: it differs from *C. labiatus* in the shape of the front, in the possession of large telegraph-like auricles, in the much smaller size of its ciliated lip, and in its foot having three joints instead of two.

Our species resembles *C. labiatus* in size and in general shape. When swimming, it is about $\frac{1}{40}$ inch long, narrow and cylindrical anteriorly, posteriorly broad and ventricose. The face is covered (as for instance in *Notommata aurita*) with short cilia, and runs downward exactly as in *C. labiatus* into a pointed, channeled lip, the groove in which is lined by a continuation of the same cilia. At certain times, when the animal is swimming freely in the water, the great lateral, "telegraph-like" auricles are seen

¹ "Journ. of the Quekett Microscopical Club," (2). iv. p. 359, pl. xxiv. figs. 9-10, Jan. 1892.

expanded. They are broad ovate arms, somewhat expanded at the ends, and, when fully extended, distinctly longer than the breadth of the head. They are furnished with rather long cilia, which cover their ends, and apparently their upper surfaces to the base; but as the animal swims with great rapidity when they are expanded, the exact distribution of the cilia is difficult to see. How these auricles are projected and retracted, and whether or not they are invaginated into pouches, I have not been able to determine. In their retracted state I have failed to see a trace of them. Sometimes a single auricle is expanded alone. On the dorsal side of the head is a short ANTENNA, broad below, then narrowing suddenly to a blunt point, crowned with a tuft of rather long sensory bristles. At the broadest part of the ventricose body spring two lateral tufts of much longer sensory bristles, in the position in which Gosse figures (*loc. cit.*) a pair of single bristles only in *C. labiatus*, but where a bunch of setæ has already been recognised in *C. pachyurus* (Hudson "Rotifera," App. p. 20, footnote). The TAIL is well marked, short, and transparent. It is narrower near the base than in the middle, where there is formed an abrupt shoulder, succeeded by a straight, blunt, apical portion. The FOOT is rather long, and consists of two joints, carrying a pair of straight pointed toes. A very fine covering of gelatinous mucus clothes the body of the animal, so transparent in its nature as to be scarcely detected save for the presence in it of minute adherent particles.

From this description of the external view it results that our species resembles the description and figure of *Copeus Ehrenbergii* in its general form, the size and position of the auricles, the size and shape of the tail, the position of the lumbar processes, and the possession of a gelatinous covering. It differs from the account of that species in not having the tips only of the auricles ciliated (Ehrenberg's figure suggests an attempt to make the ends of these organs look like the wheels of an ordinary *Rotifer*), in having only two joints to the foot, but in this matter, though Ehrenberg's description gives three, his figure only shows two; in the possession of two bunches of fine setæ in the lumbar region instead of a pair of single stout bristles, a difficult matter to define with

an imperfect instrument. The balance of characters seems to show that the two species are practically identical.

On the other hand, the general characters, and in particular the lip, are extremely like *C. labiatus*, in which species, however, Mr. Gosse, though he appears to have studied it repeatedly, never detected any protrusible auricles, nor any trace of gelatinous covering. At the same time, if our species were studied in only a small quantity of water, it might be examined over and over again and its auricles never seen. Mr. Gosse figures the lumbar sense-organs as single stout bristles, but he seems to have had some doubt on this point, as in the description he calls them "apparently single."

Proceeding to the internal structure:—The BRAIN, which is large and transparent, is formed apparently of three lobes as described by Gosse in *C. labiatus*. Two lobes are lateral, short, and each containing a well-defined rounded spot of dark pigment. The central lobe is long, dependent, enlarged at the extremity, and free from granular or pigmentary deposit. The red EYE, which is stated by Gosse to be situated in *C. labiatus* and *C. cerberus*, on the narrow waist of this central lobe, is here placed more anteriorly, in the very front of the brain. The TROPHI, of which I have not made a special examination, seem to correspond with the figure of *C. labiatus*. The ŒSOPHAGUS is very long, narrow, and transparent. The STOMACH is wide and large, but has never shown to me that peculiar appearance of being divided up by constrictions into squares which, according to Gosse, is in *C. labiatus* "not accidental but characteristic, being seen in every example that has occurred to me, and distinguishing the species from all its congeners." The two ovate GASTRIC GLANDS are present, perched on the anterior border of the stomach. The NEPHRIDIA (*branchiæ* of Gosse), are in the usual form of convoluted tubes, on each side of which I have seen at least four ciliated funnels ("vibratile tags.") In several specimens the ovary appeared as a single row of globular, nucleated, transparent cells.

Triarthra terminalis, Plate.¹

A solitary specimen of this rotifer was found in sediment of Dundee tap-water. It does not seem to have been hitherto recorded in Britain, and, as Dr. Plate gives no figure, the accompanying sketches may be of interest. I have unfortunately no observations on its internal structure.

Explanation of Plate VIII.

- Fig. I. *Notops pygmaeus*, n. sp.
 I. *a* Dorsal view.
 I. *b* Front view of trophi.
 ,, II. *Copeus Ehrenbergii*, Gosse.
 II. *a* Head with expanded auricles.
 II. *b* Head with outline of brain.
 II. *c* Head in lateral view, with retracted auricles.
 ,, III. *Triarthra terminalis*, Plate.
 III. *a* Outline of the same, in contracted state.
- | | |
|--------------------------------|----------------------------------|
| <i>a</i> Antenna. | <i>ls</i> Lumbar setæ. |
| <i>br</i> Brain. | <i>lt</i> Left lumbar tentacle. |
| <i>cv</i> Contractile vesicle. | <i>a</i> Œsophagus. |
| <i>e</i> Eye. | <i>ov</i> Ovary. |
| <i>ft</i> Foot. | <i>rt</i> Right lumbar tentacle. |
| <i>gg</i> Gastric gland. | <i>t</i> Toe. |

PISTILLODY OF THE STAMENS IN THE
 "CHAMPION" POTATO

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

FOR several years I have observed every season that pistil-
 lodody of the stamens has been of very frequent occurrence in
 fields of potatoes near Aberdeen; and this year it has been
 extremely common and well marked in numerous fields
 within a radius of several miles. On inquiry I find that it
 seems in all cases to be the "Champion" variety that shows
 this curious sport in the flowers. Mr. Alexander Macdonald,
 in reply to an inquiry whether he had observed this condi-

¹ Dr. L. Plate, "Beiträge zur Naturgeschichte der Rotatorien" Jenaische
 Zeitsch. f. Nat. (Bd. xix. p. 19, 1885.)

tion in Durris on the south bank of the Dee, about twelve miles from Aberdeen, tells me that in five fields of "Champions" in his immediate neighbourhood he had found it common. It seems to have become habitual in this variety of potato in this vicinity. Has anything of the kind been observed elsewhere?

The flowers of the "Champion" potato vary much near Aberdeen, the variation depending on the extent to which pistillody has affected the stamens. Certain plants seem more prone than others to the alteration; but widely different degrees of it may be observed in the same inflorescence. The younger flowers in an inflorescence seem more liable to be affected as regards both frequency and degree. All the flowers show a marked tendency to fall off, either very soon after they open or while still in bud. I have not observed fully-developed fruits or "plums" on this variety of potato. In any case their production must be rare. The "Champion" potato is largely cultivated in the neighbourhood of Aberdeen; where it has a high reputation as yielding large returns, and resisting disease better than most other varieties. Possibly the vigour and healthiness of the organs of vegetation may be connected with the tendency of the flowers to fall off early.

Only a small proportion of the flowers are of the ordinary structure. In considerably less than one-half are the petals as large and well-formed as usual in potatoes; and in many even of these the stamens, though to a comparatively slight extent, show evident tendency towards pistillody. Even where the filament and anther are distinct, and where the anther is coloured as in the healthy stamen, and produces pollen, one very often sees the connective prolonged into a small style with a minute stigma; or the stigma may arise from the inner surface of the connective, near the base. More often one or more, or all, of the petals are dwarfed into narrow segments, little longer than the sepals; in which case they very often remain greenish white. The inner organs of such flowers are often visible externally while in the bud. The aspect of the inflorescence is changed so much as to become recognisable from a distance of a good many yards.

In the more extreme cases the stamens are so greatly metamorphosed as quite to assume the appearance of carpels, each having a well-developed ovary, style, and stigma. On making a cross section of the ovary one finds usually numerous ovules crowded on a single placenta. Very seldom is the placenta double as in the true pistil. Frequently the inner surface of the connective bears near its base a placental wart covered thickly with ovules. One finds at times one side of the anther still producing pollen and the other metamorphosed, and bearing ovules on such a placenta as that now described. The ovules produced on the modified stamens vary from a rudimentary to a well-developed condition. In many of the flowers the true pistil differs from the five or six staminal pistils around it in little save its rather larger size and more regular form. All the pistils may enlarge for a time; though even the true pistil seldom reaches the size of a small pea before the young fruit falls off. Occasionally one meets with flowers in which one or more of the staminal pistils become lobed, each lobe bearing an ill-formed style and stigma.

I am not aware of any record of so abnormal a condition as pistillody of the stamens becoming habitual on so wide a scale in the potato or in any other species of plant. The tendency to it certainly appears to be already habitual in the "Champion" potato, and to become more marked in the successive generations.

CONTRIBUTIONS TOWARDS A FLORA OF CAITHNESS. No. II.

By ARTHUR BENNETT, F.L.S.

IN the "Scottish Naturalist" for 1888 Mr. Grant and myself published a list of Caithness plants, using as far as then possible such materials as we had in our possession. Since then I have tried to gather together any matter that seemed to assist in building up the records for some future Flora of the county.

In the first place, some apology is needed to Dr. R. Brown of Campster; inasmuch that his two papers (afterwards named) were not consulted.

When reading the life of Robert Dick of Thurso, it seemed to me that if those who so persistently asked him for the Holy-Grass had only been as keen in the advancement of Botany as in the greed for specimens they might have been the means of some use being made of Dick's knowledge of the Caithness Flora:—that he would communicate with any one who he saw was really anxious was seen by the hearty and laborious way in which he helped Hugh Miller in geology. Since his death two more remarkable men have made the Flora their part study:—Mr. Henderson, a shepherd (of whom a sympathetic notice appeared in "The Northern Ensign," by my friend Mr. Grant), and Mr. Rosie, a postman; to both of whom Mr. Grant and myself are much indebted.

The flora is far from being exhausted, I feel sure. So far as the Cryptogams are concerned little has yet been done. Dick's fine series of Mosses were sent to Liverpool 13 years ago to be named, and have never been returned. To whomsoever they went, it is a downright bit of dishonesty not to return them, even if they could not be named.

The papers by Dr. R. Brown were published in "The Transactions of the Edinburgh Botanical Society," 1860, p. 328; and 1863, p. 8. Beyond these the principal paper is one by Dr. Craig "On the Excursion of the Scottish Alpine Club to Sutherland and Caithness in 1888," "Trans. Edin. Bot. Soc.," 1889, p. 379.

I give such notes below as I have accumulated.

Thalietrum majus, *Crantz*.—Dunnet, *J. Grant! Dick*.

"*Thalietrum flavum*."—Sandside, Caithness, *T. J. Cowie*, fide H. C. Watson, in "Outlines of the Geogr. Dist. of Brit. Plants," p. 79 (1832), "Probably a form of minus"; Watson in "Geogr. Distrib.," p. 49 (1843).

T. maritimum.—Reiss, Murkle.

Ranunculus confusus.—*R. Brown*, in Catalogue sent to H. C. Watson.

Ranunculus acris; var. *tomophyllus* (*Jord.*).—Sandy cliffs; Sand-side Bay, Reay.

- Caltha palustris*; var.—*Dr. Ward*, sp.!
- Papaver dubium*.—Cornfields, Reay, *W. F. Miller*.
- Fumaria officinalis*.—Potato field, Dunnet, *W. F. Miller*.
- F. parviflora*.—*R. Brown*, l.c. p. 8.
- Subularia aquatica*.—Loch at Calam, *T. Henderson*, 1889.
- Cochlearia danica*.—*R. Dick*, in Brown's Cat. to H. C. Watson.
- † *Camelina sativa*.—Ballast heap, Wick, *R. Brown*, l.c.
- ? *Cardamine impatiens*.—*R. Brown*, in Cat., l.c. p. 329.
- Viola lutea, amœna*.—Dunnet Hill, 1889, *W. F. Miller*.
- Hypericum quadrangulum*.—*R. Dick*, fide *R. Brown*, l.c. p. 329.
- Tilia parvifolia*.—*R. Brown*, in Cat., l.c. p. 328.
- Linum catharticum, L.*; var. *condensatum, Lange*.—Reay Links, *Messrs. Linton*.
- † *Acer Pseudo-platanus*.—Fairly grown trees in seed; several plantations about Thurso and Reay, *W. F. Miller*.
- Lathyrus sylvestris*.—Cliffs near Berriedale, *Messrs. Linton*, J. B., 1889, p. 209.
- Rubus hemistemon, P. J. Müll.*—Dunbeath, *Mr. Linton*, J. B., 1889, p. 209.
- Rosa canina, L.*; var. *Watsoni*.—Near Dunbeath, *Messrs. Linton*, J. B., 1889, p. 209.
- Dryas octopetala*.—In his second communication Mr. R. Brown remarks on this plant "During the last two years I have searched every likely locality, especially limestone rocks which it affects, but have never seen a trace of it." He goes on to say that "through the kindness of Mr. Peter Anderson of Inverness, one of the authors of the "Guide" (where *Dryas* was reported), and the Rev. Dr. Gordon of Birnie, who revised the list of Highland plants, I have been favoured with a perusal of the original M.S. and localities; and I find no locality is given for *Dryas*; and the introduction of it into the Caithness list must have arisen from oversight." Yet the plant comes so near the Caithness border, at Melvich, that it might be expected between there and Downreay, where the *Oxytropis* grows. *Dick* also states he had many hunts for it.
- Rosa canina, L.*, var. *Andevagensis, Batard*.—*Miller*, 1889.
- R. canina, L.*, var. *glauca, Vill.*—Berriedale, *W. R. Linton*, 20th July 1888.
- Pyrus Aria*.—*R. Brown*, l.c. p. 329.
- P. Malus*.—*R. Brown*, l.c. p. 328.

- Saxifraga aizoides*.—*R. Dick*, *fd*e *J. Grant* in *Cat.* at *Kew*.
- S. oppositifolia*.—*R. Brown*, in *Dick's Cat.* at *Kew*.
- † *Ribes alpinum*.—*R. Brown*, *l.c.* p. 328.
- Scleranthus annuus*.—For several years round *Wick*, *C. W. Peach*.
- Chærophyllyllum temulentum*.—*R. Brown*, *l.c.* p. 329.
- Valeriana dioica*.—*R. Brown*, *l.c.* p. 329.
- Solidago virgaurea*, var. *cambrica*.—Cliffs at *Dunnet*, *W. F. Miller*.
- Chrysanthemum Leucanthemum*.—Rare 20 years before 1881. *Dick* had found only three specimens. *Grant*, in *Cat.* to *H. C. Watson*.
- Anthemis nobilis*.—*R. Brown*, *l.c.* Was formerly grown in the "kail-yards" at the back of the cottages, so likely enough escaped.
- Matricaria maritima*, *L.*—*Ackergill* sandhills, *Rev. E. Marshall*.
- Aretium majus*.—*R. Brown*, *l.c.*
- Eupatorium cannabinum*.—Cliffs between *Dunbeath* and *Berriedale*, *R. Rosie*.
- Saussurea alpina*, *D.C.* ; var. *macrophylla* (*Gren. et Godr. sp.*, non *Sauter* !).—Near *Thurso*, *J. Grant* !
- Hieracium murorum*, *L.* ; var. *basifolium*, *Almq.*—
 " " var. *crassiusculum*, *Almq.*—
- H. anglicum*, var. *longibracteatum*, *Hanb.*—*Reay*.
- H. proximum*, *Hanb.* (non *Norrlin*) (" = var. *farinosum*, *Lindbg.*," in "Scot. Nat.")—*Isauld* burn and *Thurso* river, *W. F. Miller*.
Mr. Hanbury published his name about six weeks before that of *Norrlin* appeared.
- H. scoticum*, *Hanb.*—*Thurso* river, *W. F. Miller*.
- H. caledonicum*, *Hanb.*—*Scrabster*, *W. F. Miller*.
- H. oreades*, *Fr.*—*Strathstevan*, *J. Grant* ! *Berriedale*, *W. R. Linton*.
- H. Friesii*, *Hartm.* ; var. *vestitum*, *Lindéb.*—*Lybster*, *J. Grant* !
- H. auratum*, *Fr.*—*Reay*, *W. F. Miller*. *Sandside*, *Isauld* Burn, *W. F. Miller*.
- Leontodon autumnalis*, var. *pratensis*.—*Loch Winless*, *Fox & Hanbury*.
- † *Campanula rapunculoides*.—*Stirkoke* !
- C. rotundifolia*, var. *laneifolia*, *Koch.*—*Dunnet* Hill, *W. F. Miller*.

- Polemonium cœruleum*.—Near Thurso; *Dick's herbarium*. On a moor on the middle of Dunnet Head; see Report of Scot. Alp. Club, by Dr. Craig, in "Trans. Edin. Society," 1889, p. 379.
- Convolvulus sepium*.—*R. Brown*, l.c.
- † *Anchusa sempervirens*.—*R. Brown*, l.c.
- Veronica Anagallis*.—*R. Brown*, l.c.
var. *anagalliformis*, *Boreau*.—Dunnet, *W. F. Miller*.
- Euphrasia Rostkoviana*, var. *borealis*. Townsend, *W. F. Miller!*
Along the coast.
- Salsola Kali*.—Sandy shore, Reay, *W. F. Miller!* Freswick Bay, *Mr. Peach*.
- [*Chenopodium Bonus-Henricus*.—"Very common in some places along the shore," *vide R. Brown*, l.c.—Some error?]
- Rumex sanguineus*.—*R. Brown*, l.c.
- Salix cinerea* × *aurita*.—(× *S. lutescens*, Kerner), Caithness, *E. F. Linton*, *vide Dr. B. White*.
- Salix repens*, var. *argentea*.—Dunnet Hill, *F. W. Miller!*
- [*Hippophae rhamnoides*.—Abundant at Reay, *Dr. Davidson*, in *litt.* 10th August 1887. Some mistake?]
- Typha latifolia*.—Duran, 1863, *R. Dick*.
- Potamogeton nitens*, var. *latifolius*. Tisel.
- P. natans*, var. *lanceolatus*. Fieber. Thurso River, *Grant, Hanbury*.
- P. heterophyllus*, *Schreb.*, var. *graminifolius*.—Thurso River, *Grant!*
- Luzula Forsteri*.—*R. Brown*, l.c. When Dr. Brown reported this to the Edinburgh Society, naturally enough doubt was expressed (January 12th, 1860). In November of the same year Dr. Brown, in a second communication, remarked that he "had in company with Mr. Drummond very carefully examined specimens of the plant from the locality, both by comparison with English specimens and with published descriptions, and I believe it to be the true plant." May not the explanation be, that some other species, neither *pilosa* nor *Forsteri*, was gathered. Unfortunately, I have failed to trace the specimens.
- Potamogeton plantagineus*.—This fails to reach mid-Scotland, *vide certain* published records (Argyle?); but it reaches the provinces of Blekinge and Gotland in Sweden; so that there is no great improbability that it may be found in the north of Scotland. Robert Dick's specimens, seen by Mr. Grant, are said to be *polygonifolius*; I have not yet seen them myself.

- P. pectinatus*, *L.*—Wick River, *J. Grant*.
- Schœnus nigricans*, var. *nana*, *Lange*.—Loch Winless, pasture by the sea, east of Reay, *W. F. Miller!*
- Carex pauciflora*.—Morven, *R. Dick*.
- C. Goodenovii*, var. *juncella*, *Fr.* (sub. *vulgaris*).—Thurso river near its mouth, *W. F. Miller!*
- C. salina*, *Wahl.*, var. *Kattegatensis*, *Fr.* (*Sp.*)—Mr. Nicolson of Wick writes me that this "was sent to Prof. Dickson at Edinburgh, but was not recognised by him."
- C. paludosa*.—Isauld Burn, *W. F. Miller*, 1889.
- Hierochloe borealis*.—Once found in the Forss Water near the mill, *R. Dick*.
- Alopecurus fulvus*.—Near the salmon pool, Thurso, *R. Brown*, l.c. Not on record north of Chester; but reported from Fife and Forfar, not confirmed. It is reported from many places in Norway north to Varanger. But there is another plant it might have been, lately described as a new sub-species by A. Blytt; i.e. *A. intermedius* (= *geniculatus*—*fluitans* Blytt, in "Norges Flora," p. 68; an L?). But we have no specimens to decide from.
- Agrostis alba*, var. *subrepens*, *Bab.*—Breakwater, Wick, *J. Grant*.
- Deyeuxia strigosa*.—*Robert Dick* found this at Duran in 1863. Specimens were sent to Prof. H. Balfour, and were named by him "*Calamagrostis stricta*." *Dick*, however, evidently did not agree with this determination, as he calls it "The Lapland Rush."
- Poa trivialis*, f. *grandiflora*, *Hackel*.—Westerseat, *J. Grant*.
- Athyrium Filix-fœmina*, var. *rhæticum*.—Dunnet Head, *R. Dick*.
- Lastrea fœnisecii*.—Dunnet Head, *R. Dick*. Would need to be gathered again.
- Polypodium calcareum*.—Morven, *R. Dick*. Like the last species, this would need to be again gathered before it could be safely accepted.
- Chara fragilis*, var. *delicatula*.—Loch on Holborn Head, *Reeves and Ward*.

There are still some 30 to 40 species that should occur in the county, as they nearly all occur either in Sutherlandshire, the Orkneys, or Shetlands.

NOTES ON "ENGLISH BOTANY, SUPPLEMENT."¹

PARTS I. AND II.

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

THIS the supplement to [Boswell] Syme's English Botany is to be prepared by Mr. N. E. Brown as far as Dipsacæ. Mr. Arthur Bennett is to complete the work, which it is expected will reach to eight or nine parts.

The first part gives coloured plates of *Ranunculus flabellatus* (*R. chærophyllus*), *Arabis alpina*, *Polygala amara*, *Claytonia sibirica* (*C. alsinoides*), and *Lavatera cretica* (*L. silvestris*). A good plate of *Brassica Napus* to replace the old one in "E. Bot." is also supplied. Although dated on the title-page 1891, I do not think this part was issued till 1892; in fact all along there has been great neglect in properly dating the publications of the parts of "English Botany," which should not occur in works of this importance.

The compiler apparently dates his citation of species from the first edition of the "Systema Naturæ," of 1735. I have elsewhere² pointed out at length the objections which exist to going back to that date, and have suggested that the date taken should be 1753; when the binomial system was first consistently applied in the first edition of the "Species Plantarum." If the date chosen, 1735, had been rigorously followed, very many generic names would have had to be altered from those employed in "English Botany."

An innovation which (although followed by some eminent foreign botanists) is not altogether pleasing is that of commencing all specific names, except those derived from persons, with a small letter. British custom has almost been universal in writing names which have been used in a generic or appellative sense with an initial capital.

The compiler must be congratulated, however, on the much more complete and correct citation of authorities than was to be found in Syme's portion of the work; and it is to be

¹ "English Botany," Supplement to the Third Edition, Nos. 90 and 91. By N. E. Brown, 1891-92. J. Bell and Co., No. 90, 5 plates; No. 91, 1 plate.

² "Pharm. Journal, Mar." May 1892.

wished that it might be followed not only with the synonyms but also with the botanical names of the plants and of their genera.

The species of *Thalictrum* receive a complete revision; and the arrangement is certainly now more natural, and nearer the facts than are the names given in the "London Catalogue."

Ancmone nemorosa, L., has two varieties now given, viz. var. *rubra* and var. *cærulea*; but the authority given (Pritzel, in "Anem. Revis.") is antedated by that of De Candolle in "Fl. France," v. p. 884, (1805), where they are described as var. *cærulea* and var. *purpurea*. See "(Verhandlungen des Bot. Verein der Prov. Brand.," xxxiii. 1892). The latter I have seen in its most typical form from Staffordshire.

R. auricomus, L.—Surely the var. *apetalus* of Wallroth is scarcely worth including as a variety, since the same plant may show the various stages.

The forms of *R. acris* have not received sufficient attention. The true *R. acris* I have seen in Berks and Hants; but the common buttercup of the Highlands is *R. vulgatus*. Jord. I still think the var. *pumilus*, Wahl., worth varietal distinction, as this plant still keeps true in cultivation; while montane *vulgatus* reverts to the type in cultivated ground.

Under *Glaucium phæniceum*, Crantz, and *G. flavum*, Crantz, the respective synonyms of *Chelidonium corniculatum*, L. ("Sp. Pl. 506) and *C. Glaucium*, L. (*l.c.*) might have been quoted.

Mr. Brown changes the generic name of *Corydalis*, D. C., to that of *Neckeria*, Scop.; but Adanson's name of *Capnoides* (adopted by Medikus, Gärtner, and Mönch), although a faulty word, has the priority; moreover, it has already had two species of the De Candollean genus described under it. If *Neckeria* be chosen some purists will be wanting to change the name of the moss genus *Neckera*.

Mr. Brown, however, leaves the invalid genus *Nasturtium* of Robert Brown, notwithstanding the priority of Scopoli's genus *Roripa*.

Sisymbrium altissimum, L. ("Sp. Pl." 659). Dr. G. R. Beck in "Flora von Nieder-Österreich," p. 477, queries this being equal to the plant we have been accustomed to call

S. pannonicum, Jacq. He uses the name *S. Sinapistrum*, Crantz, "Stirp. Aust.," Ed. ii. I. 52 (1769), and says it is not the *S. altissimum* of the Linn. Herb.

Erysimum perfoliatum, Crantz. If the "Gen. Plantarum" be followed, this should be called *Conringia*, and should stand as *C. perfoliata*, Link, "Enum. Hort. Berol.," ii. 172 (1822), = *C. orientalis*, Andrzej., in De Candolle's "Systema," ii. 138 (1827).

Cardamine bulbifera, R. Br., is still cited; but the name will be found in Crantz's "Crucif.," p. 127, of a much earlier date.

Cardamine pratensis, L. The variety should be *Hayneana*, Neill., not *Heyneana*, as spelled here and in the last edition of Bentham and Hooker's "Flora." Under *C. pratensis*, it is stated that *C. dentata*, Schultes, is merely a condition of the plant. No mention, however, is made of *C. palustris*, Peterm., which is the common British plant, and which is figured by Smith, and also in Syme's "English Botany."¹ True *C. pratensis* of Linn. Herb., and of "*Flora Danica*," is a much rarer plant, which as yet I have seen only in Berkshire.

Arabis petræa, Lamk., var. *hispida*, DC., will I think be found to be an error. Kerner has identified this plant with *A. hispida*, Mygind, which is equivalent to *A. Crantziana*, Ehrh., and has longer pods than our British plant. So far I have seen no British specimens of *A. hispida*, Mygind. Mr. Brown, in "Additions and Corrections," p. iv., speaks of the Ben Laoigh plant (var. *grandifolia*, Druce) as "merely a state." Had he seen it growing I do not think he would have come to that conclusion. It is so different in appearance from the Cairngorm plant as to lead one to doubt their specific identity. It keeps quite true in cultivation. Nor, although I have searched the Cairngorms with some degree of thoroughness, have I ever seen any specimens from that range which are identical with the Ben Laoigh plant. I hope later on to give further particulars about Lamarck's *Arabis petræa*.

Draba verna, L., is still kept up as the name of the Whitlow grass. Adanson's name *Gansbium* is not alluded

¹ See Kerner's "Schedæ Fl. Exs. Aust.-Hung. (1884), 73.



to, although its priority is undoubted. *Gansbium* is, however, rejected by the Berlin Committee in favour of the later name *Erophila*, which should replace *Draba* for this plant, if the "Genera Plantarum" of Bentham and Hooker be followed.

It would have been very interesting to learn the exact reasons which induced Mr. Brown to say that *Polygala amarella*, Crantz, is doubtless the same plant as *P. calcarea*, Schultz, since Dr. Beck, in "Fl. Nieder-Österreich," uses it for the Teesdale plant; and he gives the reference to Crantz, "St. Aust." v. 438 (*zum Theil nach der Beschreibung*). Neither Nyman nor Beck gives *P. calcarea* as a native of Austria. Koch and Neilreich consider *P. amarella*, Crantz, to be *P. amara*, L. (*i.e.* the Kentish plant); but it does not agree with the stations given by Crantz, who, it may be said, describes his plant "caules ex multicipiti radice plures suberecti." Mr. Brown also states "The specimens of *P. amara* from locality 1 of Kerner's 'Flora Exsiccata,' No. 512, [are] distributed under the erroneous name of *P. amarella*." This statement rests upon Mr. Brown's identification of *P. amarella*, Cr., with *P. amara*, L. I might also point out that his statement that "*P. amara*, Jacq., is . . . according to the figure given in Jacquin's "Flora Austriaca," vol. v. p. 412, identical with *P. amarella*, Cr. is one I cannot accept. The figure, although the flowers are large, does not convey the idea of *P. calcarea* to me; and the description given by Jacquin that the stems are upright is opposed to what Schultz in "Bot. Zeit," 1837, distinctly says of his plant, that it is prostrate. I think we must wait further evidence before we replace the well-known name of *P. calcarea* by that of *P. amarella*, Crantz.

Respecting the caulescent state of *Drosera intermedia*, noted in the "Additions and Corrections," p. v., it may be well to call attention to the account of it which may be found in Hull's "British Flora," 1799, where it is described as "var. 3, caulescent. This is in every respect like var. 1, except that there is a stem which, in some instances, is full two inches in length, with numerous leaves. I have always found it growing with *Sphagnum* in moist bogs or heaths; and at first thought that the plant pushed up to a greater

height on account of the moss growing quickly around it, and that this appearance of stem was rather to be considered as an elongation of the root; but I have doubted of this since I have found a stem leafy; and that the other two species of *Drosera*, though growing exactly in the same situation, and within a few inches of the *longifolia*, do not assume this caulescent form." Dr. Hind noticed this, which he thought "a new variety if not a new species," near Killarney, and reported on it in the "Phytologist," *n.s.*, vol. ii. 1857-58, pp. 26, 27, where it is figured; and later on he gave it the varietal name *caulescens*, so that Dr. Hind, not Mr. Melvill, is the author of the varietal name. Following recent examples *D. longifolia*, L., would seem to be the name we should use for the species.

Under the "Cheddar Pink" the synonym or name of *D. grantianopolitanus* is misspelled *grantianopolitanus*.

The very weak varieties, if such they can be called, of *Silene gallica* from the "London Catalogue" are not only included, but add one more to our list of synonyms.

The large-flowered variety of *Cerastium vulgatum*, L., is called *C. triviale*, Link., var. *Serpentini*, Boswell (Syme). Mr. Brown says "it is one of a series of forms that seem to completely connect these two species," *i.e.* *C. alpinum* and *C. vulgatum*. Last year I noticed on the Spean hills how numerous were the intermediate forms, and how difficult it was to define the limitations of *C. arcticum*, *C. alpinum*, and *C. vulgatum*. Respecting the statement made by Mr. Brown that the var. *alpinum* of *C. vulgatum* has "the petals not much longer than the sepals," this is not according to my idea of the plant. Dr. Boswell labelled as his var. *alpestre* a form of *C. vulgatum* from West Ross, with the flowers much longer than the sepals, indeed nearly as large as ordinary *C. alpinum*. A great many plants are called var. *alpestre* or var. *alpinum*, with short petals; but I do not think they represent the views of Dr. Boswell Syme.

No notice is taken of the fact that the suggested mistake of Sherard in that he mistook *Spergula pentandra* for one of the winged *Lepigonums* is without foundation, since all Sherard's specimens of *S. pentandra* are correctly named.

Corion, Mitchell, 1748, is substituted for *Lepigonum*,

Fries, 1818. If the rule I have suggested be acted upon, *Corion*, as published before 1753, will be inadmissible.

In Allione's "Flora Pedemont." the two forms of *Montia fontana* are described as var. *minor* and *major*. The varietal names will be also found in Roth's "Tent. Germ.," 1788.

The name *H. quadratum*, Stokes, is substituted for that of *H. tetrapterum*, Fries; but an earlier name than either is that of *H. acutum*, Mönch., "Meth." (1794), p. 128.

Acer campestre. Mr. Brown has overlooked the note on this plant in "Journ. Bot.," Dec. 1891, where I pointed out that the type of the Linnæan Herbarium was the pubescent form named *hebecarpa* in the "London Catalogue," and that I had seen the glabrous form from Oxford and Berks.

The prostrate form of *Sarothamnus scoparius* is given as a variety. But so many of our plants when growing by the sea assume this habit that it makes one doubt if it be worth characterising by a varietal name.

If it be considered worthy of such a name, then we must so name *Prunus spinosa*, L., var. *prostrata*, which may be seen on the shingle near Port William in Wigtownshire. Of this I noticed a specimen in the British Museum Herbarium, labelled as *Salix*, nov. sp. (!), from the south-west of Ireland.

Curiously enough, all notice relating to *Trifolium agrarium*, L., and to *Lupinus perennis* is omitted. To Scotch botanists this will be a surprise, since both are met with in the north-east counties [abundantly in many places.—Ed.]

Alchemilla vulgaris, L. Under this we have no notice of the occurrence of the glabrous form in Britain. I have found it in Glen Spean and elsewhere. It is the var. *glabra*, Wimm. et Grab. "Fl. Sil.," i. p. 135. The Linnæan type is pubescent. It remains to be seen if we have the var. *hybrida*, L. in Britain.

With reference to the synonymy of *Potentilla verna* and *rubens* it may be said that Zimmeter takes a very different view. He contends that the plant in the Linnæan Herbarium, labelled *P. verna*, is the plant we have been calling *P. maculata*, Pourr.¹ In the first edit. of "Sp. Pl." *P.*

¹ Prof. Aschenberg identifies the plant of the Linn. Herb. as *P. verna*; it has the number referring to that species. It is what we have been erroneously calling *P. maculata*.

verna is, he says, "eine collectiv Species. In Europæ pascuis siccis frigidioribus." The light thrown on it by the Linnæan Herbarium, by the "Flora Suecica," and by the second edit. of the "Sp. Pl.," shows that *P. verna* is the name to be applied to *P. maculata*, Pourr., as Ruprecht long since pointed out. Our *P. verna* is, according to Zimmeter, *P. opaca*, L. ("Sp. Pl.," ed. ii., 713, 1762), = *P. verna*, auct. plur., = *P. minor*, Gilib. The *P. opaca*, which was one of the plants recorded from Scotland, therefore becomes dispossessed in turn of its name, which Zimmeter says should be *P. rubens*, Crantz, "Stirp. Aust.," fasc. ii., p. 75, 1769, non. Vill.

Hartmann also, in his account of the Scandinavian species in the Linnæan Herbarium ("Acts of the Stockholm Acad.," 1849-51), unhesitatingly pronounces two of the specimens with the number of *P. verna* to be the plant named by various authors *P. sabauda*, *P. salisburgensis*, *P. alpestris*, et. *P. maculata*; but of the third specimen, which has the name written under it, he says, "De cetero cum *P. verna* sensu recentiorum convenit, pars vero caulis infima minus et patenter pilosa est, quasi immaculata." Prof. Ascherson considers the specimen also to be the *Potentilla* which is here termed *P. verna*.

The small pretty form of *Potentilla Anserina*, which is just as much a variety as *P. reptans*, var. *microphylla*, is unnoticed; as is also the densely pubescent form of *Potentilla palustris*, which appears to be quite worthy a varietal name; especially when we see such given to the shades of colour of *Oxalis* and *Anemone*, and the varieties of *Rubus Idæus*, etc.

The only plate given in the second part is one of an introduced plant, *Potentilla norvegica*. The mass of the text in this part is made up of a compilation of the so-called *species* of *Rubus* and the varieties, etc., of the genus *Rosa*, regarding which we may say that the distribution given of the various forms mentioned is by no means exhaustive.

Among the omissions from these two parts may be mentioned the Poppy gathered by Mr. Nicholson, which appears to be intermediate between *P. Rhæas* and *P. dubium*. The fact of our *Helleborus viridis*, L. being indigenous in the chalk woods of Bucks and Oxford might have

been pointed out, as well as that it is the western plant, the *H. occidentalis* of Reuter.

Brassica sinapioides, Roth., "Man.," ii. 957 (1830), is an older name than *B. nigra*, Koch., ed. ii. (1833), for the Black Mustard.

Caltha radicans, Forst., has been found near Rescobie, Forfar, where the writer has seen it, and also near Loch Morlich, Easterness.

Chelidonium majus. The varietal name *laciniatum* will be found in Stoke's edition of Withering, 1787.

As I have already said, the generic name *Roripa*, Scop. ("Fl. Carn.," p. 520, 1760), antedates Brown's *Nasturtium*. Our plants will be

Roripa Nasturtium, Beck ("Fl. Nied.-Öst.," p. 464).

var. *microphylla*, Beck, *l.c.*

sifolia (Reich).

Roripa silvestris, Bess., "Fl. Enum. Pl. Volhyn.," 27.

R. palustris, Bess., *l.c.*

R. amphibia, Bess., *l.c.*

var. *indivisa*, Beck ("Fl. Nied.-Öst.," ii. 465).

variifolia, Beck, *l.c.*

auriculata, Beck, *l.c.*

Sagina apetala, L., should be *Harduini*.

Respecting *Oxalis Acetosella*, L., var. *subpurpurascens*, DC., in the "Flora of Shropshire" Mr. Leighton says that it is constant in cultivation.

LIST OF THE HIERACIA OF PERTHSHIRE.

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

NOT since the period when the late Mr. James Backhouse (the father of British hieraciology) established a scientific basis for the study of the Hawkweeds of Great Britain have these plants commanded so much attention as they have during the past few years. Partly as the result of this attention, and partly as producing it, we have Mr. F. J. Hanbury's beautiful Monograph of the genus. This fine

work is now appearing in parts (of which a few only have as yet been published), and ought to be supported by every botanist who can afford to do it. As its author has remarked elsewhere, the British Hawkweed flora is a very rich and interesting one; we may thus expect that, by the time the Monograph is completed, we shall have a large gallery of lifelike portraits of these beautiful but difficult plants.

Till of late years the *Hieracia* of Perthshire have been, on the whole, neglected, or at least not been studied as they deserve. Mr. Backhouse's Scottish explorations were chiefly amongst the mountains of Forfarshire and Aberdeenshire, the granitic formation of some of which seems to make them peculiarly grateful to certain species. In north-east Perthshire there is a similar formation, and here also some of the granite-loving species appear. When this rather inaccessible portion of the county is more thoroughly explored, it is probable that other species will also be found to occur. In the meantime the schists and similar rocks of highland Perthshire have proved to be by no means unproductive of the alpine species; whilst the mountain valleys, and the banks of the Tay and other streams, both lowland and highland, have afforded a rich harvest of those forms which are not restricted to a high altitude.

I think that hitherto there has not been any attempt to bring together in one list all the species of *Hieracium* which have been observed in Perthshire. It has therefore occurred to me that, considering the central position of the county and its botanical importance, such a list may be of some interest and value. It must not, however, be taken as a complete and final list, for, apart from the species which will probably yet be discovered, there are at least half a dozen which have still to be "worked out," amongst which there may be some "novæ species." The distribution I have indicated merely by the "Watsonian vice-counties."¹ A more detailed account (with authorities for the localities) will be given in the Flora of Perthshire, when that long-delayed work

¹ As usual, there is occasionally some haziness in the records for that portion of Perthshire draining into Loch Lomond which some botanists refer to Mid Perth and some to West Perth, though it properly belongs to neither. In the meantime I have put it into Mid Perth as is, I think, most frequently done.

appears. In the meanwhile those interested will find various notes, which include mention of some of the rarer Perthshire species, by Mr. Hanbury and other writers in the "Journal of Botany." Personally I may say that I have seen most of the species in a living condition, and can vouch for the correctness of the distribution indicated—the determination of the plants, in the majority of cases, being due to the kindness of Mr. Hanbury.

The total number of species in the list is 54. Of these West Perth has 16, Mid Perth 48, and East Perth 25. Two are as yet restricted (in Perthshire) to West Perth, 24 to Mid Perth, and 3 to East Perth.

What relation the Perthshire list bears to the British is as yet uncertain; but it is probable that not less (and very possibly more) than 75 per cent of the British species occur in the county. In the latest (1886) edition of the "London Catalogue" the number of British *Hieracia* is given as 40, (including 5 naturalised species). Of these 31 occur in Perthshire. There has thus been in this short period an addition of 23 species to the Perthshire list.

For convenience of reference I have placed the species in the subjoined list in alphabetical order.

Hieracium—

aggregatum, *Bckh.*, 88 Mid Perth.

amplexicaule, *L.*, 89 East Perth (naturalised on a wall).

anglicum, *Fr.*, 87 West Perth, 88 Mid Perth, 89 East Perth.

var. *longibracteatum*, *F. J. Hanb.*, 88 Mid Perth, 89 East Perth.

angustum, *Lindeb.*, 88 Mid Perth.

var. *elatum*, *Lindeb.*, 88 Mid Perth.

argenteum, *Fr.*, 87 West Perth, 88 Mid Perth, 89 East Perth.

aurantiacum, *L.*, 88 Mid Perth (naturalised in several places).

auratum, *Fr.*, 87 West Perth, 88 Mid Perth, 89 East Perth.

bifidum, *Kit.*, 88 Mid Perth.

boreale, *Fr.*, 87 West Perth, 88 Mid Perth, 89 East Perth.

Breadalbanense, *F. J. Hanb.*, 88 Mid Perth.

buglossoides, *Arv.-Touv.*, 88 Mid Perth.

cæσιο-murorum, *Lindeb.*, 88 Mid Perth.

Hieracium—

- cæsium*, *Fr.*, 89 East Perth.
calenduliflorum, *Bckh.*, 88 Mid Perth.
callistophyllum, *F. J. Hanb.*, 88 Mid Perth.
chrysanthum, *Bckh.*, 88 Mid Perth, 89 East Perth.
cinerascens, *Jord.*, 88 Mid Perth.
commutatum, *Koch*, 88 Mid Perth.
corymbosum, *Fr.*, 87 West Perth, 88 Mid Perth, 89 East Perth.
 f. angustifolia, *Lindeb.* (= *H. æstivum*, *Fr.*), 88 Mid Perth.
crocatum, *Fr.*, 87 West Perth, 88 Mid Perth, 89 East Perth.
Dewari, *Bosw.*, 87 West Perth, 88 Mid Perth.
duriceps, *F. J. Hanb.*, 88 Mid Perth.
euprepes, *F. J. Hanb.*, 87 West Perth, 88 Mid Perth.
eximium, *Bckh.*, 88 Mid Perth.
 var. tenellum, *Bckh.*, 88 Mid Perth, 89 East Perth.
Farrense, *F. J. Hanb.*, 88 Mid Perth, 89 East Perth.
flocculosum, *Bckh.*, 88 Mid Perth.
globosum, *Bckh.*, 89 East Perth.
gothicum, *Fr.*, 88 Mid Perth.
gracilentum, *Bckh.*, 88 Mid Perth, 89 East Perth.
hibernicum, *F. J. Hanb.*, 89 East Perth.
holosericeum, *Bckh.*, 87 West Perth, 88 Mid Perth, 89 East Perth.
iricum, *Fr.*, 88 Mid Perth, 89 East Perth.
lasiophyllum, *Koch*, 89 East Perth.
 var. euryodon, *F. J. Hanb.*, 88 Mid Perth.
lingulatum, *Bckh.*, 87 West Perth, 88 Mid Perth, 89 East Perth.
Marshalli, *Linton*.
 var. crennanthes, *F. J. Hanb.*, 88 Mid Perth.
murorum, *L.*, 87 West Perth, 88 Mid Perth, 89 East Perth.
 var. ciliatum, *Almq.*, 88 Mid Perth.
 var. micracladium, *Dahlst.*, 88 Mid Perth.
 var. sagittatum, *Lindeb.*, 88 Mid Perth.
 var. sarcophyllum, *Stenstr.*, 88 Mid Perth.
 var. silvaticum, *L.*, 88 Mid Perth, 89 East Perth.
nigrescens *W.*, 88 Mid Perth, 89 East Perth.
 var. gracilifolium, *F. J. Hanb.*, 88 Mid Perth.

Hieracium—

norvegicum, *Fr.*

var. *confertum*, *Lindeb.*, 88 Mid Perth.

orarium, *Lindeb.*, 88 Mid Perth.

pallidum, *Biv.*, 88 Mid Perth, 89 East Perth.

Pictorum, *Linton*, 88 Mid Perth.

Pilosella, *L.*, 87 West Perth, 88 Mid Perth, 89 East Perth.

præaltum, *Vill.*, 87 West Perth (naturalised).

prælongum, *Lindeb.*, 88 Mid Perth.

prenanthoides, *Vill.*, 87 West Perth, 88 Mid Perth, 89 East Perth.

reticulatum, *Lindeb.*, 88 Mid Perth.

senescens, *Bckh.*, 87 West Perth, 88 Mid Perth.

sinuans, *F. J. Hanb.*, 88 Mid Perth.

sparsifolium, *Lindeb.*, 88 Mid Perth.

strictum, *Fr.*, 88 Mid Perth.

subanfractum, *Marshall*, 88 Mid Perth.

tridentatum, *Fr.*, 87 West Perth [88 Mid Perth?].

vulgatum, *Fr.*, 87 West Perth, 88 Mid Perth, 89 East Perth.

var. *nemorosum*, *Bckh.*, 88 Mid Perth.

var. *nemorum*, *Fr.*, 88 Mid Perth.

umbellatum, *L.*, 88 Mid Perth, 89 East Perth.

[NOTE.—In a paper on “**Strathearn Hieracia**” in the August number of the *Journal of Botany*, Mr. J. C. Melvill, M.A., F.L.S., enumerates several “species” as from localities all in West Perth (87). As some of the plants have not been recorded from West Perth this may give rise to erroneous vice-county records, the localities named by Mr. Melvill being all in Mid Perth (88).—ED.]

NEW SCOTTISH GALLS.

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

THE series of papers on Scottish Galls in former years has apparently left but few forms unnoticed, if I may judge by the small number that have been added since I

last wrote on this subject, in January 1890. I have, however, four additions to record for the years 1891 and 1892. It need scarcely be said that specimens of galls will be welcomed from any part of the country, as helping to extend our knowledge of their distribution. Information with regard to the nature and the makers of the galls will gladly be given, so far as is in my power, in response to inquiries accompanied by specimens such as will permit identification.

Thalietrum dunense, Dumort. (= *T. minus*, L., var. *maritimum*, Syme).—On the coast of Benholm, in Kincardineshire, among shingle, the pseudo-galls of one of the gall-midges (? *Cecidomyia*) occurred not very plentifully in August. They consisted of segments of the leaves, rendered somewhat fleshy, and so folded or contorted as to furnish a retreat to the larvæ of the gall-maker. Otherwise the segments showed little change in aspect or in size. Occasionally two or three segments were included in a single gall; or all the young leaves in the terminal buds of the stem were affected. Unfortunately the galls, when found, were already abandoned by their inmates; but in some of them were a few empty small white cocoons,—evidently those of a gall-midge. The fruits were not affected in any way; and the gall is evidently different from that recorded by myself from Kinloch Rannoch (Scot. Nat., 1884, p. 206) on *Th. flexuosum* (*T. minus*, L., var. *montanum*, Syme): I have not found any record of a gall-midge with such habits having been reared or named from this food-plant.

Sambucus nigra, L. (Common Elder, or Bourtree).—In July Dr. Buchanan White sent to me from his garden, near Perth, flowerbuds of the elder still closed, but swollen to twice or thrice their usual bulk, and become somewhat fleshy. The petals were white or, less often, greenish; and the stamens, styles, and stigmas were fleshy and functionless, or were in part abortive. A careful search showed only a single larva in one gall of an orange colour, not quite like a gall-midge larva in form, and larger than these usually are. Possibly it may have been an inquiline or guest. There can be little doubt that the galls were the work of a gall-midge. Not improbably they belong to *Diplosis lonicerearum*, Fr. Löw, which forms galls of quite similar structure on *S. nigra* and *S. Ebulus*, as well as on other species of the Caprifoliaceæ.

Campanula glomerata, L.—In the months of August and September 1891 I found at St. Cyrus, near Montrose, several examples of this plant in which the inflorescence had undergone, in

whole or in part, the change in structure known as virescence. The flowers were replaced by dense clusters of ill-formed green leafy structures covered with hairs, and contorted. Similar galls have been described from Lorraine by Abbé Kieffer as found on *C. glomerata*, and on several other species of *Campanula*. They are the work of mites (*Phytoptus*). The mites in the similar galls on *C. rapunculoides* have been described and figured by Nalepa as *Cecidophyes Schmarde*.

Scrophularia nodosa, *L.*—In August 1891 I found, beside the burn of Benholm in Kincardineshire, a plant of Figwort several of the flowers of which were galled, evidently by gall-midges (? *Cecidomyia*). The galled flowers were swollen to twice or thrice the size of healthy buds, and rendered somewhat fleshy; and among the abortive sexual organs lived a few larvæ. *Asphondylia Verbasci*, *Vall.*, galls the ovaries of deformed flowers of *S. nodosa*, and of various allied plants, in several countries in Europe; but the larvæ live singly in the deformed ovaries; hence there is room for doubt as to the maker of the galls in Scotland.

ZOOLOGICAL NOTES.

Daubenton's Bat (*Vespertilio daubentonii*, *Leisler*) in **Banffshire**.—On the 16th of July last I received for identification, through the kindness of the Rev. George Birnie, Manse of Speymouth, Fochabers, a living bat. Mr. Birnie informed me that the specimen was obtained by Mr. Webster, the gardener at Gordon Castle, when smoking the greenhouses, in which it and others of its kind seek shelter. Here these bats take up their quarters behind a structure which has a width of one and a half inches between it and the wall. They enter the greenhouses by way of the crevices near the eaves, and crawl down to the narrow space above described. Mr. Birnie also tells me that a few years ago he used to see bats in the castle grounds on fine mild evenings "in great numbers about the pond." The specimen sent is a female *V. daubentonii*. The above notes have a further interest since they place on record the most northerly occurrence of this species in the British Islands, as well as an addition to the fauna of Banffshire.—WM. EAGLE CLARKE.

Water Shrew (*Crossopus fodiens*, *Pallas*) in **Argyllshire**.—During a short stay with Mr. Mason, the forester on Ardtornish estate, in the parish of Morven, Argyllshire, I had an opportunity of seeing that district and obtaining a few specimens from it. On the 22nd of July while a field of hay was being cut at the head of Loch Aline, I

had brought to me a shrew mouse which I recognised as the Water Shrew. The ground on which it was got was close to the loch, and almost of the nature of a marsh. I immediately sent it off to Mr. Eagle Clarke, who informs me that my capture is an interesting one, because this species, though naturally supposed to be present in Argyllshire, has not hitherto, it is believed, been recorded for the county.—CHARLES CAMPBELL, Dalmeny Park.

Habits of the Mountain Hare (*Lepus variabilis*, Pallas).—Bell ("Brit. Quad.," Ed. 2, p. 340), and MacGillivray ("Brit. Quad.," p. 284) both make the positive statement that the Mountain Hare does not burrow. This may be true in a general sense; but that it is not universally true I had ample evidence while spending a few days in the southern section of Inverness-shire during the early part of the present summer. I had all but reached the top of a hill fully 3000 feet high when I observed a burrow in the peaty soil which covers the greater part of the hill to a considerable depth. Turning to the keeper who had appeared upon the scene a few minutes before, I remarked, that surely it was unusual to find rabbits in such a locality. "There are no rabbits here," he replied, "that hole has been made by a Blue Hare." He then informed me that according to his experience, which, however, was limited to that part of the country, it was quite a usual thing for these hares to make burrows. In them he had many a time found the young ones concealed, and he had often heard it said that they were used by the animals as a place of refuge on the approach of the eagle. While they are probably made in the first instance for the reception of the young, there can be little doubt they are at all times used as a shelter from particular kinds of danger. On examining the burrow above referred to, I found that it measured fully five feet in length, and some six or seven inches in diameter. In front of it there was a quantity of newly excavated soil, and there was enough fur adhering to the sides to prove that a Blue Hare had been at work. The keeper, at my request, afterwards took me to a peaty flat near the foot of the hill where there were five burrows all within the space of three or four square yards, and varying from two to four feet in depth. We started a Blue Hare from the spot on our approach, but instead of seeking safety in the burrows it at once made off across the heather.—WILLIAM EVANS, Edinburgh.

Black Rat (*Mus rattus*, L.) in Orkney.—It would appear that the Black Rat is not, as yet, uncommon in any of the Orkney Islands. I say, *as yet*, for it is quite likely that since the Brown Rat has got a footing there, the other species may experience the same fate as it has in other places, and die out. A correspondent kindly sent me a specimen which I sent to the Cambridge Museum, and Mr. Barrett-Hamilton has kindly sent me the following dimensions, which, as the species is rare, may prove of some interest. Head and body,

6.5 (inches); Head, 1.75; Ears, .87; Tail, 7.5; Forefoot and Claws, .75; Hindfoot and Claws, 1.25. Mr. Barrett-Hamilton further adds that the specimen was a small male.—T. E. BUCKLEY, Inverness.

The occurrence of the Hooded Seal (*Cystophora cristata*, Erxleben) in Orkney.—Mr. W. F. Dennison kindly informs me that a seal of this species was shot by Mr. B. Swanson in Otterswick Bay, Sanday, on the 6th of December 1890, and that another, apparently of the same kind, was seen in the bay at the time. Mr. Swanson presented the head of the specimen to Mr. Dennison. An accurate description of the teeth was submitted to Mr. Thomas of the British Museum, who named the seal as above. The example was 8 feet 2 inches in length. T. S. PEACE, Kirkwall.

[This seal has hitherto only had a place among the species reputed to have occurred in Orkney, *vide* "A Vertebrate Fauna of the Orkney Islands," by Messrs. Buckley and Harvie-Brown, 1891, pp. 71-72.—EDS.]

Whin Chat (*Pratincola rubetra*, L.) in Barra.—When riding round the island on the 16th of June last I saw two of these birds, one on the east side, and one on the west. I have never met with any of them in the long island before, although I believe they have been noticed in Lewis and Harris. I believe they were passing migrants, as I saw no more of them after this date.—JOHN MACRURY, Barra.

The Wood Wren (*Phylloscopus sibilatrix*, Bechstein) in West Ross.—The wood wren was seen and heard on three several occasions in the latter part of May and early June, the localities being birch woods at the head of Loch Shieldaig, and at Camas-an-Eilean on the south shore of outer Loch Torridon. The above facts may be worthy of record, since it is thought they indicate an extension of the known range of this species; which has not hitherto, we believe, been noticed as occurring so far north-west on the mainland of Britain.—LIONEL W. HINXMAN, and W. EAGLE CLARKE.

Great Grey Shrike (*Lanius excubitor*, L.) in the Stewarty of Kirkeudbright.—I saw in the hands of a bird stuffer a specimen of the Great ash-coloured Shrike (*Lanius excubitor*), killed this spring in the neighbourhood of Castle Douglas. Some years ago it used to occur not uncommonly in that neighbourhood, but I have not seen one since. My attention was called to them by a man who saw one with a robin in front of it, torn to bits and hung on the thorns.—ADAM SKIRVING, Dalbeattie.

Kingfisher (*Alcedo ispida*, L.) in Barra.—The occurrence of this bird has, so far as I am aware, only been once recorded from the Outer Hebrides, namely a specimen which was found in Rodel

Glen in an exhausted state after a severe storm, in March 1884, and which is noted in "A Vertebrate Fauna of the Outer Hebrides," by Messrs. Harvie-Brown and Buckley. I was therefore not a little pleased to meet with one in very beautiful plumage in this island on the 25th of July last. It was in a small plantation, through which a stream well stocked with sticklebacks and small trout flows, and owing to the rapid way in which it darted in and out through the trees whenever I approached, I thought at first there were two birds, but could not make sure of this. I contrived, however, to drive one bird out beyond the plantation. The weather was very fine at the time, and as the locality was favourable, I thought it would have remained with us at least for a time, but although I went back to the place several days in succession, I failed to see the stranger again.—JOHN MACRURY, Barra.

Nesting of the Stock Dove (*Columba oenas*, L.) in Banffshire.

—In April last I obtained two nests of the Stock Dove in the braes of Glenlivet—one in a crevice among the rocks on the summit of Caen Dregnie, at an elevation of nearly 2000 feet; the other in a hole in the heathery bank of a burn on the face of Caen Suidhe. The keeper on the Blairfindy shootings also informed me that he had often seen their nests among the heather on the steep face of the Bochel, an isolated hill in the upper part of the glen. There is little evidence to show whether this is a recent extension of breeding range, as the bird may hitherto not have been distinguished from the Ring Dove, which is very abundant in the locality.—LIONEL HINXMAN.

Turtle Dove (*Turtur communis*, Selby) near Wick.—A male Turtle Dove was obtained near Wick on the 7th of June. I note that one of these birds usually occurs in this district about once in every fourth year.—LEWIS DUNBAR, Thurso.

Turtle Dove (*Turtur communis*, Selby) in Sutherland.—On Sunday, August 31st, I observed a Turtle Dove near the mouth of the Strathy River in the north of Sutherland. Luckily I had my glass with me, or should not have been able to make out to what species the strange bird belonged.—T. E. BUCKLEY, Inverness.

Occurrence of the Ruff (*Machetes pugnax*) in Tiree.—Mr. P. Anderson writes us as follows:—"I beg to enclose a bird which I take to be a Ruff or Reeve. But I don't know for certain. It is a new bird for Tiree, whatever it is. I saw it feeding in a marsh on Sunday, where it stayed until Tuesday morning, when I shot it. It was very tame, and instead of flying away it lay flat, and tried to hide when wounded. Its note was a sort of Hick-Hick or Kick-Kick."—EDS.

Ruddy Sheld Ducks (*Tadorna casarca*, L.) in the Moray Firth.—A pack of six Ruddy Sheld Ducks appeared near the mouth of the

river Findhorn early in July, and fed in the Buckie Loch. If disturbed they generally made out to the sea. One, a female, was shot on 6th July by a salmon-fisher there, and sent to me to be preserved. I have been inquiring after the birds but as no one has seen them for some weeks I expect they have left our coast.—
JAMES BROWN, Forres.

[There appears to have been an undoubted westerly migration of this species to the British shores in the past summer; since the bird has been recorded from Cumberland, Lincolnshire, Suffolk, Hampshire, and several localities in Ireland.—EDS.]

Wild Swans (*Cygnus musicus*, Bechstein) in Tiree.—Mr. Peter Anderson, gamekeeper in Tiree, whose knowledge of the birds of that island I consider to be very perfect indeed—has written to me regarding the increase of the Wild Swans on the lochs of that island. This has been due to the steadfast determination of the proprietor, His Grace the Duke of Argyll, to prevent all molestation of the noble birds, a clause being inserted in leases to the shootings, providing for their strict preservation. Mr. Anderson writes:—"The number that come here have certainly increased greatly since I came in 1886. I did not notice the increase much until 1889-90, when there would be over 80 swans on the island at one time, and in 1890-91 there would be over 150 here at one time, while last year (his letter is dated July 29th, 1892) there were quite as many if not more. They feed on all the lochs more or less except Loch Vassapol, which they seldom stay on. They are more partial to Loch Balephriel and Loch Riaghar than any of the others. I have also seen them in Gott Bay during hard frost. They usually arrive here about the middle of November and leave the beginning of March. A young whooper came here last winter. It stayed *alone* all winter and has continued here all summer, at least it was still here about a week ago, when I saw it last. It seemed to be strong enough on the wing, but I suppose it must have some weakness." In a forthcoming volume of the "Vertebrate Fauna of Argyll and the Inner Hebrides," a sentence at page 123 is somewhat affected by the above notes by Mr. Anderson. From notes received from Captain Savile G. Reid and Colonel Irby, it would appear that "in Tiree their favourite haunts are Loch Vassapol and Loch Riaghar," and they add:—"Those frequenting the former were almost certainly Wild Swans of the larger size, but those on the latter were almost as certainly *C. bewicki*." The above notes by Mr. P. Anderson were received too late for insertion in the volume, and we take this opportunity of inserting them in the "Annals."—J. A. HARVIE-BROWN.

The Introduction of Dace into Linlithgow Loch, and of Grayling into Cobbinshaw Loch.—About a year ago I observed a quantity of Dace (*Leuciscus vulgaris*) exposed for sale in the shop of

Messrs. Anderson, fishmongers, Castle St., Edinburgh, and was informed they were from Linlithgow Loch, where the species had been introduced and was now abundant. Considering it desirable that the facts connected with the introduction should be ascertained and placed on record, I called on Mr. A. G. Anderson in April last and learned from him that the introduction took place in 1883, the fish having been obtained by him from England for the purpose.

Mr. Anderson at same time informed me that about fifteen years ago he introduced Grayling (*Thymallus vulgaris*) into Cobbinshaw Loch in the extreme west of Midlothian.—WILLIAM EVANS, Edinburgh.

Supposed Cannibalism in the Slow-worm (*Anguis fragilis*, L.)—

Two years ago a fine specimen of the slow-worm, mangled and partially eaten, was found on Ailsa Craig—where the species is abundant—and beside it a similar-sized individual, which seemed to be devouring the remains. Thinking this a curious trait in the species, Mr. Dawson, the Assistant Lighthouse Keeper, sent it on to me with an explanatory note of the circumstances under which the specimens were found. On opening the box I found the living specimen had a firm grip on its dead comrade to which it held with much tenacity, and which it relaxed with considerable reluctance. The mangled state of the dead specimen evidently was due to its having been eaten by *some* creature, but that its companion was the culprit I am not inclined to believe. Having kept slow-worms for years and bred them in confinement, I have never found these gentle and inoffensive reptiles exhibit any cannibalistic tendency, nor do I remember any author charging them with such a character, nor would their weak jaws and teeth be sufficiently powerful, in my opinion, to tear such a comparatively tough body as one of their own species. Perhaps the individual in question had developed a new taste. At any rate, I should be glad to hear of any similar case which may have come under the notice of any one. I have since that time experimented with the specimen above mentioned (which I still have alive), and others, and have not noted any recurrence of the act.—J. MACNAUGHT CAMPBELL, Kelvingrove Museum, Glasgow.

Strangalia armata (Herbst) in Kirkeudbrightshire.—Towards the end of July I took one specimen (♀) of *Strangalia armata* near here. I believe this longicorn beetle has only once or twice been recorded in Scotland. I also found here a single specimen of *Syncalypta* which seems to be the true *setigera*, Ill., and which therefore slightly extends its limited range.—W. D. R. DOUGLAS, Orchardton, Castle-Douglas.

Larentia flavicinctata (Hb.) as a Garden Insect.—This pretty grey and yellow moth is so essentially (with us) a Highland species that I could scarcely believe my eyes when first one and then

another specimen turned up in my garden, which is within the municipal boundaries of Perth. The species does not occur within many miles of Perth, so that it must have been introduced in some way—probably with plants from one of its mountain habitats. At the same time I have no recollection of having *recently* brought into the garden any plants on which there would likely be the eggs or larvæ. It is possible, therefore, that it may have been brought some years ago, and established itself amongst the Saxifrages (its food plant), of which I have a number growing. It will be interesting to see if it appears another season. The specimens were rather smaller and darker in colour than Highland individuals.—F. BUCHANAN WHITE, Perth.

Argissa (*Syrrhoë*) *hamatipes* (Norman) in the Firth of Forth.—This apparently rare amphipod has been obtained in the Forth during the past summer. The only previous British records for it known to me is that given by Rev. A. M. Norman in his Shetland Report for 1868, and that published a short time ago by Mr. David Robertson in the proceedings of the Natural History Society of Glasgow. *Argissa hamatipes* (= *Argissa typica*, Boeck) resembles *Ampelisca* in form, and might be mistaken for a member of that genus, but an examination of the eyes of *Argissa* reveals a very curious structure that at once distinguishes it from *Ampelisca*. The eye consists of four pairs of lenses arranged at about equal distances round the edge of a somewhat circular patch of diffused pigment. In the male also, the median dorsal part of the third last segment of the pleon is produced backward over the next segment in the form of a free tooth-like process, and is one of the more obvious characters by which the species may be identified. G. O. Sars describes and figures *Argissa* in his "Crustacea of Norway," vol. i. page 141 (1891).—THOMAS SCOTT, Leith.

Modiolicola insignis (Aurivillius) in the Firth of Forth.—Some time ago, when examining specimens of the "Horse Mussel"—*Mytilus modiolus*,—from the Firth of Forth, several specimens of a prettily coloured copepod were observed which appeared to be *Modiolicola insignis*, Aurivillius. It seems to be a commensal rather than a parasite of the mussel, and is found harbouring about the branchial lamellæ. It is frequently of a brilliant pink colour when alive, even the ovisacs when present being of the same colour. *Modiolicola* is closely allied to the genus *Lichomolgus* from which it differs in the form of the footjaws and in one or two other characters. Several specimens of this copepod are sometimes found in a single mussel, and fully half the number of mussels examined contained specimens. It may be of interest to state in contrast to this example of commensalism or semiparasitism, that though many specimens of the common (edible) mussel—*Mytilus edulis*—from various localities have been examined, no copepod has hitherto been

observed associated with that species. *Modiodicola* has been obtained in the horse mussel at various parts both of the East and West coasts.—THOMAS SCOTT, Leith.

Ilyocryptus sordidus (Lievin) in Lochend Loch, Edinburgh.—This curious *Cladoceran* was found to be moderately common in material collected some time ago with a hand net on the south-east side of the loch. In form it somewhat resembles *Daphnia*. It appears to be incapable of swimming, and therefore need scarcely be looked for among the free-swimming organisms. Its usual habitat is among the muddy vegetable debris that collects about the shallow grassy margin of lochs, and, the test being rather hirsute, adult specimens are often coated with mud. *Ilyocryptus* was obtained in considerable numbers in a similar gathering made on the south shore of Loch Leven, Kinross-shire, in 1890.—THOMAS SCOTT, Leith.

BOTANICAL NOTES AND NEWS.

Rediscovery of *Sagina alpina* (another plant of George Don's) in Scotland.—While botanising last summer on the Cairngorms with Mr. G. Robertson of Burnside, Forfar, a small *Sagina* was gathered on the steep cliffs of Corrie Sneachda, and also on a rock near the waterfall which enters Glen A'an from Ben Muich Dhu (*i.e.* in Easternness and Banff), which appeared to be Don's *Sagina alpina*. Mr. Arthur Bennett says he does not see what else it can be. I have compared it with Don's specimens in Herb. Brit. Mus., in Herb. of J. E. Smith, and in Miss C. E. Palmer's collection, and have come to the conclusion that it is the same plant.

Some of Don's plants are only *S. maritima*, of which he was one of the earliest discoverers in Great Britain. Some of his specimens are cultivated ones; and he says of the alpine plant that it keeps its character in cultivation. It will be remembered that Don said he gathered *S. alpina* near the summit of Ben Nevis in 1794. The specimen in the herbarium of J. E. Smith in the possession of the Linnean Society is dated 1803. In the same collection is a specimen of *Sagina maritima* labelled "New Sperg. saginoides, but perhaps differs, J.E.S. Marshy ground on the coast three miles to the west of Ardbigland in Galloway, J. Mackay, 1800." A specimen of Don's from the Aberdeen coast, dated 1803, is worth further study; it appears rather to be a maritime form of *S. apetala*, but I have seen it only in bad light.

Near Loch Morlich, Easternness, I gathered a plant which is, I believe, identical with *Caltha radicans*, Forst. It may be worth noting that *Ranunculus bulbosus* was gathered near Boat of Garten, in the same vice-county.—G. C. DRUCE.

Strobilomyces strobilaceus in Perthshire.—During a recent excursion of the Perthshire Society of Natural Science to Kincardine Glen, near Auchterarder, I found a curious fungus which my father tells me is the very rare *Strobilomyces strobilaceus*, Berk., and which has been found before in Scotland only near Crieff. We saw one specimen only.—M. BUCHANAN WHITE, Annat Lodge, Perth.

First Records of Scottish Flowering Plants.—In the valuable series of “First Records of British Flowering Plants,” compiled by Mr. WILLIAM A. CLARKE, and in course of publication in the “Journal of Botany,” there are included a number of Scottish Records. In the instalments published since our last issue the following are included. Full references are given by Mr. Clarke. We extract only the names of the species, the date of publication as found in Scotland, and the place and date of discovery with the name of the discoverer. *Lychnis Viscaria*, L., 1670, on rocks in Edinburgh Park, by Thos. Willisel. *L. alpina*, L., 1811, Clova in 1795, G. Don. *Cerastium trigynum*, Vill., 1794, Ben Nevis in 1792, by James Dickson. *Alsine sulcata*, Schl. = *A. rubella*, Wahl., 1828, Ben Lawers in 1793 by G. Don. *Arenaria norvegica*, Gunn., 1838, Unst in 1837, by T. Edmonstone. *A. sedoides*, Schultz, 1774? on Baikval, in Rum. *Sagina maritima*, Don, 1810, in 1794 by G. Don, near Aberdeen and on Ben Nevis. *S. Boydii*, B. White, 1887, by W. B. Boyd, in Braemar. *S. Linnæi*, Presl = *S. saxatilis*, Wimm., 1800, on Ben Lawers in 1847, by Prof. Balfour. *Ononis reclinata*, L., 1835, on the seashore near the Mull of Galloway. *Melilotus alba*, Desr., 1830, in cornfields at Aberlady, near Edinburgh, by Mr. Lloyd.

Hieracia new to Scotland.—In the continuation of Mr. F. J. HANBURY’S “Further Notes on Hieracia new to Britain,” in the “Journal of Botany” for July, the following are described, viz. *H. euprepes*, new species, first gathered on Snowdon by Prof. Babington in August 1847. In Scotland it has been found in some abundance on the banks of the Almond, at Loch Voil, near Tyndrum, on Clach Leathad in Argyllshire, in Glen Dole, and beside the Dee in Braemar. *H. lasiophyllum*, Koch, var. nov. *euryodon*, found on Moncrieff Hill and in other Perthshire localities, near Loch Lee in Forfarshire, and on Little Craighindal. *H. rubicundum*, n. sp., from Lochinver in West Sutherland, and Moffat in Dumfriesshire. In the September number are described:—*H. hibernicum*, n. sp. “A plant collected by Dr. White in 1875, from Glen Tilt, Perth, may, I think, be referred to this species; but the only specimen I have is immature and not well dried.” *H. murorum*, var. *sarcophyllum*, Stenstr., “has been found by Dr. White on the banks of the Tay at Murthly Castle, and by the Messrs. Linton at Black’s Hope, Moffat, Dumfries.” *H. murorum*, var. *micracladium*, Dahlet., has been found by Col. J. S.

Stirling in a corrie at the head of Balglass, near Denny, Stirling; by Mr. D. A. Boyd on subalpine rocks at Largs, Ayrshire; and by the Allt Dubh Ghalair, Glen Lochay, Perthshire, by F. G. H. *H. duriceps*, n. sp. It is abundant on the miniature rocky cliffs of some of the burns of Sutherlandshire. "It also occurred sparingly near Kingshouse, Argyll; and Mr. Marshall gathered it last year from Ben Chaistel, near Tyndrum, and from Stob Garbh, West Perth. Mr. Beeby has found it in Shetland, while specimens, which I believe to be referable to this species, were sent me by the Rev. W. R. Linton from Sneasdale, Uig, Skye." *H. breadalbanense*, n. sp. "This species, first gathered in 1888, appears to be confined to the Breadalbane range proper."

"*Grevillea*" has, under Mr. Masee's editorship, commenced its twenty-first volume with the number for September 1892. As already announced, it is continued with no material alteration in form. The chief difference observable is in the greater prominence assigned, under Mr. Batters' charge, to the Algæ. There would have been cause for regret had the only journal in Britain devoted to the Botany of Cryptogams been discontinued.

British Fungus Flora. By GEORGE MASSEE. We read in the September number of "*Grevillea*" as follows: "It is expected that the first volume of the above work will be ready in August. It contains a short introduction to the study of fungi, also descriptions, accompanied by critical notes from various authors, of all British species included in the following groups: Gastromycetes, Tremellinæ, Clavariæ, Thelephoræ, Hydneæ, Polyporeæ, and the black and purple spored species of Agaricinæ. The genera are illustrated. The following numbers justify the appearance of a new book on the subject. It is now twenty-one years since the last complete British Mycological Flora was published—Cooke's "*Handbook of British Fungi*"—the number of species therein described being 2810, whereas the species now number 4895, and are distributed as follows: Basidiomycetes, 1980; Ascomycetes, 1275; Sphærospideæ, 685; Hyphomycetes, 580; Uredinæ and Ustilaginæ, 230; Phycomycetes, 145." Dr. Stevenson's "*British Fungi, Hymenomycetes*," and Dr. Plowright's "*British Uredinæ and Ustilaginæ*" have within recent years given us excellent monographs of these groups; and Dr. Cooke in his "*Handbook of British Fungi, Revised Edition*," of which the first volume has been published as supplements to "*Grevillea*," has still more recently revised the British *Agaricini*. Mr. Masee himself, in 1891, issued a monograph of the British Phycomycetes and Ustilaginæ, to which we have already referred in this journal. In view of these facts it may be questioned whether monographs of the remaining groups of British Fungi would not be far more desirable than another mycological flora, which, indeed, it is now scarcely within

the power of one man to render of the first rank. The *Ascomycetes* stand in great need of revision in our flora; and the groups of imperfect forms (*Sphaeropsidæ* and *Hyphomycetes*) require discussion from the sides alike of life-histories and of classification. A Mycological Flora of the British Islands will be valuable in proportion as it supplies information with regard to groups not recently treated of by competent writers, that information being reliable and complete up to the date of issue.

It may be pointed out that the advance in the number of recorded British species is even more striking than the above extract from "Grevillea" shows. In the 2809 species in Cooke's "Handbook" are included upwards of 100 species of *Myxogastres*, a group not included in the second enumeration just referred to.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—July to October 1892.

[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.

On a Black variety of the Water Vole (*Arvicola amphibius*). By H. A. MACPHERSON and O. V. APLIN. *Zoologist* (3), Vol. xvi. pp. 281-293 (July 1892).—Scottish distribution given at pp. 283-286.

Blackbird pairing with Thrush. J. K. DOBBIER. *Zoologist* (3), Vol. xvi. p. 270 (August 1892). In an Edinburgh garden.

Grasshopper Warbler in S.W. Scotland. ROBERT SERVICE. *Zoologist* (3) Vol. xvi. p. 333 (September 1892). Several nests found near Dumfries.

Late nesting of the Lapwing. ROBERT SERVICE. *Zoologist* (3) xvi. p. 333 (September 1892). In S.W. Scotland owing to the dryness and coldness of the Spring.

Notes from St. Andrews Marine Laboratory. No. XIII. By Prof. M'INTOSH, M.D., LL.D., F.R.S., etc. *Ann. and Mag. Nat. Hist.* (6) Vol. x. pp. 97-108. Plate viii. (July 1892). On the Eggs and young stages of the Sand-eels. On the Ova and Larvæ of certain Pleuronectids. On *Cymene ebiensis*, Aud. and Ed. On the Atalanta-like Larval Mollusc.

On some new or rare Crustacea from the Firth of Forth. By THOMAS SCOTT, F.L.S., and ANDREW SCOTT. *Ann. and Mag.*

Nat. Hist. (6) Vol. x. pp. 201-206. Plates xv. and xvi. (September 1892). *Lichomolgus agilis* described as new. ? *Enterocola eruca*, Norman. *Bathyporeia norvegica*, G. O. Sars, *Cerapis crassicornis*, Spence Bate, and *Petalomera declivis*, G. O. Sars (Cumacean) recorded.

On the British Mysidæ, a Family of Crustacea Schizopoda. By the Rev. Canon A. M. NORMAN, M.A., D.C.L., F.R.S., etc. *Ann. Mag. Nat. Hist.* (6) Vol. x. pp. 143-166, Plates ix. and x. (August 1892) and pp. 242-263 (September 1892). Gives the habitat of the Scottish species.

A Second Contribution towards a Catalogue of the Amphipoda and Isopoda of the Firth of Clyde and West of Scotland. By DAVID ROBERTSON, F.L.S., F.G.S., etc. *Trans. Nat. Hist. Soc., Glasgow*, Vol. iii. pp. 199-223. Sixty species new to Scotland added to the previous Contribution.

Coleoptera taken at Loch Awe in June 1892. A. J. CHITTY. *Ent. Mo. Mag.* (2) Vol. iii. p. 216 (August 1892). List of thirty-three species.

Eros (Pyropterus) affinis, Payk, etc. in the North of Scotland. G. C. CHAMPION. *Ent. Mo. Mag.* (2) Vol. iii. p. 243 (September 1892). At Aviemore in July. New to Scotland. Other species of Coleoptera are recorded.

Colias edusa, Fb., in Wigtonshire. J. HENRY STOCK. *The Field*, Sept. 3rd, 1892, p. 368. Two seen at Luce Bay on 23rd of August 1892.

[*Vanessa antiopa* at Forres] "Current Notes." *Ent. Rec.*, Vol. iii. p. 177 (August 1892). Seen by Mr. Reid.

Variety of Polyommatus Agestis, var. Artaxerxes, with four white spots above. CHAS. G. BARRETT. *Ent. Mo. Mag.* (2) Vol. iii. p. 245. (September 1892). Specimens captured in Fifeshire during 1891 and 1892.

Notes on Collecting at Aberdeen. A. HORNE. *Ent. Rec.*, Vol. iii. pp. 161, 162 (July 1892). Records of Lepidoptera captured.

Notes on Collecting at Lanark. Rev. J. A. MACKONCHIE. *Ent. Rec.*, Vol. iii. p. 210 (Sept. 1892). Records of Lepidoptera.

Notes on Collecting at Perth. J. WYLIE. *Ent. Rec.*, Vol. iii. p. 210 (Sept. 1892). Captures among Lepidoptera recorded.

Drepanopteryx phalænoides. KENNETH J. MORTON. *Ent. Mo. Mag.* (2) Vol. iii. p. 194 (July 1892). Captured near Cleghorn on the 6th of June.

BOTANY.

On Natural Hybrids. By WILLIAM H. BEEBY, is an interesting contribution to a much-discussed question (*Journ. Bot.*, July).

Species, Varieties, etc., described or observed in Great Britain and Ireland since the publication of Babington's Manual, Ed. 8. (1881) and Hooker's "Student's Flora," Ed. 3 (1884). By ARTHUR BENNETT, F.L.S. This is a very valuable enumeration of the above additions to our flora, with brief notes of the characteristic features, and references to the original notices of their records as British. The arrangement is that of the "London Catalogue," Ed. 8, and the list extends to *Potamogeton coriaceus*. The many new records under *Rubus*, *Epilobium*, *Hieracium*, and *Salix*, are not detailed, as of interest to few save specialists, but the sources of information are stated. ("Science Gossip," Sept.)

First Records of British Flowering Plants (Continued). Compiled by WILLIAM A. CLARKE, F.L.S. (*Journ. Bot.*, July-September). The numerous records include several for Scotland (see this Journal p. 272). We are informed that this series of records is to be published in separate form.

On Cochlearia grœnlandica, L. By the Rev. EDWARD S. MARSHALL, M.A., F.L.S. The true species is here illustrated on plate 326 A, and is distinguished from *C. alpina*, formerly regarded as *C. grœnlandica* in British floras. It was first discovered in Shetland in 1886 by Mr. W. Beeby, and afterwards at Lochinver in 1890, and at Tain in East Ross in 1891, by Rev. E. S. Marshall, all on the sea coast. (*Journ. Bot.*, Aug.)

Sagina Boydii. This plant, named and described by Dr. BUCHANAN WHITE (*Trans. Bot. Soc. Edin.*, 1887, xvii. pp. 32-35), from a plant found by Mr. W. B. Boyd in Braemar (? on Ben A'an), is here illustrated, on plate 326 B), from a specimen supplied by Mr. Boyd; and Dr. White's description is quoted in full. (*Journ. Bot.*, Aug.)

Key to British Rubi. By Rev. W. MOYLE ROGERS. In the continuation of this valuable key the only direct reference to Scottish plants is the remark under "28 *R. latifolius*, Bab.," that "Professor Babington's own specimen (Cramond Bridge, near Edinburgh, July 30, 1850), in the Borrer Herb. Kew, looks to me very corylifolium." (*Journ. Bot.*, July-Sept.)

Further Notes on Hieracia New to Britain (Continued). By FREDERICK J. HANBURY, F.L.S. Five "species" and one variety from Scotland are recorded as new, and two varieties of *H. murorum* from Scotland are noted as new to Britain, as are also several other "species" and varieties from other parts of the British Islands. The new forms are fully described. (*Journ. Bot.*, July and Sept.) See p. 274 of this Journal.

Strathearn Hieracia. By JAMES COSMO MELVILL, M.A. F.L.S. This is an enumeration (with localities, of the Hieracia found by the author since 1875, chiefly on and near Ben Chonzie

and in Glen Artney. See note on p. 264 in this Journal. (*Journ. Bot.*, Aug.)

British Moss-Flora. By R. BRAITHWAITE, M.D. Fam. xv. Bryacea, Part II. This newly issued part of Dr. Braithwaite's most valuable monograph treats of the mosses of the genera *Pohlia* (replacing *Webera*), and *Plagiobryum* (replacing *Zieria*), and includes 25 species of the genus *Bryum*. As was to be looked for a few changes are shown to be necessary in nomenclature. As the work is indispensable to all students of mosses it would serve no useful purpose to detail these changes. The plates are, as always, distinguished by their excellence.

A new British Hepatic. By W. H. PEARSON. Records *Marsupella conferta* (Limpricht), Spruce, as found, by Mr. W. West, on 12th August 1880, on Ben Nevis at about 4000 feet. It "grows in depressed tufts, or struggling among mosses." The species is fully described; and plate 327 is devoted to its illustration. It is found in Alpine situations on the Continent of Europe. (*Journ. Bot.*, Sept.)

A new Marine Lichen. By GEORGE MASSEE. This paper is an account of a small collection of marine Lichens of the genus *Verrucaria* made by Mr. E. A. L. Batters between tide marks. It includes a new species *V. latevirens*, found at Berwick-on-Tweed, Loch Goil, Cumbrae, and Gare Loch. The species is described, and excellently figured on plate 324. The other species noted in the paper from Scotland are *V. marina* (Deak), Leight., from Berwick-on-Tweed and Loch Goil (ascus and spores figured), *V. mucosa*, Whlgb., from Loch Goil; and *V. maura*, Whlgb., from Cumbrae and Lochgoilhead on the west, and Burnmouth and Eyemouth on the east of Scotland (ascus and spores figured). (*Journ. Bot.*, July.)

New British Moss. On 7th April 1892 Mr. R. H. Meldrum announced, at a meeting of the Perthshire Society of Natural Science, the discovery by himself in July 1891, on limestone on Ben Lawers, of *Hypnum procerrimum*, Molendo, an alpine species confined to limestone. At the same time he gathered another limestone species, *Pottia latifolia*, not previously recorded from Ben Lawers.

New or Critical British Algæ. By E. A. BATTERS, LL.B., F.L.S. *Ascophyllum Mackaii*, Holm. and Batt., *F. Robertsoni*, Batt., is described and illustrated (on plate 183), and its relations to *A. nodosum* are discussed fully. Mr. Batters thereafter describes a number of forms recently recorded, including those referred to on p. 205 of the *Ann. S. N. H.* In addition to the above he describes the following new or rare species from Scotland:—*Microchæte ærugenia* (Batt., *Journ. Bot.*, xxx. p. 86), from shallow sandy pools near high-watermark at Berwick, *Pogotrichum filiforme*, Rke., forma nova *gracilis*, in the Gare Loch; *Ascocyclus globosus*, Rke., on *Cladophoræ* in the Gare Loch; ("Grevillea," September).

REVIEWS.

A Vertebrate Fauna of Argyll and the Inner Hebrides. By J. A. HARVIE-BROWN and THOMAS E. BUCKLEY : (Edinburgh, David Douglas, 1892). This is the fifth volume of the fine series at present being issued by Mr. David Douglas in connection with the fauna of Scotland.

The geographical position of the special faunal-area dealt with by the authors may be briefly defined as the greater part of the political division or county of Argyll and some portion of Inverness, with the islands adjacent which pertain to the two counties, embracing Canna, Rum, and Muck to the north and Jura and Islay to the south, altogether an area of 838 square miles.

From page 22 to page 84 of the introductory topographical sketch we have a clear and most charming description of the physical features of Argyll and the Inner Hebrides ; this is especially interesting as the authors have avoided the beaten tracks of the guide-books, steamers, and tourists, and depicted the wilder glens and more remote fastnesses, and the lone and rarely visited islets of the sea,

“Where no human road yet travels,
Never tourist's foot hath come ;”

spots doubly attractive from their exquisite scenery and remoteness from the haunts of men.

The chapter dealing with the mammals contains much that is quite new in connection with the indigenous feræ of the district. The wild cat is totally absent from the Isles, and, although not extinct on the mainland, has receded to the least accessible districts. The marten is local and becoming very scarce, so also the founart. The otter is still abundant on the mainland and isles ; and the badger on the former only, but less so than in the past. Much interest attaches to the notice of the common, harp, and grey seals, and it is pleasant to learn that the latter are for the most part protected, as far as is possible, from disturbance in the few localities where it is still to be found.

Of the 368 species included in the avi-fauna of Great Britain, 210 are at present ascertained to be resident or occasional visitors to Argyll and the Isles. In recent years the extension of woods and plantations has favoured the increase of some species, as the resident *Turdidae*, redstart, which latter has increased vastly in recent years, the spotted fly-catcher, wood-wren, and grasshopper-warbler. So also the starling and jackdaw, and in some instances no doubt the latter aggressive species is answerable for the diminution of the old-fashioned chough. The rook also is increasing, and

at the same time developing destructive and carnivorous propensities. The raven continues to hold its own.

On the other hand the goldfinch is becoming local and rare ; the yellow-hammer reported as decreasing rapidly in the neighbourhood of Inverary. The lesser whitethroat and chiff-chaff are of doubtful occurrence, as also is the yellow wagtail. So far the advancing stock-dove has not found a place in the fauna, the snow-bunting is recorded as probably nesting on Ben Nevis. We much regret that limited space forbids us further to follow the authors through the remainder of their list, having reference to the game birds, owls, eagles, falcons, hawks, geese and ducks, waders, gulls, terns, divers, and petrels, pages containing much which is of the greatest interest to ornithologists ; indeed every part is full of new and original matter, and every attainable scrap of lore, past or present, written or oral, has been carefully utilised.

The concluding portion of the volume is taken up with notices of the reptiles, amphibians, and fishes. There is a chapter by Mr. Henry Evans on the deer of Jura, and another by Professor Heddle on the Geology of the Inner Hebrides.

Regarding this volume we had looked for much, but the results, as now set forth, have greatly exceeded our expectations. The illustrations which embellish the work are of high merit, and along with the maps and charts add much to the value of the text. We can most sincerely congratulate the authors on the publication of their admirable volume, which is a credit to all who have been connected with its production.

JOHN CORDEAUX.

British Birds : Key List. By Lieut.-Colonel L. HOWARD IRBY, F.L.S. Second Edition. Revised and enlarged. (London : R. H. Porter. Pp. 69.)

This work aims at supplying in a few words the essential characters by which each species of British bird may be recognised, whether male or female (in summer or winter dress), or young. The scientific name, the faunal status, and the true habitat of the rarer visitants, are also given. As a *vade mecum* the "Key List" will be found most useful to the travelling ornithologist, and it is also convenient for general reference. The fact that a second edition has been called for in so short a time affords the best evidence that such a little book was wanted, and also indicates in no small degree that Colonel Irby's excellent method of treating the subject has been much appreciated, and deservedly so. Two plates explaining the technical terms employed have been added to this edition, which has also been otherwise enlarged and improved.

The Museum of the Perthshire Society of Natural Science.

The Members of the Perthshire Society of Natural Science are about to make an extensive addition to their Museum—the Perthshire Natural History Museum—the rise and progress of which were duly chronicled in the *Scottish Naturalist*. For some years past it has been but too evident that the accommodation provided for the collections was quite inadequate, and that an extension of the building was urgently needed. The Society is fortunate in possessing ground at the back of the present building, and on this it is purposed to erect a hall (41 feet by 32 feet), surrounded by a gallery, and lighted from the roof. A new laboratory will also be put up, and space found for a herbarium room. The new building will be devoted to the collections illustrative of the Natural History of Perthshire, while the present museum hall (55 feet by 22 feet) will be chiefly occupied by the Index Collection or guide, by means of typical specimens, to Natural History in general. To meet the cost of building, furnishing, and specimens, the Society wishes to raise a sum of between £2500 and £3000, and, has just issued a circular asking for subscriptions. In the meantime a few kind friends have already promised upwards of £1700, so that there is every prospect of the extension being carried out. We are requested to state that donations of specimens to either department of the Museum will be gratefully accepted. They should be sent to the Museum, Tay Street, Perth.

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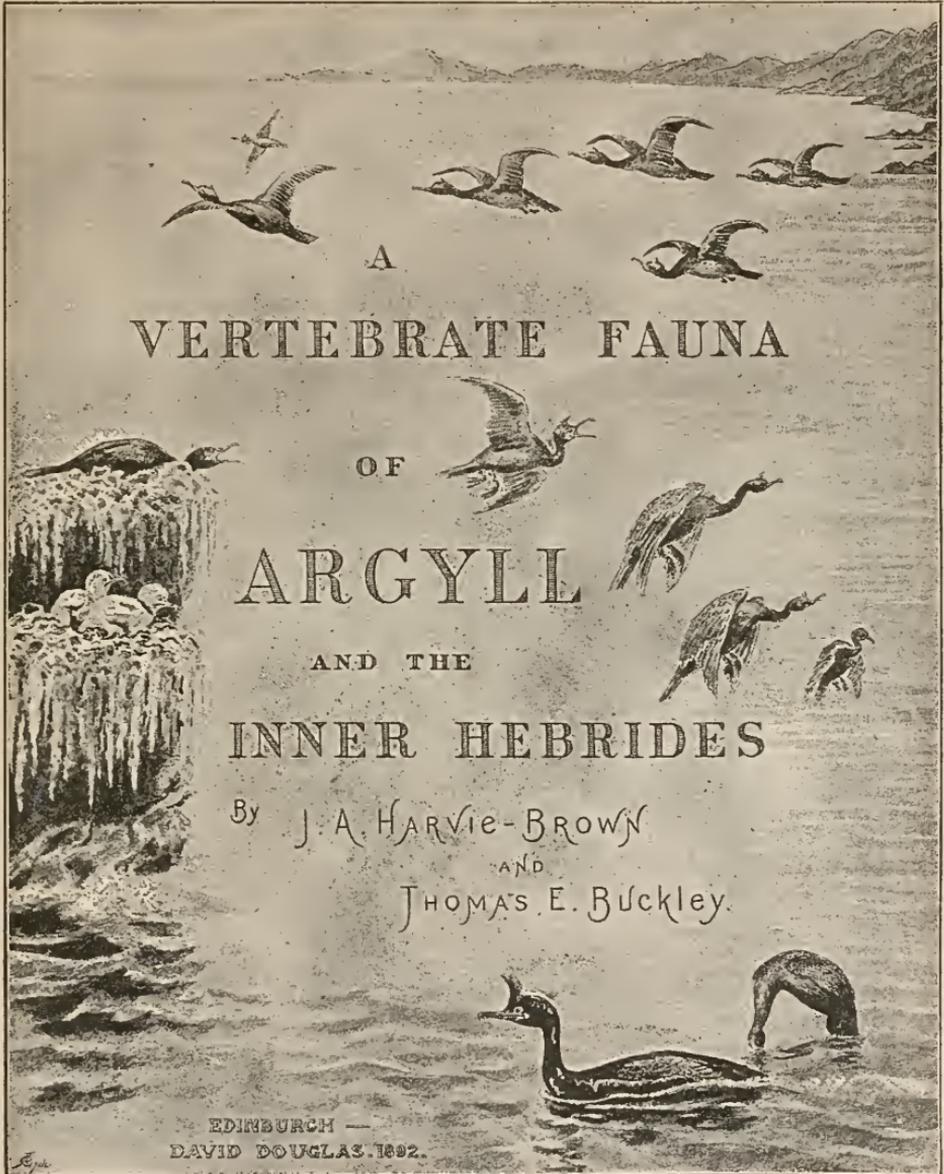
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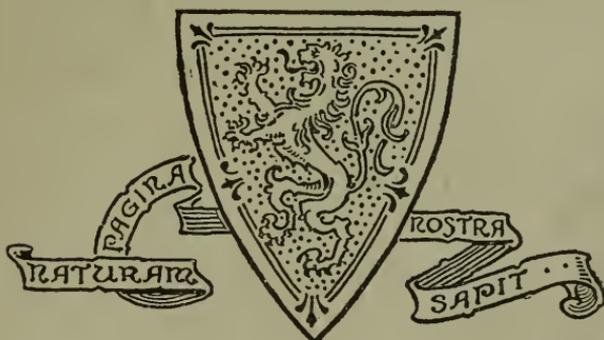
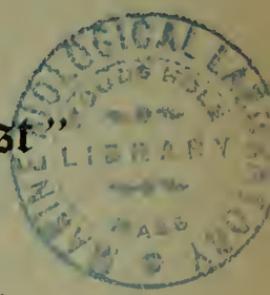
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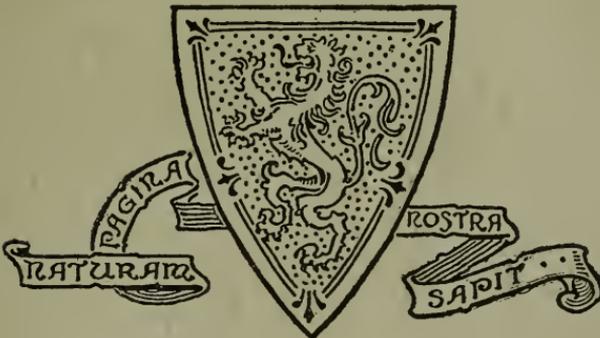
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