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

MEMBER OF THE BRITISH ORNITHOLOGISTS UNION

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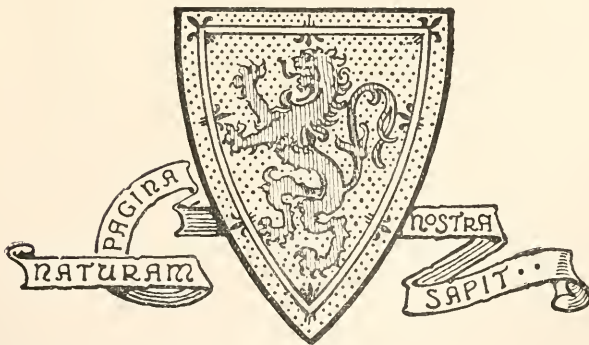
PROFESSOR OF BOTANY IN THE UNIVERSITY OF ABERDEEN

AND

WILLIAM EAGLE CLARKE, F.L.S., F.R.S.E.

NATURAL HISTORY DEPARTMENT, ROYAL SCOTTISH MUSEUM, EDINBURGH

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[JANUARY

REV. JOHN STEVENSON, LL.D.

OBITUARY.

THE Rev. John Stevenson was born at Coupar Angus, on the borders of Forfarshire and Perthshire, in 1836, his father being the Rev. Patrick James Stevenson, clergyman of the parish for upwards of fifty-two years. In 1850 he went to the University of St. Andrews; and, after passing through the courses of study in Arts and Theology, he was, in 1859 (along with his brother Patrick, now minister of Inverarity in Forfarshire) licensed as a preacher in the Established Church of Scotland. Very soon he became Assistant in the West Church in Aberdeen, and in 1861 was presented to the church of Millbrex in Aberdeenshire, in 1865 to the parish of Dun near Montrose, and in 1873 to Glamis near Forfar, not far from his birthplace.

About the year 1870 interest re-awoke among Scottish botanists in the great group of *Fungi*, which for a considerable time had received little careful attention except from one or two. The "Scottish Naturalist" almost coincided in its commencement with this new movement, and did much to aid it, the earlier volumes containing valuable lists, by the Rev. Dr. Keith and others, of the numerous novelties discovered. Great encouragement and assistance was given

in these researches by the Rev. Miles J. Berkeley, to whom most of the forms were sent in the fresh state, and by whom they were named and recorded in the long series of 'Notices of British Fungi,' published by M. J. Berkeley and C. E. Broome in the "Annals and Magazine of Natural History."

Mr. Stevenson began his residence at Glamis when interest in fungi was very strong; and fortunately near the Manse was ground peculiarly rich for several years in numerous forms of the larger fungi. Soon he was prominent among the most successful discoverers of additions to the British lists of fungi, and "Glamis" became a very familiar locality to students of Mr. Berkeley's "Notices."

But not content with discovering and forwarding these forms to be named, Mr. Stevenson made a careful personal study especially of the *Hymenomyces*, and was recognised as an authority on these fungi. He took an active part in the foundation of the Scottish Cryptogamic Society in 1874, and in the very successful exhibition of fungi in Perth with which it was inaugurated. In 1879 he laid students of the fungi of Scotland under great obligations by the publication of "Mycologia Scotica," printed for the Cryptogamic Society of Scotland. In this were enumerated all forms that had been published by Greville, Johnstone, Gardiner, and Dickie in their local floras, by Berkeley and others in British floras, and by numerous writers in such journals as "Annals and Magazine of Natural History," "Grevillea," "Journal of Botany," "Scottish Naturalist," and transactions of scientific societies. The number of named forms, including "provisional species," is 2156; and for each of these the geographical distribution is indicated as far as known, under natural areas based on the chief watersheds.

The book gave a great stimulus to the study of the fungi of Scotland, both by the information gathered up in it and by directing attention to the groups of fungi and the districts of Scotland of which little or nothing was known; and very substantial progress was made in the discovery of additional species, in the extension of the known areas of distribution of many, and in the recognition of the

true relations to one another of many of the recorded forms.

In 1886 appeared "British Fungi (Hymenomycetes)," in two octavo volumes, founded chiefly on Fries' "Hymenomycetes Europæi" and "Monographia Hymenomycetum Sueciæ," but embodying the labours of Berkeley and other mycologists in this great division of fungi. A great admiration for the work of Fries, based on a very intimate knowledge of his writings and on their practical application, led Mr. Stevenson to take peculiar care to secure accuracy in the rendering into English of Fries' descriptions, which are in Latin. "British Fungi" was welcomed as a valuable aid to students of the *Hymenomycetes* of Britain.

Mr. Stevenson took a keen interest in the prosperity of the Cryptogamic Society of Scotland, being Honorary Secretary almost from its origin until 1903, when ill-health rendered him unable to discharge the duties, and led to his resignation. He was rarely absent from the annual gatherings, to the pleasure and success of which he very largely contributed by his unfailing geniality and by his readiness to place his wide knowledge freely at the service of every one whom it could help. His death will leave a grievous blank in the future meetings of the Society. In 1888 his *Alma Mater*, the University of St. Andrews, conferred upon him, *honoris causâ*, the degree of LL.D.

Few men have possessed more strongly than Dr. Stevenson the gift of winning personal regard as well as respect and esteem, feelings that grew stronger the longer and more intimately he was known. None that knew him could fail to recognise in him a true man, desirous to do to others as he would have others do to him, strong and ready to help those in need of his aid.

His health gave way some months before his death, which occurred on 27th November 1903. He has left a widow and two daughters.

THE OCCURRENCE OF THE SPERM WHALE
OR CACHALOT IN THE SHETLAND SEAS.By SIR WILLIAM TURNER, K.C.B., F.R.S.¹

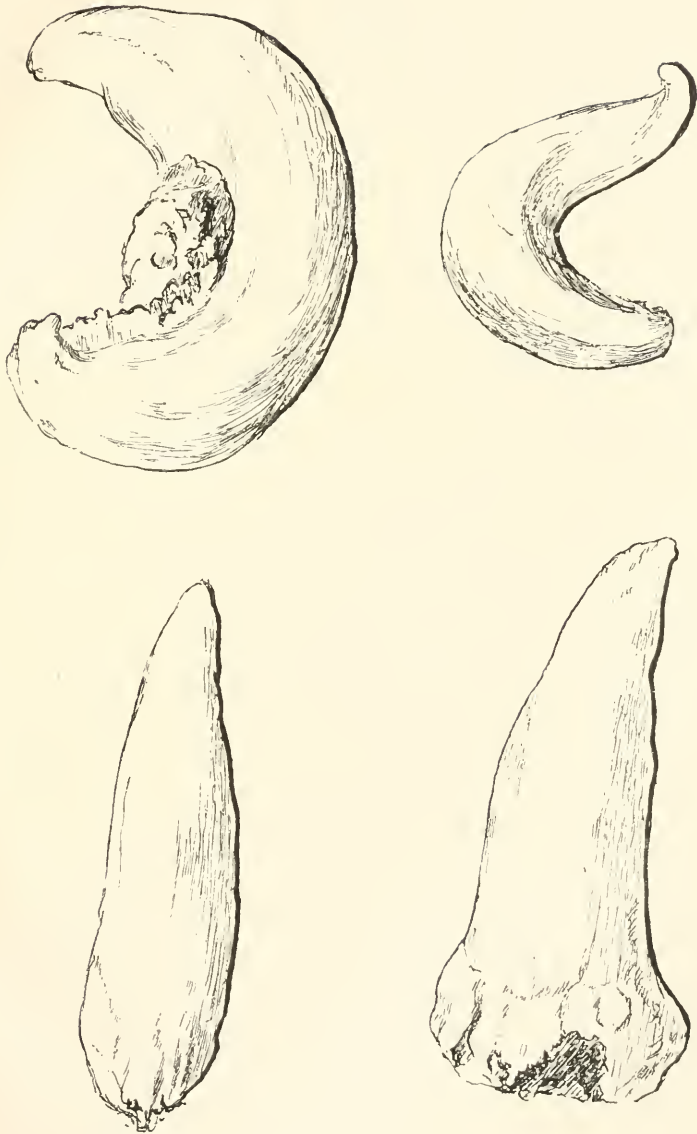
PLATE I.

IN August 1901 Mr. Thomas Anderson, merchant, Hillswick, to whom and to other members of whose family I have on several occasions been indebted for specimens to illustrate the Zoology of Shetland, wrote to tell me that a dead whale had been found floating near Hillswick and had been towed into Roeness Voe. It was within three miles of land when seen by the fishermen and was claimed by the Crown. From the appearance of the animal Mr. Anderson thought that it was a sperm whale, and he sent me the following description, from which it was clear that he had correctly recognised it.

The head was very large and blunt at its free end; the blow-hole was near the end of the head; the eye was low down, near the angle of the mouth; there was no dorsal fin, but only a hump where the fin is usually situated; the lower jaw contained large teeth. The animal was a male and was 61 feet long.

Mr. Anderson further stated that the salvers had bought the whale, and that if I wished the skeleton, or any part thereof, he thought that he could procure it for me. I gladly availed myself of his kind offer, but owing to the size of the animal, the weight of the head, the difficulty of taking a steamer into the Voe where the whale was lying, and the storms of the winter, it was not possible to secure more than the lower jaw, the teeth, and the tympano-petrous bones. In flensing the carcase the point of a massive explosive harpoon was found imbedded in the head of the whale, and had probably been the cause of death. The harpoon had penetrated

¹ A communication made to the Royal Society of Edinburgh on 18th May 1903, and reproduced, with the permission of the author, from the Proceedings of that Society, with additional notes. We desire to acknowledge the courtesy of the Council of the Royal Society in granting us the use of the blocks from which the plate has been produced.—EDS.



Rudimentary Teeth of Sperm Whale. (Natural Size.)

the great chamber for the lodgment of the spermaceti, which, in consequence, had to a large extent drained away, so that the captors obtained only a small quantity of this valuable fat. The blubber yielded about 450 gallons of oil.

When the stomach was opened, numerous beaks of cuttlefish were found in it. But in addition a quantity of fish-hooks of various sizes were observed, ranging from those used for catching haddocks to the largest size made for use in Shetland and the Faroe Islands for the capture of halibut. It would seem, therefore, as if the animal had also lived on fish, and had cleared the fishermen's lines, and swallowed the fish and the hooks to which they were attached.

Mr. Anderson writes me that a careful search in the intestine of the Shetland specimen for ambergris was made, but without success. He states that the fishermen told him that in flensing the whale they found hair in places rooted in the skin; but as no portion of the skin was preserved, neither he nor I was able to put this statement to the test of observation.

The lower jaw enables one to form a good idea of the magnitude of the animal, and in the following table I have placed side by side measurements of the Shetland specimen, one caught some years ago in Loch Scavaig, Isle of Skye, now in the Anatomical Museum of the University, and one in the Museum of Science and Art, Edinburgh.¹

	Shetland.		Skye.	Museum of Science and Art.	
	ft.	in.	in.	in.	
Length of mandible	16	3	(195)	190½	196
Length of symphysis	10	3	(123)	116	120
Width between inner border of condyls	5	0½	(60½)		
Width between outer border of condyls	6	7	(79)		
Greatest girth of ramus	4	9	(57)	56	54

¹ See my paper in "Proc. Roy. Soc. Edin.," vol. vii. p. 635.

The length of the mandible in *Physeter macrocephalus* was taken in the way adopted by Sir William H. Flower.¹ A line was drawn between the backs of the two condyls, and from its mid-point a straight line was drawn to the tip of the jaw. It should be stated that the jaw had probably been two inches longer than the measurement obtained, as the most anterior tooth socket on each side had been broken across.

When these measurements are compared with those given by Sir William Flower in his account of the mandibles of sperm whales in the Museum of the Royal College of Surgeons of England, it will be seen that the Edinburgh specimens compare favourably with the largest mandible from Tasmania in that Museum, and show that they were from animals which had reached adult life and were of great magnitude.

Sixty-four teeth were sent to me. Of these, forty-two were undoubtedly mandibular teeth from their conical shape, the size and depth of the pulp cavity, and the polished, partially worn and somewhat flattened surface of the summit of the crown. The longest of these teeth was 193 mm. (7.6 in.), and the one with the greatest circumference was 200 mm. (almost 8 in. in girth). The shortest tooth which showed evidence of being worn was 109 mm. (4.3 in.) in length and only 80 mm. (3.3 in.) in circumference.

Of the remaining twenty-two teeth it was difficult to say definitely whether seven were or were not mandibular, though probably some of them were; they varied from 104 mm. to 85 mm., and the greatest circumference was 77 mm. Five had shallow pulp cavities, but in the two others the cavity was obliterated by dense tooth tissue, perhaps crista petrosa. No specimen had the summit of the crown polished or worn, but the tip was roughened and somewhat jagged. Obviously they had never cut the gum or been subjected to friction; if mandibular, they had been at the hinder end of the dentary arcade, where the dental groove in the jaw is shallow and the sockets for the teeth are comparatively faintly marked.

The remaining fifteen teeth had in part, if not altogether,

¹ 'Osteology of the Cachalot or Sperm Whale,' "Trans. Zool. Soc. Lond.," vol. vi. part vi. p. 320, 1868.

belonged to the upper jaw. They varied considerably in size and form; eight of the smallest teeth were curiously bent, and these, Mr. Anderson states in one of his letters, were found in the upper jaw. Three were attenuated in form, pointed at opposite ends, and varied in length from 80 to 69 mm. The remaining four were pointed at the crown, but were broadened and flattened at the fang; the longest of these teeth was 88 mm., the shortest was 64 mm., and the broadest part of the fang ranged from 22 to 32 mm. in different teeth. In five of these teeth a shallow pulp cavity was present, but in the others it was obliterated by hard dense tooth substances, which was frequently irregularly tuberculated. The crowns in four teeth were pointed at the tip, but in the others the tip was roughened and somewhat jagged. In no specimen was the crown polished or worn, and the presumption is that they had not cut the gum. The bent teeth were most interesting in their form. The largest specimens were curved to about $\frac{1}{3}$ of a circle, the two smaller to about $\frac{1}{2}$ a circle, but owing to a twist in the tooth the tips of the crown and fang were not in the same plane. Several had odontomatous excrescences on the concave aspect of the tooth, resembling the maxillary tooth figured by Sir W. H. Flower. These teeth were obviously rudimentary and functionless (see Plate).

The sockets of the teeth were elongated antero-posteriorly. Those which had the largest teeth were 8 inches in length and about $3\frac{1}{4}$ inches in greatest breadth. In each alveolus the hinder end was the deepest part, from which it gradually shallowed forward. The fang of the tooth was lodged in the deep posterior end. The teeth in the two halves of the mandible behind the 8th pair were not set directly opposite to each other, and for some distance backwards a tooth on one side was opposite the interval between two teeth on the other side, so that the teeth were not symmetrically arranged; the dental formula, judging from the alveoli, was 23 in the right and 22 in the left half of the mandible.

In two previous communications which I have made to this Society on the occurrence of the sperm whale in

the Scottish seas, I referred to all the cases of which I had been able to find a record.¹ The specimen now described, with one subsequently captured, gives two additional examples.

Locality.	Date.	Authority.
Hoxay, Orkney	9th or 10th cent?	George Petrie.
Limekilns	February 1689 . . .	Sir R. Sibbald.
Cramond	1701	James Paterson.
Monifieth	February 1703 . . .	Sir R. Sibbald.
Ross-shire	1756	Sir W. Jardine.
Cramond	1769	James Robertson.
Hoy Sound, Orkney . .	About 1800	George Low.
Oban	May 1829	Sir William Turner.
Thurso	July 1863	J. E. Gray and Sir W. H. Flower.
Loch Scauig, Skye . .	July 1871	Sir William Turner.
Roeness Voe, Shetland	August 1901	Sir Wm. Turner. ²
Roeness, ,,	June 1903	Sir Wm. Turner. ³

It is well known that the sperm whale in its customary habitat moves about as a rule in herds or 'schools.' The specimens captured on the coasts of Scotland have, on the other hand, usually been solitary animals. The majority of these were males and of great size, a fact which supports the statement made by Mr. Thomas Beale that the full-grown males go singly in search of food.

In connection with this record of the occurrence of the sperm whale in the Scottish seas, it will be of interest to note the cases in which specimens have been observed to the north of Scotland, or on the opposite coast of Scandinavia. Professor Gustav Guldberg of Christiania, in a recent publication,⁴ has collected evidence of the

¹ "Proc. Roy. Soc. Edin.," Feb. 6, 1871, and Jan. 29, 1872, vol. vii.

² As an addition to this list we may mention that Dr. John MacRury recorded in this Magazine (1897, p. 249), the occurrence of a sperm whale in South Uist in May 1897. This specimen was cast ashore in a comparatively fresh state, was 70 feet in length, and yielded a quantity of oil. Since this note was published, Mr. Andrew M'Elfrish has furnished us with some additional data, according to which the carcase came ashore at Aidmill Bomish, was 78 feet in length, and was estimated to weigh 50 tons. The muzzle had a sheer height of 12 feet, and the length of the jaw was 14 feet. It produced 15 tons of oil, but the ambergris was untouched. The teeth were sold to a commercial traveller, from whom Mr. M'Elfrish procured two. The skeleton was left upon the shore.—EDS.

³ This specimen was a male, killed in June 1903 by the Norwegian Whaling Company, of which Mr. Castberg is the manager, 30 miles north-west from Roeness. It was 62 feet long and 36 feet in girth, and yielded about 800 gallons of spermaceti and 53 barrels of oil, and was one of a herd of three, but two escaped. I am indebted to Mr. Thos. Anderson for this information.—WM. TURNER.

⁴ "Nyt Magazin f. Naturvidenskab," B. 39, H. 4. I am indebted to Prof. Guldberg for a copy of this memoir.

capture of several examples of this whale in the North Sea. Thus, in 1770, one fifty-two feet long was stranded on the small island of Hjarnö in Horsens Fjord; bones of another specimen were found at an uncertain date on the island Lessö, in the Cattegat. Prof. Collett states that in 1780 one was obtained on the west coast of Norway, in Sönd Fjord, and another in 1849 near the island of Smoelen, off Christiansund. Professor Sars mentions that in the summer of 1865 one was got as far north as the Lofoden Islands, within the Arctic Circle. The Bergen Museum obtained in 1888 the tooth of a sperm whale found in the sand on the coast of Jäderens, in the south-west of Norway.

Guldberg also records two specimens seen in 1895; one, an old solitary male, 19 metres long, was caught in the neighbourhood of the North-West Coast Islands, and its skeleton is now in the Tönsberg Museum. The other, one of a herd of four sperm whales, was captured off the Faroe Islands. It was a male, 20 metres long, obviously full grown, and its skeleton is in the Museum at Copenhagen. In the early summer of 1896 a herd of seven was seen near the coast of East Finmark, and of these two were captured; one was a young male 12.8 metres long, and its skeleton is in the Natural History Museum at Berlin; the other, a female, was 10 metres long. A third specimen was taken in the same summer in Baadsfjord; it was a male, 15 metres long, and the skeleton is in the Bergen Museum.

In 1899 a herd of sperm whales was seen in the neighbourhood of the Faroes, but they escaped capture. In the summer of 1901 a sperm whale between 60 and 70 feet long was seen north-east of the Faroe Islands, and after an exciting chase was captured. The sex is not stated, but from its length it was probably a male. In August 1901 Captain Albert Grön observed a herd of about ten sperm whales in the neighbourhood of the Faroes, one of which was harpooned, but escaped; it is not unlikely that the Shetland specimen, which had been struck by a harpoon, and was found floating dead during the same month, was this animal.

From these examples it is evident that the seas to the north and east of Shetland have of late years been frequented by the sperm whale in considerable numbers.

The presence of quantities of beaks of cuttlefish in the stomach of the specimen from Shetland corroborates the observations made of late years that sperm whales live largely on cephalopoda. But the hooks found in considerable numbers in its stomach point also to a fish diet. Mr. Frank T. Bullen, in the "Cruise of the Cachalot" states that during the cutting of a sperm whale, in addition to dismembered squid of large size, a number of fish, such as rock cod, barracouta, schnapper, and the like, were found in its stomach.

Professor Guldberg relates that in the stomach of the old male captured in 1895, in addition to the remains of cuttlefish, a portion of the spine of a large fish, a fish-hook and some stones, there was about a square foot of the skin of a seal, with its hairs and four of its claws. In the stomach of the young male caught in 1896 off East Finmark a gelatinous and cartilaginous mass several feet long was found. It consisted of the half digested portions of a cartilaginous spinal column, which from its magnitude had evidently been a part of a large cartilaginous fish, possibly, according to Professor Collett, *Selache maxima*.

These observations extend very materially our knowledge of the range of the food of the sperm whale, as, in addition to cephalopoda and smaller species of fish, the animal apparently at times attacks and devours large cartilaginous fish and seals. It is difficult to explain the purpose which was served by the stones found in the stomach of one of the above specimens, but I should state that some species of seals are in the habit of swallowing stones, and afterwards of ejecting them, a habit which has led the seal hunters to speak of the stomach in which stones are found as the ballast bag. As the stones were present in the stomach of the same sperm whale in which the remains of the seal were found, it is possible that they had formed part of the contents of the stomach of the seal which the whale had eaten.

It is interesting to note that Professor Benham, in his

account¹ of the stomach of a full-grown specimen of the small species of cachalot *Cogia* (*Kogia*) *breviceps*, stranded near Dunedin in August 1900, found a great quantity of cuttle beaks, lenses of eyes, the remains of the pens of some *Loligo*-like species, and some partially digested red membranes with horny, conical teeth-like structures growing from thick white patches, recalling gizzard teeth of *Aplysia*.

ON THE NESTING OF THE HAWFINCH IN FIFESHIRE.

By WILLIAM BERRY, B.A., LL.B., M.B.O.U.

I HAVE the satisfaction of placing on record the fact that the Hawfinch can now be included among the species which have been found breeding in Scotland.

The Hawfinch is a bird of shy and retired habits, and, in spite of its somewhat singular appearance and shape, very readily succeeds in escaping observation.

Writing in 1837, Macgillivray describes the Hawfinch as an irregular visitant in the northern parts of the island, appearing here and there in various parts of the country towards the beginning of winter; he adds that, although more frequently met with in England than in Scotland, it was not so rare in the latter country as had been supposed, several specimens killed in the southern counties of Scotland having come under his own inspection. Montague, writing in 1802, had stated that no instance had up till then been recorded of the Hawfinch having bred in Great Britain; and this statement is simply repeated by Macgillivray on the authority of Montagu, whom he characterises as perhaps more to be depended upon than any other British ornithologist.

In 1843, however, Sir William Jardine, who himself wrote the volumes on "British Birds" in the "Naturalists' Library,"² was able to carry the history of the bird a stage further. He records that the Hawfinch had lately been ascertained to breed in some parts of the South of England, his own collection having been furnished with specimens of

¹ "Proc. Zool. Soc. Lond.," May 21, 1901, vol. ii.

² "Nat. Lib.," vol. xxv.; "Brit. Birds," vol. ii. p. 269.

the birds, with the nest and eggs, "procured in the vicinity of Epping Forest by Henry Doubleday, Esq.," who considered that it was owing to their extreme shyness that we had been hitherto kept in ignorance of their habits. At that time the occurrence of the Hawfinch in other parts of England, so far as information then went, was confined to straggling parties or individuals; but Sir William Jardine thought that the attention of ornithologists might perhaps discover other breeding stations besides Epping and Windsor and the vicinity of Wolverhampton, in all of which localities records of its nidification had already been obtained. In the north, he says that it had been killed or seen in the counties of Durham and Cumberland, as well as across the border in Dumfriesshire.

Gray, in his "Birds of the West of Scotland," published in 1871, was unable to record the Hawfinch as a West of Scotland species, though specimens had by that time been obtained in nearly all the eastern counties as far north as Aberdeenshire, Banffshire (where Mr. Edward informed Mr. More that he believed a pair had once bred), and Caithness. Mr. Howard Saunders, however, has no doubt that it has been steadily increasing during the last fifty years, and says that, though still local in distribution, its nest has been obtained in every county in England, excepting Cornwall, and even as far north as the Lake District, though there the bird becomes rare. In Russia, the Hawfinch has been found nesting as far north as the vicinity of St. Petersburg.

Macgillivray, in his account of the Hawfinch, has an interesting note on the extension of range of this and other birds, which, recorded first as winter visitants, have subsequently been found to be breeding and resident species in the same district. He says: "It is quite possible that, although the Hawfinches are now resident in several parts of England, they may, at a former period, have been merely winter visitants. In Scotland this would appear to have been the case with the Missel-Thrush, which appeared occasionally in flocks during the winter in districts where it was not seen in summer. Twenty years ago it was scarcely ever observed in the neighbourhood of Edinburgh at the latter season, insomuch that I was scarcely disposed to believe the evidence of my eyes when I first saw a pair of them at

Rosslyn ; but now they are quite numerous, and may be found in summer in the immediate vicinity of the town, where they breed."

In the fourth edition of "Yarrell," Professor Newton states that, in all the countries it inhabits, the Hawfinch is most generally a resident—that is to say, as regards the adults, since the young unquestionably leave their birth-place towards autumn. Their food consists in great part of the kernels of the seeds of trees, the fleshy pulp of cherries and other fruits and berries being always rejected, and the enclosed stone or seed cracked between their powerful mandibles. The authorities concur, however, in noting the fondness of the bird for green peas.

In the beginning of August last, a nest was discovered in my neighbourhood—the neighbourhood of Newport, in the east of Fifeshire—which contained one unhatched egg, the rest of the clutch having doubtless been hatched some two months earlier in the year. The nest and eggs were shown to me, and were quite new to me ; but the finder informed me that a similar nest occupied the same situation last year, though, being empty when found, no particular examination had been made of it.

In the present instance, I found the nest to be placed on and among a bunch of twigs and suckers growing from the bole of a large elm tree, which stands in a shrubbery, surrounded by undergrowth, about one hundred yards from a dwelling-house. It was not more than five feet from the ground, and, though a good deal knocked about by the winds and rains of a very inclement season, still retained its shape sufficiently for identification. The egg, too, had unfortunately been somewhat broken before I saw it, but more than one-half remained intact. It was undoubtedly a typical Hawfinch's egg in appearance ; but, not liking to take upon myself to add the new breeder to the list of Scottish birds, I took the egg to the Edinburgh Museum, where Mr. Eagle Clarke pronounced it to be unquestionably the egg of a Hawfinch.

Readers of the "Annals" will remember that the capture of a very young bird in the gardens of Arniston House, Midlothian, early in August 1894, was the text for a paper

by Mr. Eagle Clarke in the "Annals" for that year (pp. 195-197), on the "History of the Hawfinch as a Scottish Species," and that subsequently an adult Hawfinch was recorded as having been picked up dead in a shrubbery at the same place. Mr. Eagle Clarke, in noting the latter occurrence, expressed the opinion that we should in future be warranted in considering it as among our probable home-breeders, a surmise that has now been verified.

It is interesting to note that, as at Arniston, the parent birds were able to escape observation during the whole of the nesting time, although they must have been living for weeks in the immediate neighbourhood of this dwelling-house, and within a short distance of observers both interested and competent. It is indeed believed that one of them came to be fed with some other birds at the house door during a spell of hard weather in the end of April; at all events, a momentary glimpse was obtained of a bird that seemed to answer to the description of the Hawfinch, but it was impossible to identify the bird satisfactorily on that occasion, and it was not seen again. It is much to be hoped that these birds, and perhaps their progeny, will return to breed in East Fifeshire in future years, and that they may again be successful in rearing their broods undisturbed. The nest was composed of dried grass-stems, moss, and a few twigs; no roots. In shape it was shallow, not very strongly built, but, of course, a good deal knocked about by the weather; very shallow externally, internal diameter 3 inches. The egg was pale bluish-green, with a few streaks and spots of purplish-brown.

ON THE OCCURRENCE OF THE LITTLE BUNTING (*EMBERIZA PUSILLA*) IN ORKNEY:
AN ADDITION TO THE SCOTTISH AVIFAUNA.

By WILLIAM EAGLE CLARKE.

ALTHOUGH a circumstance to which too much importance must not be attached, it is, nevertheless, both pleasurable and interesting to be able to record an addition to our avifauna.

On the 15th October, Mr. John R. Laurence wrote to me from the Pentland Skerries Lighthouse asking me to identify several birds, which he enclosed in the flesh, killed or captured at that station. These were a Goldcrest, a Mealy Redpoll, a Garden Warbler, a Blackcap, a Brambling, and the remains of a Bunting which had been rescued from a cat which had captured and partly eaten the bird. This occurred on the morning of the 15th October. The remains of the Bunting consisted of the head, wings, tail, and legs of a bird of the year of *Emberiza pusilla*, a species which has only twice before been detected in Great Britain, namely in the counties of Sussex and Durham. There can be little doubt that the other birds sent had been killed about the same time, for they were quite fresh in condition on reaching Edinburgh on the 20th.

The Little Bunting is a summer visitor to the northern portions of the Old World, and though a breeding species as far westwards as the government of Olonetz in N.W. Russia, it does not appear, according to our knowledge of its distribution, to have winter quarters in either southern Europe or in Africa, or indeed in Asia westwards of India. It occurs, however, on migration in S.E. France and Italy with some regularity, which would seem to indicate that the bird has winter retreats somewhere in the southern portion of the Western Palæarctic Region. On the autumn passage the bird has somewhat frequently been obtained at Heligoland, and on several occasions on the coasts of Holland and Belgium. It has twice been recorded for Algeria. In all probability it is not quite such a rare visitor to our own shores during the autumn as is at present supposed, but at that season its plumage is inconspicuous and renders it much liable to be overlooked; this is especially the case as regards the birds of the year, which have a superficial resemblance to the Lesser Redpoll of a similar age.

This species was added to the British avifauna on the strength of a specimen captured in a clap-net near Brighton on the 2nd November 1864 ("Ibis," 1865, p. 113). From that date until 1902, however, no other example had been detected in our Islands; but on the 11th October in that year one (a female) was shot on the Durham side of the

mouth of the river Tees ("Naturalist," 1902, p. 350), and thus the bird's claim to be regarded as British was satisfactorily established. Now, thanks to Mr. Laurence, an interesting addition has been made to the Scottish avifauna.

SULE SKERRY, ORKNEY, AND ITS BIRD-LIFE.

By JAMES TOMISON.

SULE SKERRY is a small island situated 35 miles N.W. by W. from Hoy Head in Orkney, and $32\frac{1}{2}$ miles N.E. by E. from Cape Wrath. It is thus almost out of sight of all land, and only the higher ground in Sutherland and Orkney is visible during clear weather. The island lies very low in the water, the highest point towards the centre being 45 feet above high water. The coast line averages about 15 feet, rising at one or two points to about 30 feet. The rocks are composed of gneiss, similar to the rocks in Sutherlandshire, and quite different from anything found in Orkney. About 4 miles distant, W. by S., is the Stack, a solitary rock rising directly from the water to a height of 140 feet. On the west side it rises perpendicularly, but on the east it slopes gradually from sea to summit, and is thus accessible to the occasional visitor. Fifteen miles further on, in a southerly direction, is a sunk rock, 13 feet under water, known as the Nun Rock; while close to Cape Wrath—about a mile distant—is a reef of considerable size. These reefs run in almost a direct line to Sule Skerry, and as the water, with the exception of a few deep gaps, is comparatively shallow, we can almost venture to think that at one time it has formed part of the mainland.

The name Sule is supposed by some to be derived from the Gaelic word meaning Solan; others say it is a corruption of seal, the name Seal Skerry being given to it on account of the vast number of seals that in time past made it their home.

The island is of some considerable extent, being 900 yards long by 500 yards broad, with a superficial area of

35 acres. It is extremely irregular in shape, and is intersected by several gullies, some of which go right through from N. to S., others forming what are locally known as goes or voes. As it lies so low, and all round the water is comparatively deep, one can easily imagine, exposed as it is to the full force of the Atlantic, how little shelter it can afford to animal life. There is a fringe of bare rocks on all sides entirely free from soil, broadest towards the more exposed parts, which receives the full force of the ocean breakers in winter, and protects a small part in the centre, about 15 acres, which is covered with mossy soil, varying in depth from 4 feet to a few inches. This more favoured part is covered in summer with a heavy crop of coarse grass and weeds, and from June to November is infested by myriads of insects, chief of which in numbers are the earwigs.

At one time this isle was a danger to mariners, it being situated in the track of shipping passing through Pentland Firth, and also in the way of vessels passing between Orkney and Shetland. The shipmaster who was afraid of the dangers of the Firth had to pass it either going north or coming south; and many stories are told of wreckage and human remains being found by occasional visitors in by-gone days.

On 1st October 1895 a lighthouse, erected by the Northern Lighthouse Commissioners, was lit for the first time; and now, instead of being a terror to mariners, the isle is a guide, and undoubtedly a welcome sight, to the storm-tossed sailor on a dark stormy winter's night.

From time immemorial this isle has been the haunt of vast flocks of sea-birds during the breeding season, and a resting-place for birds of passage in the migration season. Situated, as it is, far from the disturbing influence of mankind, these birds have returned to it year after year, finding it a particularly suitable locality for rearing their young. Though the island is now inhabited by the three lightkeepers, their numbers have in no way decreased, for no one disturbs them; in fact they are looked upon as friends from the outside world, and are carefully protected.

During a residence there of seven years I paid some attention to their manners and customs, and also took

occasional notes of their arrival and departure. In this paper I will try to give a short account of my observations. To make the paper more easily followed I will divide the birds of Sule Skerry into six classes:—1. Residents; 2. Regular Summer Visitors; 3. Regular Winter Visitors; 4. Occasional Summer Visitors; 5. Occasional Winter Visitors; 6. Rare Visitors.

I. RESIDENTERS.—Shag or Green Cormorant (*Phalacrocorax graculus*), Great Black-backed Gull (*Larus marinus*), Herring Gull (*L. argentatus*), and Rock Pipit (*Anthus obscurus*). In this class the Shags come first in point of numbers. They seem to find an abundant supply of food in the vicinity, for they are continually to be seen, no matter what the weather may be. In fine weather they devote all their energies to fishing a short distance from the land, and when the sea is wild and stormy in winter they take refuge on the rocks, seeking some sheltered nook when the storm is more than usually severe. In December they don their breeding plumage, when the ornamental crest on the head first makes its appearance. In February, if the weather is anything moderate, they begin nest-building, a piece of work they go about in a very business-like way, but very often their labour is in vain. Instinct guides the lower animals in a wonderful manner, but I have frequently thought that a wee bit of reason in the Shag's head would often have saved him an immense lot of labour. Occasionally in February there are a few days of quiet weather, and whenever that is the case they begin nest-building, which nests, without exception, are all washed away by the first heavy sea. There is always a lot of withered grass on the island, which is considered the best material for nest building; and when the work is begun no time is lost. One bird builds, and the other acts as carrier. It is a common thing to see them stealing from one another, an occurrence which causes a big row. When the one engaged building is busy at work, and its mate away in search of more material, I have often seen a "carrier" from another nest approach in a suspicious manner which is understood by the bird approached, for it at once puts itself on the defensive, and uses very threatening

language. More than once I have seen the labour of two days utterly destroyed in this fashion. In ordinary circumstances it takes from six to eight days to complete the nest, and when finished it presents a curious appearance, consisting of dried grass, seaweed, old rope, wire rope, and pieces of wood. The usual time to begin laying is about the middle of April, but in 1896 I got an egg on the 5th of that month. In other parts of the country Shags' nests are, in my experience, built in inaccessible places, but on Sule Skerry they are built all over the island, in some cases under big boulders 200 yards from the sea. For the most part they nest in colonies in suitable localities. On a space of rock not more than 30 yards square I have counted 54 nests, some of them within a foot of one another. The number of nests on the island is about the same every year, averaging about 300, the number of eggs in each varying from 2 to 5. Three is the most common, but 4 and 5 is by no means rare. During incubation the nest is never left for a moment, the one bird relieving the other at intervals. When the young are small, one of the parents acts as food provider, but when they are a fortnight old it takes the united efforts of both parents to convey sufficient food to their hungry offspring. It is a very interesting sight to watch them with the telescope when the feeding operation is going on. The old bird comes in from the sea and alights at the side of the nest. Immediately there is a rush made by the young to see who will get to work first. The fortunate one shoves its head entirely out of sight down the old one's throat, and by its movements seems to be enjoying itself. I don't suppose they know what it means to get enough; but apparently the parent decides that question, for I have often seen it shake off the one at work and give No. 2 a chance, and then No. 3. Sometimes No. 1 or No. 2 manages to take the place of No. 3, and the latter must go without till next time. I have seen 5 eggs and 5 young birds hatched, but I never saw more than 3 come to maturity. If one or two are a day or two later in being hatched, they are consequently weaker than those first hatched, and are pushed aside by their more vigorous brothers and sisters at feeding time, the parent seemingly

being unable to discriminate between those which have been fed and those which have not. On 2nd June 1902 there was a very heavy sea all round the island which washed away fully 200 nests. In many cases the young were hatched, but were quite unable to battle with the stormy sea. The old birds stuck by their nests as long as a vestige remained, trying all in their power to protect young and eggs by spreading out their wings as a covering, but all in vain. The following week nest-building was again in full operation on the same spots, and by the end of June most of the birds were sitting on 1 and 2 eggs. These were hatched in July and August, and the young were able to fight the battle of life unaided in September. The young leave the locality about the beginning of winter, for after November it is rare to see an immature bird. I am inclined to think they take refuge on some more sheltered shores until they attain full strength. The number of old birds remains year after year much about the same in winter and spring.

The Great Black-backed Gull is found all the year round on the island. It nests on the outlying parts, and during the breeding season spends all its spare time stealing anything in the shape of food, especially the eggs and young of other birds. Altogether there are about a dozen pairs resident.

Very few Herring Gulls build on the island, but in summer vast flocks assemble on the outlying rocks, finding, I have no doubt, an abundance of food when the herrings are on the coast. About a dozen are resident all the year round.

A small number of Rock Pipits seem to find the locality a suitable one in which to spend their whole life. In winter they are always in evidence about the house door, continually on the watch for any refuse that may be thrown out. They nest in May and June, but in what numbers it is not easy to say, for they lay in out-of-the-way corners not easily discovered. In July the young can be seen in considerable flocks, but they, like the young of the Shag, seem to emigrate, for the resident population does not increase. When the relief boat (*Pole Star*) from Stromness comes out, crowds of them fly to meet her, and rest on the deck and rigging.

Occasionally one or two take a trip ashore, only leaving the ship when within a mile of the Orkney land.

Amongst the residents we may class the Eider Ducks (*Somateria mollissima*). They are about the island almost the whole year. In November and December very few are to be seen, but early in January crowds of them make their appearance, spending their whole time afloat, no matter how stormy the weather may be. In June the duck and drake come ashore and select the spot for their nest, and that is the only occasion on which the male takes any active part in domestic duties. The nest is built sometimes on the bare rock, but generally amongst the grass, and consists of, as a foundation, some coarse grass, the famous down being added as the eggs are laid. Five and six are the usual number of eggs laid, and incubation is complete in a month. I have often approached the duck so closely at this stage as to be able to stroke it with my hand. Immediately the young are hatched they leave the nest for the sea, where they are at home at once.

II. REGULAR SUMMER VISITORS.—Under this heading comes:—Puffin (*Fratercula arctica*), Razorbill (*Alca torda*), Common Guillemot (*Uria troile*), Black Guillemot (*U. grylle*), Kittiwake (*Rissa tridactyla*), Arctic Tern (*Sterna macrura*), Oyster-catcher (*Hæmatopus ostralegus*), Whimbrel (*Numenius phæopus*), and Corncrake (*Crex crex*).

The Puffin may be said to be *the* bird of the island. To give any idea of their numbers is an impossible task, for when on the island they are scarcely ever at rest. The air is black with them, the ground is covered with them, and the sea is alive with them. They are here, there, and everywhere. They first make their appearance early in April, and spend 8 to 12 days at sea before landing, coming close in shore in the forenoon, and disappearing at night. The day they land they begin by flying in clouds round the place, and having made a survey to see that all is right, they begin to drop in hundreds till in half-an-hour every stone and rock is covered. The exact dates of their arrival are:—1896. First seen 15th April, landed 20th. 1897. First seen 14th April, landed 22nd. 1898. First seen 8th

April, landed 22nd. 1899. First seen 7th April, landed 16th. 1900. First seen 12th April, landed 18th. 1901. First seen 10th April, landed 18th. 1902. First seen 9th April, landed 18th. After spending a few hours on the island they all disappear, and don't land again for 2 or 3 days. But when they come back a second time there is no ceremony about the business; they come in straggling flocks from all points of the compass, and at once start clearing out the old nesting holes and making new ones. Early in May they begin to lay—the earliest observed was on 6th May. The greater part of them burrow under ground in the loose peaty soil, but large numbers lay their single whitish egg under loose stones and rocks. We easily know when the young are hatched by seeing the old birds coming in from sea with herring fry or sand eels, which are carried transversely in their bills. The sole work of the parents for the next 3 or 4 weeks is fishing and carrying home their takes to the young. The young are at first covered with a thick coat of black down, and in about a fortnight the white feathers on the breast begin to show. As near as I can calculate, they are fully fledged in 4 weeks, when they leave the land for what we may call their native element. As soon as they get afloat, young and old leave the vicinity, and about the middle of July we can easily detect that their number is decreasing. After that time they dwindle away day after day as the young are ready for the sea, until the first week of September—11th September is the latest I have seen one. If they all laid at one time and brought out their young together, they would all be away in July; but accidents will happen, and so necessitate another effort to obey the law of nature. This means delay, and while the young one is alive the old one won't leave it.

A considerable colony of Razor Bills visit the island for breeding purposes. They generally arrive a week before the Puffins, but rarely land before the 1st of May. They lay their single egg on a bare ledge, or under a large stone, towards the end of May. Some authorities say that the male bird brings food to its mate whilst sitting, but I have never noticed this, though watching carefully to see if such was the case. I have distinctly seen the one relieve the

other. The young remain where hatched for over 2 weeks if not disturbed, and I have seen a young one remain ashore until fully fledged. They all, young and old, leave in August.

Very few of the Common Guillemots visit Sule Skerry. Their great haunt is on the Stack, where they are to be seen in myriads on the perpendicular side facing the west. Crowds of them sometimes rest on the outlying reefs, amongst which I have seen a few of the ringed form. Every year there are a few eggs to be found in out-of-the-way corners, but they are so seldom seen that they attract very little attention.

The Black Guillemot is a very regular visitor, arriving off the island in February and March. An occasional one in winter plumage may be seen in November and December, but as a rule they do not winter near the island. They are never seen ashore before the end of April, and don't lay till the end of May. Their nests, in which are always 2 eggs, are made under stones, or out-of-the-way crevices, and not easily discovered. The young are fully feathered before leaving the nest.

In the early spring a few Kittiwakes make their appearance, but, unlike the Puffins, their time of arrival is very irregular. Every year from 6 to 10 pairs hatch their young in the most inaccessible part of the island. The work of nest building with them is a serious piece of labour, but before they begin, an unusually long period is devoted to love-making. From the end of March till the middle of May they seem to do nothing but make love, sitting on or near the ledges where they intend building, billing and cooing the whole day long. They always build in a somewhat similar manner to the Swallow, the chief constituent of the nest being mud plastered on to the side of a rock. The mud is mixed with dried grass to keep it together, and the inside is finished with a layer of soft dry grass. They lay 3 eggs about the end of May or 1st June. Every year large flocks visit the island in July, sometimes remaining till the end of August.

Next to Puffins in numbers are the Terns—the Arctic Tern. They are also like the Puffin in their regularity of

arriving at the island. When first seen they are flying high up, and continue doing so for a day or two, only resting at night. In 1896 they arrived on 13th May; 1897, 14th May; 1898, 15th May; 1899, 12th May; 1900, 14th May; 1901, 16th May; 1902, 18th May. There are certain localities where our visitors take up their abode, and they stick closely to the same ground year after year. We thus know exactly where to find their nests. They begin to lay in the first week of June, and lay 2 eggs, sometimes 3, but this is not common. After they begin laying we carefully avoid walking over that part of the island where they are in possession, for their nests are so numerous and close together that it is hardly possible to avoid trampling nest and eggs. When the young are hatched the parents are kept busy supplying them with food, which consists chiefly of small sand eels and young herrings. They also prey on worms when it is too stormy for fishing at sea. On a wet evening, when worms are having an outing, the terns are to be seen in hundreds all over the island, hovering about 6 feet above the ground, every now and again making a dart down, and when successful flying home with their catch to their young. No time is lost, for the old bird rarely alights when handing over the worm. It swoops down to where the young one is standing with outstretched neck and wide open bill, screaming out to let its whereabouts be known, then off again for more. This continues from morning till night. In 3 weeks from the time they are hatched the young are able to fly short distances, and about the 1st of August all are able to take wing and do a little hunting on their own account. When this is the case, young and old assemble together from the various breeding places to a bare rocky part on the N.E. corner of the island, and make this their headquarters until their departure. Every day they make long flights in search of food, and I suppose training the young for the long flight before them. As a rule they disappear about the end of August, but I have heard their cry at night well on towards the end of September. These, I think, must be birds from some other locality on passage, and attracted by the light. I have never seen them near the light, but by the

sound they were making I don't think they were more than 200 yards distant. I never saw or heard them during the day-time in September.

The Oyster-catcher is a very regular visitor, making its appearance every year about the end of February. From 30 to 40 pairs annually rear their young, laying 3 eggs—in 1902 I found 6 nests with 4 eggs in each—in June. When the young are able for the journey they all disappear, generally about the end of September.

A very interesting visitor is the Stormy Petrel (*Procellaria pelagica*). It is not an easy matter to fix the exact date of their arrival, for they are never seen during the day, and it is only by going out amongst the rocks at night that one can both see and hear them. On a clear night in June, between 11 P.M. and midnight, I have often sat amongst the rocks watching them flitting around in hundreds, very like Swallows in their movements. They lay in holes in the ground and under stones, and about the only way to find their nest is by listening for their peculiar cry, which they keep up the whole night—that is to say all the time darkness lasts, for at that time the night is of short duration. They lay about the 1st of July, but I have got an egg quite fresh on the 1st August. However, the former day is the general time, for about the 1st August, by listening at night near their haunts, one can hear the young birds in all directions making a cry very similar in sound to the plaintive call of the progeny of the domestic fowl when they have lost sight of their mother. Like their arrival, it is difficult to fix the date of their departure. I have got young birds on the lantern in November. It is a common belief that these birds feed entirely on an oily substance skimmed off the surface of the sea. I can testify that they believe in something more substantial. It is quite common on dark nights in November to see 5 and 6 on the lantern, and almost without exception the first thing they do after alighting—they rarely dash against the windows, just rest carefully on the trimming pathways—is to vomit everything in their stomach. I have, scores of times, sat inside the lantern room, with a 90,000 candle power light shining on the bird, and seen it disgorge pieces of half-digested

fish. One night in November 1901 I saw one vomit a piece of sand eel, or young herring—the latter I think— $1\frac{1}{2}$ inches long by $\frac{1}{2}$ inch broad. It was the tail end of the fish, and, as near as I can judge, about half of it, so that originally it could not have been less than 3 inches long.

The above are the only birds that nest on the island.

Every summer about a dozen Whimbrels arrive in May, and remain till the end of July, but never nest. They spend their time feeding all over the island, chiefly on worms and insects. For some time I was inclined to think that they were nesting, but the island is so small, and I watched them so closely, that it was impossible for them to have done so without being detected. But though not breeders, they are very regular visitors, arriving in May and leaving at the end of July or first week of August. A few stragglers are seen in September, but they are birds of passage on their way south.

The Corncrake is a regular summer visitor in June and July, but does not nest, and very rarely utters its well-known cry. In the months mentioned one or two can be seen almost every day, but I never saw one in August. Occasionally in September one is seen, probably resting on its southward journey.

The Common Swallow (*Hirundo rustica*) may also be termed a regular summer visitor, a few being seen every year in May and June.

The Sky Lark (*Alauda arvensis*) does not nest, but is rarely absent during spring and summer. Flocks are seen on migration in spring.

(*To be continued.*)

DIPTERA SCOTICA : III.—THE FORTH DISTRICT.

BY PERCY H. GRIMSHAW, F.E.S.

(*Continued from Vol. XII. p. 226.*)

Family SCIOMYZIDÆ.

352. ACTORA ÆSTUUM, Mg.—North Berwick, 19th May 1893 (P. H. G.), and August 1893 (W. Eagle Clarke); Aberlady, 30th August 1898; and Gullane, 29th August 1900 (Wm. Evans).

353. *ÆDOPAREA BUCCATA*, *Fln.*—Common at Aberlady—Yerbury, "Ent. Mo. Mag.," 1900, p. 86.
354. *DRYOMYZA FLAVEOLA*, *Fab.*—Pease Bridge, 1843 (Hardy)—Selby, 2; Musselburgh (A. E. J. Carter).
355. *NEUROCTENA ANILIS*, *Fln.*—Aberfoyle, July 1903 (A. E. J. Carter).
356. *SCIOMYZA CINERELLA*, *Fln.*—Arthur Seat, 1st July 1893 (P. H. G.); Gosford Bay, 26th August 1895 (P. H. G.).
357. *TETANOCERA ELATA*, *Fab.*—Loch Ard, July 1903 (A. E. J. Carter).
358. *TETANOCERA LÆVIFRONS*, *Lw.*—♀, Aberlady, 5th July 1899 (Colonel Yerbury).
359. *TETANOCERA FERRUGINEA*, *Fln.*—♂, Aberlady, 5th July 1899 (Colonel Yerbury).
360. *TETANOCERA CORYLETI*, *Scop.*—♂ and ♀, Aberlady, July 1898 (Wm. Evans); ♀, Aberlady, 5th July 1899 (Colonel Yerbury).
361. *TETANOCERA PUNCTULATA*, *Scop.*—Aberlady, 2nd June 1903 (P. H. G.).
362. *LIMNIA UNGUICORNIS*, *Scop.*—Aberlady, 1873—Verrall, "Scot. Nat.," vol. ii. (1873-74), p. 202; ♂, Aberlady, July 1898 (Wm. Evans).
363. *LIMNIA RUFIFRONS*, *Fab.*—♂ and ♀, Aberlady, July 1898 (Wm. Evans).
364. *ELGIVA ALBISETA*, *Scop.*—Aberlady—♂, 17th August 1896 (W. Eagle Clarke); ♂ and ♀, July 1898 (Wm. Evans); ♂, 5th July 1899 (Colonel Yerbury).
365. *ELGIVA DORSALIS*, *Fab.*—Aberlady, 1873—Verrall, "Scot. Nat.," vol. ii. (1873-74), p. 202; Glencorse, 6th June 1894, and Aberlady, 3rd May 1895 (P. H. G.).

Family PSILIDÆ.

366. *PSILA FIMETARIA*, *L.*—Aberdour, 6th July 1893 (P. H. G.)
Musselburgh (A. E. J. Carter).

Family TRYPETIDÆ.

367. *ACIDIA HERACLEI*, *L.*—♀, Glencorse, 8th September 1898 (P. H. G.).
368. *TRYPETA CORNUTA*, *Fab.*—♂ and ♀, Gullane, 20th July 1898—Wm. Evans, "Ann. Scot. Nat. Hist.," 1900, p. 251.

369. UROPHORA SOLSTITIALIS, *L.*—[*Musca*] Neighbourhood of Edinburgh—Stewart, 1, p. 576.
370. TEPHRITIS ABSINTHII, *Fab.*—[*Trypeta*] Pease Bridge—Hardy, "Proc. Berw. Nat. Club," vol. vi. (1869-72), pp. 264 and 424.
371. TEPHRITIS HYOSCYAMI, *L.*—[*Musca hyoscyami*] Neighbourhood of Edinburgh—Stewart, 1, p. 576.

Family LONCHÆIDÆ.

372. LONCHÆA VAGINALIS, *Flu.*—Musselburgh (A. E. J. Carter).
373. PALLOPTERA ARCUATA, *Flu.*—Musselburgh (A. E. J. Carter).

Family OPOMYZIDÆ.

374. BALIOPTERA COMBINATA, *L.*—♂, Aberlady, 17th August 1896 (W. Eagle Clarke).

Family SEPSIDÆ.

375. THEMIRA PUTRIS, *L.*—[*Musca*] Neighbourhood of Edinburgh—Stewart, 1, p. 576.

Family EPHYDRIDÆ.

376. DISCOMYZA INCURVA, *Flu.*—Ewelairs, near Cockburnspath, in November—Hardy, "Proc. Berw. Nat. Club," vol. vi. (1869-72), p. 424.
377. HYDRELLIA GRISEOLA, *Flu.*—Glencorse, 6th June 1894 (P. H. G.).
378. HYADINA GUTTATA, *Flu.*—Drem and Aberlady, 3rd May 1895 (P. H. G.).

Family DROSOPHILIDÆ.

379. SCAPTOMYZA FLAVEOLA, *Mg.*—[*apicalis*] Larvæ at Dunglass, near Cockburnspath, 1848 or 1849—Hardy, "Proc. Berw. Nat. Club," vol. ii. (1842-49), pp. 339 and 362.

Family CHLOROPIDÆ.

380. CHLOROPS PUNCTICOLLIS, *Ztt.*—Common at Aberlady on 30th June 1870—Verrall, "Ent. Mo. Mag." (2), vol. v. (1894), p. 146.
381. SIPHONELLA PUMILIONIS, *Bjerk.*—[*Musca*] Neighbourhood of Edinburgh—Stewart, 1, p. 576; [*Chlorops*] Larvæ sent by Mr. Borthwick, Alloa, to Entomological Society—"Ent. Mo. Mag.," iii. (1866-67), p. 23.

382. ELACHYPTERA CORNUTA, *Fln.*—Aberlady, 2nd June 1903 (P. H. G.).

Family AGROMYZIDÆ.

383. OCHTHIPHILA POLYSTIGMA, *Mg.*—♂ and ♀, Aberlady, July 1898 (Wm. Evans).

Family PHYTOMYZIDÆ.

384. PHYTOMYZA ALBIPENNIS, *Fln.*—Aberlady, 2nd June 1903 (P. H. G.).
385. PHYTOMYZA ZETTERSTEDTHI, *Schin.*—Emerged from soil sent from Dalkeith—Meade, "Ent. Mo. Mag." 1899, p. 103.
386. CHROMATOMYIA ILICIS, *Curt.*—[*Phytomyza*] Leaves of holly disfigured by larvæ, at Reston, 14th May 1879—Hardy, "Proc. Berw. Nat. Club," vol. ix. (1879-81), p. 12.

Family BORBORIDÆ.

387. BORBORUS NITIDUS, *Mg.*—♂, Tynefield, near Dunbar, 23rd September 1894 (Wm. Evans).
388. BORBORUS NIGER, *Mg.*—♀, Morningside, 23rd May 1895 (P. H. G.).
389. BORBORUS EQUINUS, *Fln.*—Common at Balerno, 12th January 1894 (P. H. G.); Morningside, 1st April to 25th November 1894 (P. H. G.).
390. LIMOSINA FONTINALIS, *Fln.*—Blackford Hill, 21st April 1894 (P. H. G.); Drem, 3rd May 1895 (P. H. G.).
391. LIMOSINA SYLVATICA, *Mg.*—♀, Morningside, 25th November 1894 (P. H. G.).
392. LIMOSINA CRASSIMANA, *Hal.*—Drem, 3rd May 1895 (P. H. G.).

Family PHORIDÆ.

393. TRINEURA ATERRIMA, *Fab.*—Museum window, 5th July 1897 (P. H. G.).

Family HIPPOBOSCIDÆ.

- [HIPPOBOSCA EQUINA, *L.*—Neighbourhood of Edinburgh—Stewart, 1. p. 577.—Obviously an erroneous identification.—P. H. G.]
394. ORNITHOMYIA AVICULARIA, *L.*—Edinburgh, 20th July 1903 (James Waterston).
395. STENOPTERYX HIRUNDINIS, *L.*—[*Hippobosca*] Neighbourhood of Edinburgh—Stewart, 1, p. 577.

396. LIPOPTENA CERVI, *L.*—♂, Aberfoyle, 11th September 1897 (Wm. Evans).
397. MELOPHAGUS OVINUS, *L.*— [*Hippobosca*] Neighbourhood of Edinburgh—Stewart, 1, p. 577; obtained from butcher in Edinburgh, 17th May 1895 (P. H. G.); Glencorse, July 1903 (James Waterston); Bonally, June 1899 (Wm. Evans).

The three following names occur in Stewart's List for the "neighbourhood of Edinburgh" (1, p. 576), but I have not been able to discover to what species they should be assigned: *Tipula minutissima*, *Tipula vernans*, and *Musca semi-argentina*.

SUPPLEMENT.

Since the above list was in type I have been favoured with the opportunity of examining additional material from the collections of Messrs. Evans, Carter, and Waterston, and have also paid some attention to those of certain Families in my own collection and that of the Edinburgh Museum. For the identification of the whole of these specimens I hold myself entirely responsible. I have still a great amount of material to work through, and therefore hope to raise the list ultimately up to at least 800 species, of which the additional ones will be recorded in a number of "Supplements" whenever I can find the opportunity. Many of the species here recorded from only a single or a few localities have been found to occur pretty generally throughout the district, while several of the old records by Hardy, Stewart, and others have been quite recently confirmed by the captures of Mr. Evans and the other gentlemen who have so kindly allowed me to see their specimens. Such supplementary information I hope to incorporate in a future paper on the subject.

Family MYCETOPHILIDÆ.

398. SCIARA THOMÆ, *L.*—Aberfoyle, 13th September 1897 (Wm. Evans).
399. SCIARA RUFIVENTRIS, *Mcq.*—Saline, Fife, 20th August 1901 (Wm. Evans). This large and well-marked species was inserted in pt. iii. of Verrall's "List" (1st edition) as "reputed" British. I have carefully compared Mr. Evans's specimen with the descriptions by Winnertz (Monogr. d. Sciarinen),

Schiner (Fauna Austriaca), and Zetterstedt (Diptera Scandinaviæ), and found it to agree in every respect.

Family BIBIONIDÆ.

400. *BIBIO NIGRIVENTRIS*, *Hal.*—Mr. James Waterston took a specimen at Aberdour, 26th May 1902, which appears to belong to this species.

Family SIMULIIDÆ.

401. *SIMULIUM LATIPES*, *Mg.*—Comiston, September 1896.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.

Family CHIRONOMIDÆ.

402. *CHIRONOMUS DORSALIS*, *Mg.* [*venustus*].—Craigtinny and Thornton, August 1898—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.
403. *CRICOTOPUS BICINCTUS*, *Mg.*—Roslin, 3rd June 1899 (P. H. G.).
404. *TANYPUS NEBULOSUS*, *Mg.*—Duddingston Loch, October 1896—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248; High Street, Edinburgh, 10th September 1901 (J. Mactaggart).

Family CULICIDÆ.

405. *CULEX CANTANS*, *Mg.*—♀, Aberfoyle, 11th September 1897—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.
406. *CULEX NIGRIPES*, *Ztt.*—♀, Aberfoyle, 27th July 1900—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.

Family PTYCHOPTERIDÆ.

407. *PTYCHOPTERA PALUDOSA*, *Mg.*—Luffness Marsh, August 1896, and Braid Burn, June 1900—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.
408. *PTYCHOPTERA SCUTELLARIS*, *Mg.*—Davidson's Mains, 6th August 1898 (Wm. Evans).

Family LIMNOBIIDÆ.

409. *RHYPHOLOPHUS HÆMORRHOIDALIS*, *Ztt.*—Leven, August 1893 (Wm. Evans).
410. *ERIOPTERA TRIVIALIS*, *Mg.*—Balerno, 29th July 1896 (P. H. G.).

411. *EPHELIA MILIARIA*, *Egg.*—Falkland, 14th August 1895 (Wm. Evans).
 412. *EPHELIA MARMORATA*, *Mg.*—Roslin, 3rd June 1899 (P. H. G.);
 Inverkeithing, 29th July 1899 (Wm. Evans).
 413. *LIMNOPHILA MEIGENII*, *Verr.*—Bavelaw, 18th August 1898
 (Wm. Evans).

Family TIPULIDÆ.

414. *TIPULA LONGICORNIS*, *Schum.*—Smeaton-Hepburn, 22nd June
 1897 (Sir A. Buchan-Hepburn).
 415. *TIPULA VARIPENNIS*, *Mg.*—Balerno, 19th June 1897 (P. H. G.);
 Smeaton-Hepburn, 22nd June 1897 (Sir A. Buchan-
 Hepburn).
 416. *TIPULA PRUINOSA*, *Wied.*—Balerno, 19th June 1897 (P. H. G.).
 417. *TIPULA VERNALIS*, *Mg.*—Balerno, 19th June 1897 (P. H. G.).

Family STRATIOMYIDÆ.

418. *OXYCERA DIVES*, *Lzw.*—This pretty species, hitherto regarded
 as only a doubtful native of Britain, was taken by Mr. A. E.
 J. Carter on bracken at Aberfoyle on 6th July 1903.
 419. *BERIS FUSCIPES*, *Mg.*—Musselburgh (A. E. J. Carter).

Family TABANIDÆ.

420. *HÆMATOPOTA CRASSICORNIS*, *Whlbg.*—Aberfoyle (A. E. J.
 Carter).
 421. *THERIOPECTES SOLSTITIALIS*, *Mg.*—Aberfoyle (A. E. J. Carter).
 422. *ATYLOTUS FULVUS*, *Mg.*—A female of this rare species was
 taken by Mr. A. E. J. Carter at Aberfoyle on 3rd July 1901.
 423. *CHRYSOPS RELICTA*, *Mg.*—Aberfoyle (A. E. J. Carter).

Family ASILIDÆ.

424. *IISOPOGON BREVIROSTRIS*, *Mg.*—♂, Aberfoyle, July 1903 (A.
 E. J. Carter).

Family BOMBYLIIDÆ.

425. *BOMBYLIUS CANESCENS*, *Mik.*—Kinross (many specimens),
 22nd June 1901 and 5th July 1902—Wm. Evans, "Ann.
 Scot. Nat. Hist.," 1903, p. 248.

Family EMPIDÆ.

426. *HYBOS GROSSIPES*, *L.*—Gosford Bay, 26th August 1895
 (P. H. G.); Smeaton-Hepburn, July 1897 (Sir A. Buchan-
 Hepburn).

427. *CYRTOMA SPURIA*, *Fln.*—Aberdour, 6th July 1893; Glencorse, 6th June 1894, and 8th September 1898; Gosford Park, 4th June 1896 (P. H. G.).
428. *MACROSTOMUS TENUIROSTRIS*, *Fln.*—I took a ♀ at Glencorse on 8th September 1898. The only other British record of this species with which I am acquainted is that given by Col. Yerbury in the "Irish Naturalist," March 1902, where he mentions a specimen taken at Loo Bridge in the south-west of Ireland.
429. *MACROSTOMUS NIGRIPES*, *Fab.*—♀, margin of Loch Vennachar, 17th May 1893; and Balerno, 19th June 1897 (P. H. G.).
430. *MACROSTOMUS DENTIPES*, *Ztt.*—♂, Balerno, 24th May 1900 (P. H. G.); Blackford Hill, May 1902 (James Waterston).
431. *MACROSTOMUS ANOMALIPENNIS*, *Mg.*—♀, Hawthornden, 26th May 1893 (P. H. G.).
432. *EMPIS BOREALIS*, *L.*—Aberfoyle, April 1896—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.
433. *EMPIS GRISEA*, *Fln.*—Aberlady, 4th June 1896 (P. H. G.).
434. *HILARA MAURA*, *Fab.*—♂ and ♀, Balerno, 19th June 1897 (P. H. G.).
435. *HILARA QUADRIVITTATA*, *Mg.*—Balerno, 19th June 1897 (P. H. G.).
436. *TRICHINA CLAVIPES*, *Mg.*—Gosford Park, 4th June 1896 (P. H. G.).
437. *TRICHINA FLAVIPES*, *Mg.*—♀, Glencorse, 8th September 1898 (P. H. G.).
438. *HEMERODROMIA PRECATORIA*, *Fln.*—Glencorse, 8th September 1898 (P. H. G.).
439. *ARDOPTERA GUTTATA*, *Hal.*—Gosford Park, 4th June 1896 (P. H. G.).
440. *SCIODROMIA IMMACULATA*, *Hal.*—Gosford Park, 4th June 1896 (P. H. G.).
441. *TACHISTA ARROGANS*, *L.*—Gosford Bay, 26th August 1895 (P. H. G.).
442. *TACHYDROMIA PUBICORNIS*, *Ztt.*—Glencorse, 8th September 1898, and Roslin, 3rd June 1899 (P. H. G.).
443. *TACHYDROMIA BICOLOR*, *Fab.*—Gosford Park, 4th June 1896 (P. H. G.); Aberlady, July 1898 (Wm. Evans).

(To be continued.)

WATER-BORNE SEEDS.

By ALEXANDER MACDONALD, M.A.

THE relations of the wind to the seeds of many plants have been brought out with a beauty of pen and pencil such as the subject deserves, and which has so secured their place in botany that even the children of our Nature Knowledge Classes in Elementary Schools are quite familiar with many of the details and forms of adaptation of wings, balloons, and parachutes to the transportation of seeds. The position of the centre of gravity of many seeds has been obtained, and its curious connection with the hilum, or black spot on the cuticle, pointed out. The tissue at this point is more or less porous, and the little holes readily absorb the moisture of the soil. Frequently the centre of gravity is so adjusted that the seed in falling rests with the hilar spot underneath, and thus in close contact with the wet soil. As soon as the seed comes to rest, the spongy tissue of that part of the organ begins to drink in the moisture necessary for germination.

There is another method of transporting seeds in which the above arrangement comes even more clearly into play, and that is the transport by water, which we do not think has received all the attention it merits. The distribution of palms and other tropical growths by the waves, and the methods by which many purely water plants are propagated, have been fully elaborated; while lessons of trust in the uniformity of Nature and hope have been drawn from rice and other grains cast on the waters from patriarchal times; but there are issues of lesser import—quiet little nook-workings of Mother Nature—which it is the delight of the amateur naturalist to chronicle.

The rains of this autumn have called us frequently to the river to note the various phenomena of flooding. One of these was the great masses of floating matter brought into the little creeks and bays of the banks. They consisted mainly of dead leaves, bark, twigs, branches, bits of decaying timber, straw, hay, and other refuse, mixed with which was a vast number of seeds of various kinds.

There were those of the oak, beech, hazel, alder, whole navies of birch, willow, dock, stachys, angelica, knapweed, spiræa, fruits of the rose and of many grasses, rushes, and carices.

The wavelets were lapping them to the shore, and depositing them in little heaps in the broken-surfaced creeks where "spates" and rains had undermined the turf. These miniature landslips occur along the whole course of rivers, and roughly in a line parallel to the normal water-edge. This line is the verge of the more ordinary floods when the stream is "bank full." Thrown into such surroundings, numbers of seeds cannot fail to germinate whenever aerial conditions are suitable.

It is remarkable how many fruits or seeds of ordinary riverside wild-flowers are buoyant, at least for a time. Whin and broom drop at once to the bottom, where they must rot, but the great majority are buoyed up from their lightness, or by the assistance of wings or other appendages. Such are the hazel-nut, the acorn, the beech-mast, cones, and many a floating hull; the fruits of knapweed, jerked out by the wind, ride on the waves till landed in a fine seed-bed. The willow seeds, and the myriads of birch fruits with their outriggers, land high and dry on the beach.

We have experimented, and found that very few of the denizens of the banks have seeds heavier than their bulk of water; yet there are some singular exceptions, the most notable of which, perhaps, is the toad-rush (*Juncus bufonius*). These plants depend on currents of considerable force, such as result from heavy rainfalls, for their distribution.

It is not necessary to enter on the long array of plants that leave their highland homes and establish themselves along the margins of our rivers, because in many instances the roots or whole plants have been torn up and conveyed bodily to their lowland situations. Yet we must not omit to mention these, because in not a few cases such herbs have been brought down in the most rudimentary form in which a plant can live.

The presence of acres of lupines on the river-islands of the Dee is a large-type lesson on this method. But numerous other herbs owe their existence in unnatural situations to

the same means of removal. Dozens of alpine plants may be ferreted out by enthusiasts along the middle and lower courses of our greater rivers.

The necessity for a film of water to the fertilisation of very many cryptogams is another service which running water renders to the vegetable world, a service which long escaped men's notice, yet one of the very greatest importance.

The point, however, on which we would insist, for most of the others have received attention at one time or another in the "Annals," is the considerable importance of streams and rivers as carriers of the seeds of many of our ordinary riverside trees and herbs. We would even venture to suggest the origin of the parallel rows of alders and willows, etc., which form such a striking feature of our river-valleys when viewed from a height, and of the presence of a peculiar flora whose favourite haunt is along the very margin of the stream.

These, as we take it, arise from the deposition of ripened seeds by the autumn floods that are so common on all our brooks and rivers, but the question is one on which the opinion of experts may throw another light.

NOTES ON THE FLORA OF WESTERNESS

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

THE wretchedly wet August of 1903 was a bad time to explore the district about Fort William, for even in ordinary seasons the amount of rain which falls there is considerable; and it was with some amount of trepidation that we started. Our worst doubts were completely realised, for only one day in the month was without rain; and the mountains were never completely free from cloud while we were there, while the temperature was abnormally low. My object in coming north was to endeavour to find the grass which was gathered on Ben Nevis in 1794 by John Mackay, and named *Poa flexuosa* by Smith in the "Flora Britannica" of 1800, and figured in Sowerby's "English Botany," tab. 1123 (1803),

of which type specimens are preserved in the Herbarium of the Linnean Society. It was referred to *Poa laxa* by Sir W. Hooker, in the "Flora Scotica," and was considered to be identical with the plant from Lochnagar gathered by Geo. Don, which Babington thought was *P. laxa*, but which Boswell Syme erroneously named *Poa stricta*. The Lochnagar plant I have named *Poa alpina*, var. *acutifolia*, in the "Journal of the Linnean Society" for 1903, p. 421-9; but I hesitate to refer the Ben Nevis plant to the same variety until I have seen it in the living state.

Should any botanist who reads this have any specimens of *Poas* from Ben Nevis, I should much value the loan of them for examination. It is possible that one of the meteorological observers might succeed in finding what I was unable to discover, for when we were there the most promising-looking gullies were full of snow, and I saw no alpine *Poa* of the kind I wanted. The day spent in working the great corrie was bitterly cold; fierce squalls of rain came on at frequent intervals, and the tops of the cliffs were hidden in cloud. Plant life was very backward, *Cornus suecica* and *Silene acaulis* being still in flower. The corrie, although of considerable extent and toilsome to work on account of the quantity of sharp loose stones, is distinctly poor from a botanical point of view, and especially so after one's experience on the neighbouring hills of Aonach Mhor and Aonach Beag. The Hawkweeds were few in number and in poor condition. The best alpinines there are *Cerastium arcticum*, *C. trigynum*, *Veronica alpina*, *Juncus castaneus*, and *Carex saxatilis*.

A day was spent in Glen Nevis; but again no alpine *Poas* were obtained; but one addition was made to the county flora in a small brook at the lower part of the glen, where *Caltha radicans* grew in a similar situation to those where I have elsewhere found it, namely at low elevations, at the base of lofty hills, in muddy soils where permanent moisture and nearly complete shade are the prevailing conditions of its growth. *Carum verticillatum* is a plentiful and characteristic feature of the glen, which also affords *Sedum roseum* at a low altitude.

The district round Fort William has been much worked

by botanists, and as recently as last year Mr. C. E. Salmon spent some time at Corpach, and an interesting paper by him will be found in the "Journal of Botany," pp. 271-275 (1903), so that there was not much left for me to find, nor shall I repeat here information already published. In preparing the following notes I have to thank my companion on the expedition, the Rev. H. J. Riddelsdell, for kind assistance, and Mr. Arthur Bennett, Mr. Frederick Townsend, and the Revs. W. Moyle Rogers, Augustin Ley, and E. S. Marshall, for critical aid.

We also spent a few days at Mallaig, which enabled us to visit Arisaig and Morar; but here again wind and wet were our portion.

* Means a new record to 97.

† Means an alien, or of doubtfully native origin.

Ranunculus acris, *Linn.*, *var. vulgatus*, *Jord.*—Corrie of Ben Nevis.

**Caltha radicans*, *Forst.*—Glen Nevis.

Castalia speciosa, *Salisb.*, *var. minor*, *DC.*—Arisaig, but gradually merging into the type, and a state, I believe, not a true variety.

Cardamine pratensis, *L.*—All the specimens seen are to be referred to *C. palustris*, *Peterm.*

Cochlearia alpina, *H. C. Wats.*—Corrie of Ben Nevis.

†* *Erysimum cheiranthoides*, *L.*—On the foreshore at Mallaig.

Subularia aquatica, *L.*—Minute specimens in the sandy portion at the outlet of Loch Morar.

**Viola canina*, *L.*—On the coast at Morar.

Cerastium tetrandrum, *Curt.*—Morar.

Sagina procumbens, *L.*—Unusually luxuriant about Mallaig.

Spergula sativa, *Boenn.*—The only form seen about Fort William and Mallaig. The Valerianaceous odour in damp warm weather is very sickening.

Hypericum Androsæmum, *L.*—Arisaig.

Geranium molle, *L.*—Arisaig, rare.

Ilex Aquifolium, *L.*—Certainly native on rocky cliffs about Mallaig, etc.

†*Trifolium hybridum*, *L.*—Arisaig.

**Lotus uliginosus*, *Schkuhr.*—Arisaig.

Rubus Rogersii, *Lint.*—Fort William, Arisaig.

R. plicatus, *H.* and *N.*—Arisaig.

- R. mucronatus*, *Blox.*—Arisaig, rather frequent, and a beautiful bramble.
- R. pulcherrimus*, *Neum.*—Fort William, Arisaig.
- **R. pyramidalis*, *Kalt.*—Arisaig. A new county record.
- R. Selmeri*, *Lindb.*—Frequent about Arisaig, Fort William, etc.
- Potentilla Anserina*, *L.*—The common plant of the coast has the upper side of the leaves green and sub-glabrous.
- Alchemilla vulgaris*, *L.*, *var. alpestris* (*Schmidt*).—Corrie of Ben Nevis.
- Rosa mollis*, *Sm.*—Arisaig, etc.
- R. mollissima*, *Willd.* = *R. tomentosa*, *Sm.*, *var. subglobosa* (*Sm.*)—Arisaig; *var. sylvestris* (*Lindl.*)—Arisaig.
- †*R. Eglantheria*, *L.*—Arisaig, but not native.
- R. glauca*, *Vill.*—Arisaig, Fort William.
- R. coriifolia*, *Fries.*—Arisaig.
- †**Pyrus intermedia*, *Ehrh.*—A large but almost certainly planted tree at Arisaig, fruiting freely.
- Saxifraga hirta*, *Haw.*—Ben Nevis.
- Sedum roseum*, *Scop.*—At the coast level at Mallaig.
- **Drosera obovata*, *M.* and *K.*—Near Morar, growing with *D. rotundifolia* and *D. anglica*.
- D. longifolia*, *L.* (*D. intermedia*, *Hayne*).—Mallaig, Arisaig. All four Sundews were seen at Morar. *D. obovata* is doubtless a hybrid.
- Callitriche stagnalis*, *Scop.*, **var. serpyllifolia*, *Lönnr.*—Arisaig.
- C. intermedia* (*C. hamulata*, *Kütz.*)—Arisaig in Loch nan Eala.
- Epilobium parviflorum*, *Schreb.*—Arisaig.
- **Circæa alpina*, *L.*—Arisaig.
- †*Ægopodium Pedagraria*, *L.*—Arisaig.
- †*Scandix Pecten-Veneris*, *L.*—On a thatched cottage roof at Mallaig.
- Galium verum*, *L.*, **var. litorale*, *Breb.*—Morar.
- Galium palustre*, *L.*, and as a small-leaved form at Arisaig.
- Valeriana sambucifolia*, *L.*—Plants with much of the aspect of *V. officinalis*, *L.*, occurred at Arisaig.
- Aster Tripolium*, *L.*, **var. arcticum*, *Lange.*—Morar.
- †*Tanacetum vulgare*, *L.*—Arisaig.
- Arctium intermedium*, *Lange.*—Arisaig.
- Saussurea alpina*, *DC.*—On Ben Nevis, but rare.
- Hieracium calenduliflorum*, *Backh.*—Ben Nevis.
- H. eximium*, *Backh.*—Ben Nevis.

H. senescens.—*Backh.*—Ben Nevis.

H. vulgatum, *Fries.*—Glen Nevis, Mallaig, etc.

H. auratum, *Fries.*—Glen Nevis.

Leontodon autumnalis, *L.*, *var. sordida*, *Bab.*—Fort William.
var. pratensis, *Koch.*—Glen Nevis.

Taraxacum palustre, *DC.*—Corrie of Ben Nevis.

**Statice pubescens*, *Sm.*—This pleurotrichous Thrift was the only form noticed in Westernness, either at the sea-level at Arisaig, or from the corrie of Ben Nevis, where some specimens were the broad-leaved plants *var. planifolia* (*Syme*), *Druce*.

Centunculus minimus, *L.*—Very small near Morar, on sandy peaty soil.

Erythræa Centaurium, *Pers.*—Morar.

Gentiana campestris, *L.*—Arisaig, local.

Myosotis palustris, *Relh.*

var. strigulosa, *M.* and *K.*—Arisaig.

†*Mimulus Langsdorffii*, *Donn.*—Arisaig.

Euphrasia brevipila, *Burn.* and *Gremli.*—Arisaig, Mallaig, Glen Nevis, etc.

E. gracilis, *Fries.*—Glen Nevis, and in the corrie of Ben Nevis.

**E. stricta*, *Host.*—Arisaig.

Rhinanthus stenophyllus, *Schur.* (*Rhinanthus Crista-galli*, *L.*, *var. angustifolia*, *Koch* = *var. stenophyllus*).—Fort William, Arisaig.

**R. monticola* (*Sterneck*), *Druce* (in "Ann. Scot. Nat. Hist." 1901, p. 178).—Corrie of Glen Nevis.

**R. borealis* (*Sterneck*), *Druce*, *l.c.*—Ben Nevis corrie.

Utricularia minor, *L.*—Loch nan Eala, Arisaig.

U. intermedia, *Hayne.*—Arisaig.

**Mentha piperita*, *Linn.*—Growing plentifully among Phragmites on the border of Loch nan Eala, Arisaig. *M. Briquet* considers *M. piperita* to be a hybrid of *M. viridis* and *M. aquatica*. The author of the name *M. piperita* is *Linnæus*. He gave it this name in the first edition of the "Species Plantarum," and refers to the plant described in *Ray's "Synopsis,"* and that plant is *M. piperita* and not a form of *M. aquatica*, which *Smith* thought the plant of *Linnæus* to be,—moreover it is properly represented in his herbarium. In the above locality it looks native, but the place is within a mile or less of the Arisaig gardens, and this may have been its source. At no distant period the lake was of much larger extent, but a channel was cut through the rocky margin to the sea, which has resulted in draining a very considerable portion of the neighbourhood.

**Mentha rubra*, *Huds.*—A few plants of this were growing with *M. piperita*, and the remarks given under that also apply to this mint.

M. arvensis, *L.*—A pretty form, coming nearest to *M. nummularia* of our British lists, grew on the borders of the same lake.

**Thymus Chamædrys*, *Fries.*—Morar.

Scutellaria minor, *Huds.*—Arisaig, rare.

Stachys ambigua, *Sm.*—Mallaig, more.

Galeopsis Tetrahit, *L.*, forma *alba*.—Fort William.

var. *bifida* (*Boenn.*).—Fort William, Arisaig.

At Fort William I noticed growing with *Galeopsis speciosa*, Miller, *G. bifida*, Boenng., and forms of *G. Tetrahit*, plants which were intermediate between *G. speciosa* and *G. Tetrahit*, the flowers had the shape of those of *speciosa*, but much smaller, and with shorter corolla tube than the forms of *Tetrahit*, and with relatively broader flowers than those of var. *bifida*. The lateral corolla lobes are not so much reflexed as in *Tetrahit*. I have little doubt that it is a hybrid, but on the whole nearer to *bifida*, and I should name it *G. Tetrahit*, *L.*, var. *bifida* (*Boenng.*) × *G. speciosa*, Miller.

**Lamium amplexicaule*, *L.*—Mallaig, Rev. H. J. Riddelsdell.

L. purpureum, *L.*—Fort William, rare.

(*L. intermedium*, *Fries.*—Was not observed).

Atriplex patula, *L.*—Mallaig.

Urtica dioica, *L.*—A robust form with densely crowded fruiting spikes curled round into a circle was observed at Arisaig.

U. urens, *L.*—Arisaig.

**Betula pubescens*, *Ehrh.*—Arisaig.

Quercus sessiliflora, *Salisb.* (*Q. femina*, Miller).—Arisaig, etc.

†*Castanea sativa*, *Mill.*—Arisaig, planted; as are *Fagus sylvatica*, *Salix fragilis* (probably), *S. alba*, one large tree, and *Populus alba* and *P. nigra*.

Salix repens, *L.*—Morar.

S. phylicifolia, *L.*—Arisaig.

S. pentandra, *L.*—Probably native.

S. viminalis, *L.*—Arisaig; Mallaig, planted.

Populus tremula, *L.*, var. *glabra*.—Certainly native on high cliffs near Mallaig, etc.

Pinus sylvestris, *L.*—Native, Glen Nevis, etc.

Orchis maculata, *L.*, var. *ericetorum* (*Linton*).—Glen Nevis, Arisaig, etc.

Juncus Gerardi, *Lois.*—Morar.

- J. castaneus*, *Sm.*—Local in corrie of Ben Nevis, with *J. triglumis* and *J. trifidus*.
- Juncoides multiflorum*, *Druce.*—Arisaig, with var. *erectum* and var. *pallescens*.
- Sparganium minimum*, *Fries.*—A small pretty form in a brook near Arisaig.
- Potamogeton alpinus*, *Balb.*—In Loch nan Eala, with *P. pusillum*.
- Zostera marina*, *L.*—Morar.
- Scirpus fluitans*, *L.*—Abundant at Arisaig.
- S. setaceus*, *L.*—Morar.
- S. lacustris*, *L.*—Arisaig.
- S. rufus*, *Schrad.*—On the sea-shore at Arisaig, with the so-called variety *bifolius* (Wallr.), which gradually merges into the type, and sometimes the same plant exhibits bracteate and ebracteate forms.
- Carex canescens*, *L.*—Typical at Arisaig.
- C. fusca*, *All.*—In good condition, very local on deep peat, growing with other sedges and *Molinia*, the latter is likely to be inimical to it.
- C. pallescens*, *L.*—Both as the type and as var. *undulata*, Kunze, about Mallaig and Arisaig, but the type much the scarcer form of the two.
- C. fulva*, *Good.*—Rather frequent at Arisaig.
- C. flava*, *L.*, var. *minor*, *Towns.*—Arisaig.
- C. rostrata*, *Stokes.*, *var. *elator*, *Blytt.*—In Loch nan Eala; a small dark-glumed form also was found at Arisaig.
- C. saxatilis*, *L.*—Corrie of Ben Nevis.
- Agrostis pumila*, *L.*—Morar, etc.; Arisaig, quite free from disease.
- Deschampsia cæspitosa*, *Beaur.*, var. *alpina*, *Gaud.*—Corrie of Ben Nevis.
- Arrhenatherum precatorium*, *Beaur.*—Fort William.
- Phragmites communis*, *Trin.*, and *var. *nigricans*, *Gren.* and *Godr.*—Arisaig.
- **Ammophila arundinacea*, *Host.*—Morar.
- **Poa subcærulea*, *Sm.*—Morar, Fort William.
- Festuca rubra*, *L.*
- F. pratensis*, *L.*—Mallaig.
- Hymenophyllum unilaterale*, *Bory.*—Arisaig, Morar.
- Asplenium marinum*, *L.*—Cliffs near Mallaig.
- Chara fragilis*, *Desv.*—Loch nan Eala.
- Nitella translucens*, *Agardh.*—With the above.

CENSUS OF SCOTTISH HEPATICÆ.

By SYMERS M. MACVICAR.

I HAVE been engaged for some time in working out the distribution of Hepaticæ in Scotland as far as material for examination was available, and I hope to give an account of it at a future time. I intend giving locality and collector's name with every record, and am confining myself to specimens which I personally examine. Some records taken from literature will eventually be used, but only sparingly, and an indication of the authority will be given in each case. The limitations of our species at the present time differ from those held even a comparatively short time ago, and it is impossible to know in the great majority of cases which species an author intended, unless the actual specimen is available. I hope, however, that there will be few localised specimens of former botanists which do not pass through my hands. Unfortunately the localities on the labels of the older botanists are frequently vague, such as "Scotch Alps" or "Highlands of Scotland," or sometimes only "Scotland." These are often our earliest authentic specimens from Scotland, and in consequence will of course be quoted. There is also the difficulty of correct identification of specimens from published records, particularly when the author has not made a special study of the subject, and although one cannot expect to entirely escape making errors in identification, it is of advantage to have a uniform authority.

In the meantime I give below a Census of the species drawn from specimens which I have examined. I have arranged them, meanwhile at least, in the Watsonian vice-counties, but with present county boundaries. These divisions are convenient for field work, while being sufficiently small. The Census is intended as a guide to those who are giving assistance, by showing what has so far been done; but it is also given in the hope of inducing others to send specimens for examination from unrecorded counties. I shall also be glad to see the rarer species from any of the counties, and from different parts of each—address, Invermoidart, Ach-aracle R.S.O., Argyllshire.

The following are the sources from which the records have been derived—

The Herbarium at the Royal Botanic Gardens, Edinburgh, which I have had the opportunity of examining at leisure, through the kind courtesy of Prof. I. B. Balfour. This herbarium contains, besides several original specimens of Taylor's of much value, the Greville Herbarium, and specimens from the following Scottish botanists—J. Cruickshank, T. Drummond, W. Gardiner, W. Gourlie, P. Gray, W. Jackson, Rev. J. Kerr, G. J. Lyon, Dr. W. Nichol, J. Sadler, R. M. Stark.

Prof. Dickie's Herbarium at Aberdeen, which Prof. Trail kindly sent me for examination.

A duplicate collection of Alex. Croall's hepatics.

The Herbaria of Charles Howie and of John Sim, Strachan. The latter includes many specimens gathered by the Rev. Dr. Fergusson, Fearn.

A collection, mostly from Stirlingshire, gathered by the late Col. Stirling and by Mr. R. Kidston, which Mr. M. B. Slater very kindly gave me.

Specimens, in several instances large collections, from the following correspondents and collectors—Messrs. W. H. Beeby, H. N. Dixon, W. Evans, P. Ewing, W. J. Gibson, Dr. T. F. Gilmour, Messrs. Symington Grieve, W. P. Hamilton, J. T. Johnstone, D. Kennedy, Rev. D. Lillie, Messrs. J. M'Andrew, J. Macrae, C. M'Intosh, Miss K. B. Macvicar, Messrs. R. H. Meldrum, J. Michie, A. Murray, J. Murray, C. Scott, G. Stabler, W. West, W. Young, and specimens gathered by myself. The share which each has taken will be seen when the account of the distribution is given.

Of the forty-one vice-counties into which Scotland is divided, there are four from which I have seen less than forty species. These are Wigtown, Roxburgh, Banff, and North Aberdeen, the last being a blank. When considerably more than half the vice-counties have been recorded for a species, the exceptions are given, and are printed in italics, as done by Prof. Trail with phanerogams in his "Topographical Botany."

The sequence of the genera closely follows that of Schiffner in Engler and Prantl's *Pflanzenfamilien*.

I have recently revised my records for *Riccia glauca*, after correspondence with Mons. A. Crozals, the French specialist in the genus. He has been kind enough to examine several boxes of living specimens from different parts of the country, one of the results being that the plant which we considered to be *R. glauca*, belongs also to *R. sorocarpa*. The latter species has not been previously recorded from Scotland, but it is evidently the more common of the two ; they are readily distinguished when once known. The plant which we have known as *Marsupella olivacea*, Spruce, will be found under *Gymnomitrium*. In a recent important paper *Studien über kritische Arten der Gattungen Gymnomitrium und Marsupella* in "Oester. bot. Zeit.," Prof. Schiffner shows, from an examination of Spruce's original specimen, that the plant is undoubtedly a *Gymnomitrium*, and that it is at most only a variety of *G. adustum*, Nees. In the same article he gives the identification of *Marsupella Sprucei* (Limpr.), from a Moidart specimen. This species is an addition to the British flora. In an early number of the "Annals" I will give some notes on these, also on *Mars. Jörgensenii*, Schffn., which is also an addition to the British flora, *Mars. erythrorhiza* (Limpr.), *Lophozia Wenzelii* and *Loph. longidens*. The last has not been before recorded from Britain, but I am doubtful if *L. Wenzelii* has or not ; it is not a recent discovery. Notes will also be given on Taylor's *Plagiochila exigua*. The plant given as *Cephalosiella divaricata* (Sm.), is perhaps a compound species ; specimens with perianths are much required from all parts of the country. It will be seen that there is no vice-county number after *Pallavicinia Lyellii*. This species has been recorded from Scotland, but I have not seen a localised specimen.

As some cryptogamic students may not be familiar with the Watsonian divisions, I give them here—

WEST LOWLANDS.—72, Dumfries ; 73, Kirkcudbright ; 74, Wigtown ; 75, Ayr ; 76, Renfrew ; 77, Lanark.

EAST LOWLANDS.—78, Peebles ; 79, Selkirk ; 80, Roxburgh ; 81, Berwick ; 82, Haddington ; 83, Edinburgh ; 84, Linlithgow.

EAST HIGHLANDS.—85, Fife and Kinross; 86, Stirling; 87, West Perth and Clackmannan (including the Perthshire part of the Forth basin); 88, Mid Perth (Perthshire between West Perth and the rivers Tay and Garry); 89, East Perth (Perthshire east of the Tay and the Garry); 90, Forfar; 91, Kincardine; 92, South Aberdeen; 93, North Aberdeen (separated from 92 by the watersheds, east and west of Inverurie); 94, Banff; 95, Elgin; 96, Easternness (Nairn and Inverness east of N. and S. watershed of Scotland).

WEST HIGHLANDS.—97, Westernness (Inverness west of the watershed, and Argyll north-west of Loch Linnhe); 98, Argyll (Argyllshire between Loch Linnhe and Crinan Canal); 99, Dumbarton; 100, Clyde Isles (islands in the Firth of Clyde); 101, Cantire (to Crinan Canal); 102, South Ebudes (Islay, Jura, and adjacent islets); 103, Mid Ebudes (Mull, Coll, and adjacent islets); 104, North Ebudes (Sky, Rum, and adjacent islets).

NORTH HIGHLANDS.—105, West Ross (Ross and Cromarty west of N. and S. watershed); 106, East Ross (Ross east of the watershed); 107, East Sutherland (with drainage to the east); 108, West Sutherland (with drainage to north and west); 109, Caithness.

NORTH ISLES.—110, Hebrides; 111, Orkney; 112, Shetland.

Riccia glauca L., 72, 73, 84, 86, 87, 97.

sorocarpa Bisch., 72, 73, 80, 82-85, 88, 89, 96, 97, 99, 101.

bifurca Hoffm., 88?

Lescuriana Aust. (*R. glaucescens* Carr.), 73, 74, 84, 99.

fluitans L., 85, 87.

Targionia hypophylla L., 85-87, 98, 104.

Reboulia hemisphaerica (L.), 73, 75, 80, 83, 85, 87, 88, 97, 103-105, 109.

Conocephalum conicum (L.), *except* 74, 92, 93, 94, 107, 112.

Lunularia cruciata (L.), 72, 73, 75-77, 79-89, 97, 100-102, 109.

Preissia quadrata (Scop.), 72, 73, 76, 78, 79, 83, 85-92, 96-99, 101-105, 109.

Marchantia polymorpha L., 72, 73, 75, 77, 78, 80-92, 97, 99, 106, 109, 110.

- Aneura pinguis* (L.), *except* 74, 90, 93, 94, 100.
incurvata (Lindb.), 81.
multifida (L.), *except* 74, 75, 78, 80, 86, 89, 93, 94, 100, 101, 103, 107.
latifrons (Lindb.), 72-74, 78, 80, 83, 85, 86, 88, 96-98, 101, 104-106, 109-112.
palmata (Hedw.), 72, 73, 85-88, 91, 92, 95, 97, 105, 109-112.
- Metzgeria furcata* (L.), *except* 93, 94, 95, 106, 107, 108, 111.
conjugata Lindb., *except* 74, 77, 79, 80, 82, 84, 89, 91, 93, 94, 106, 107, 111, 112.
hamata Lindb., 73, 75, 85, 88, 97-99, 102, 103, 105.
pubescens (Schrank.), 72, 83, 85, 86, 88-92, 94, 98, 109.
- Pallavicinia Lyellii* (Hook.).
hibernica (Hook.), 90.
Flotowiana (Nees) (*Mörckia hibernica* var. *Wilsoniana* Gottsche), 90.
Blyttii (Mörck.), 88, 92.
- Pellia endiviæfolia* (Dicks.) (*Jung. calycina* Tayl.), *except* 74, 76, 78, 89, 93, 94, 95, 96, 100, 107, 108, 110, 112.
Neesiana (Gottsche), 76, 78, 79, 83, 85-88, 95-99, 102, 105-107, 109, 111, 112.
epiphylla (L.), *except* 74, 93, 94.
- Blasia pusilla* L., *except* 72, 80, 82, 85, 86, 93, 94, 102, 103, 104, 111, 112.
- Fossombronina Dumortieri* (Hüb. et Genth.), 74, 88.
Wondraczekii (Corda) (*F. cristata* Lindb.), 83, 84, 88, 97, 102, 109.
pusilla (L.), 72-74, 77, 84, 97, 99, 102, 109.
- Haplomitrium Hookeri* (Sm.), 97.
- Gymnomitrium concinatum* (Lightf.), 72, 73, 87-89, 91, 92, 94, 96-99, 108-110.
obtusum (Lindb.), 73, 85-92, 94, 96-99, 105, 106, 108-110.
corallioides Nees, 88, 92, 97, 109.
crenulatum Gottsche, 73, 88, 92, 97-99, 103-105, 110.
varians (Lindb.) (*Sarc. confertus* Limpr.), 88, 97.
crassifolium Carr., 88, 92, 97.
adustum Nees.
var. olivacea (Spruce) (*Mars. olivacea* Spruce), 88, 92, 97-99.
alpinum (Gottsche), 73, 88, 92, 97, 98.
- Marsupella condensata* (Angstr.), 88.
nevicensis (Carr.), 97.
Stableri Spruce, 92, 97, 98.
ustulata Spruce, 88, 96, 97, 101.
Sprucei (Limpr.), 97.

- Funckii (*Web. et Mohr.*), 73, 79, 88, 96-99, 105.
 sparsifolia (*Lindb.*), 92.
 erythrorhiza (*Limpr.*) (*Sarc. sphacelatus*, var. *erythrorhiza*
Limpr.), 88, 92, 110, 112.
 Jörgensenii *Schffn.*, 88, 97.
 emarginata (*Ehrh.*), *except* 74, 77, 79, 80, 84, 93, 100.
 aquatica (*Lindenb.*), 73, 83, 86-90, 92, 97, 98, 100, 102, 104,
 108-110, 112.
- Nardia compressa* (*Hook.*), 73, 88, 92, 97-100, 105.
scalaris (*Schrad.*), *except* 93.
minor (*Nees*), 77, 88, 97, 109.
hyalina (*Lyell*), *except* 72, 74, 77, 80, 81, 93, 95, 103, 111.
obovata (*Nees*), *except* 74, 78, 79, 80, 81, 82, 84, 85, 89, 93, 96,
 100, 111.
subelliptica *Lindb.*, 88.
- Aplozia autumnalis* (*DC.*), 73, 88, 91, 97-99.
var. Schraderi (*Mart.*), 98.
crenulata (*Sm.*), 73, 75, 79-86, 88-92, 95-98, 102, 104-106,
 109, 110, 112.
var. gracillima (*Sm.*), *except* 74, 80, 81, 84, 86, 89, 93, 100,
 103, 104, 107, 111.
sphærocarpa (*Hook.*), 86, 88, 89, 91, 98, 108, 109.
cordifolia (*Hook.*), 72, 73, 77, 78, 83, 86-92, 98, 99, 105.
riparia (*Tayl.*), *except* 72, 93, 96, 100, 107, 110.
atrovirens (*Schleich.*), 76, 88, 90, 92, 101, 107, 112.
pumila (*With.*), 73, 75, 76, 78, 79, 81, 83, 87, 88, 90-92, 95,
 97-99, 102, 104-106, 109-111.
- Jamesoniella Carringtoni* (*Balf.*), 88, 92, 94, 97-99, 102, 105.
- Anastrophyllum Donianum* (*Hook.*), 92, 94, 97.
- Lophozia inflata* (*Huds.*), *except* 77, 79, 80, 87, 93, 94, 99, 100, 102,
 104.
var. heterostipa (*Spruce*), 73, 99, 101.
turbinata (*Raddi*), 73, 75, 77, 81-85, 89, 90, 98, 106, 108,
 109, 111.
Mülleri (*Nees*), 72, 73, 79, 86-90, 92, 96, 97, 99, 102-107,
 109.
var. bantriensis (*Hook.*), 73, 78, 81, 83-85, 88-90, 97, 98,
 107, 109.
var. acuta (*Lindenb.*), 95.
- Kaurini* (*Limpr.*), 109.
heterocolpa (*Theod.*), 88.
obtusa (*Lindb.*), 97, 99.
socia (*Nees*), 92, 96, 108.
excisa (*Dicks.*) (*J. capitata* *Hook.*), 73, 81, 83-85, 91, 96, 97,
 106.

- bicrenata (*Schmid.*), 73, 74, 81, 83, 85, 88, 91, 92, 96, 97, 99,
 101, 105, 106, 112.
 alpestris (*Schleich.*), 73, 87-90, 92, 94, 96-98, 105-108.
 var. gelida (*Tayl.*), 88, 89, 92, 96-98.
 Wenzelii (*Nees*), 97.
 ventricosa (*Dicks.*), *except* 80, 93, 94, 103.
 longidens (*Lindb.*), 96.
 incisa (*Schrad.*), *except* 74, 75, 76, 78, 80, 81, 84, 85, 93, 94,
 100, 102, 103, 107, 108.
 Lyoni (*Tayl.*), *except* 74, 78, 80, 82, 93, 95, 100, 102, 107,
 111, 112.
 barbata (*Schmid.*), 73, 83, 85, 87-92, 95-98, 104-107, 112.
 lycopodioides (*Wallr.*), 88-90, 96, 97, 107.
 Floerkii (*Web. et Mohr.*), *except* 74, 80, 93, 94, 101, 103, 104,
 110.
 atlantica (*Kaalaas*), 109.
 gracilis (*Schleich.*), 72, 73, 76, 81, 83, 84, 87-92, 96-98, 100,
 106, 107, 109.
Sphenolobus quadrilobus (*Lindb.*), 88.
 Kunzeanus (*Hübner.*), 88, 92, 96.
 politus (*Nees*), 88, 99.
 saxicolus (*Schrad.*), 88, 89, 92, 96.
 minutus (*Crantz*), 73, 83, 85, 87-92, 96-99, 105-109, 112.
 Hellerianus (*Nees*), 88, 92.
 Pearsoni (*Spruce*), 73, 97, 98.
 exsectus (*Schmid.*), 97, 98.
 exsectæformis (*Breidl.*), 73, 81, 85-88, 91, 96-98, 105, 107-109.
Anastrepta orcadensis (*Hook.*), 75, 87, 88, 90, 92, 94, 96-99, 101,
 104, 105, 107-109.
Acrobolbus Wilsoni (*Tayl.*), 97.
Plagiochila exigua (*Tayl.*) (*P. tridenticulata* *Tayl.*), 75, 97-99, 103, 105.
 punctata *Tayl.*, 73, 87, 88, 97-99, 101-105, 110.
 spinulosa (*Dicks.*), 72, 73, 75, 76, 83, 85-89, 91, 97-105, 109,
 110, 112.
 asplenioides (*L.*), *except* 93.
Pedinophyllum interruptum (*Nees*), 98.
Mylia Taylori (*Hook.*), *except* 72, 75, 79, 80, 81, 93, 95, 100, 103.
 anomala (*Hook.*), *except* 75, 77, 80, 93, 94, 95, 100, 101, 102,
 103, 108, 110.
Clasmatocolea cuneifolia (*Hook.*), 88, 97-99.
Lophocolea bidentata (*L.*), *except* 74, 93, 103, 104, 107.
 cuspidata *Limpr.*, *except* 89, 93, 100, 104, 107, 108, 111.
 spicata *Tayl.*, 81, 97, 103.
 heterophylla (*Schrad.*), 72, 73, 80-88, 91, 97, 98, 101.

- Chiloscyphus polyanthos* (*L.*), *except* 74, 79, 80, 82, 93, 94, 101, 106, 107, 110, 111.
- Harpanthus Flotowianus* *Nees*, 73, 88, 92, 109, 112.
scutatus (*Web. et Mohr.*), 97, 105.
- Geocalyx graveolens* *Nees*, 105.
- Saccogyna viticulosa* (*Sm.*), 72-74, 85-88, 91, 97-106, 110, 111.
- Cephalozia bicuspidata* (*L.*), *except* 93.
Lammersiana (*Hüb.*), 73, 75-78, 81, 83-86, 91, 92, 95-99, 101, 103-105, 109-112.
pleniceps (*Aust.*) 88, 108.
connivens (*Dicks.*), *except* 72, 77, 80, 82, 87, 89, 90, 93, 94, 95, 98, 100, 101, 103.
lunulæfolia *Dum.*, *except* 74, 76, 79, 80, 90, 91, 93, 94, 96, 99, 104, 107, 108, 111, 112.
leucantha *Spruce*, 72, 73, 82, 87-89, 91, 92, 97, 98, 101, 104, 105, 107-112.
pallida *Spruce*, 72, 73.
reclusa (*Tayl.*) (*C. catenulata* *Spruce*), 84, 92, 97.
curvifolia (*Dicks.*), 72, 73, 75, 77, 78, 83-92, 97, 98, 103, 105, 110-112.
Francisci (*Hook.*), 88, 90-92, 98, 105.
fluitans (*Nees*), 73, 83, 88, 92, 97, 105, 106, 109.
- Hygrobiella laxifolia* (*Hook.*), 73, 87-92, 94, 95, 97-99, 104-106, 108, 112.
- Eremonotus myriocarpus* (*Carr.*), 87, 88, 97, 104.
- Cephalozia divaricata* (*Sm.*), *except* 74, 76, 79, 80, 86, 89, 93, 94, 102, 103, 110, 111.
stellulifera (*Tayl.*), 76, 85, 96, 106, 109, 110, 112.
- Odontochisma denudatum* (*Nees*), 73, 74, 78, 81, 83-85, 88, 97, 98, 107, 109, 111.
Sphagni (*Dicks.*), *except* 75, 77, 80, 82, 89, 93, 94, 95, 96, 99, 100, 101.
- Adelanthus decipiens* (*Hook.*), 97, 99.
- Kantia trichomanis* (*L.*), *except* 74, 75, 80, 93, 94, 103.
Sprengelii (*Mart.*), *except* 74, 77, 93, 94, 101.
suecica, *Arnell et Persson*, 97.
arguta (*Nees et Mont.*), 72, 76, 79, 82-84, 96-98, 100, 102, 104-106, 108, 110-112.
- Bazzania trilobata* (*L.*), 73, 85-90, 92, 97-99, 101, 105.
triangularis (*Schleich.*), 73, 86-88, 90, 92, 94, 97-100, 102-106, 108-110.
- Pleuroclada albescens* (*Hook.*), 88, 94, 97.
var. islandica (*Nees*), 92, 100.

- Lepidozia pinnata* (*Hook.*), 75, 97, 98, 102, 105, 112.
reptans (*L.*), *except* 79, 93, 94, 95, 111.
Pearsoni Spruce, 73, 75, 87, 90, 97, 98, 102, 104, 105, 109.
trichoclados C. Müll., 73, 83, 84, 87, 88, 91, 96-98, 105,
 108-111.
setacea (*Web.*), *except* 75, 79, 80, 84, 86, 87, 93, 94, 95, 100,
 101, 103.
- Blepharostoma trichophyllum* (*L.*), 72, 73, 76, 78, 79, 83, 85-92,
 96-99, 101-105, 107, 109.
- Chandonanthus setiformis* (*Ehrh.*), 90-92, 96.
- Anthelia julacea* (*L.*), 73, 85-90, 92, 94-101, 104-108, 110, 112.
Juratzkana (*Limpr.*), 88, 96, 108.
- Herberta adunca* (*Dicks.*), 86, 88, 90, 96-100, 102-105, 110, 112.
- Mastigophora Woodsii* (*Hook.*), 88, 97-99, 104, 105, 108.
- Ptilidium ciliare* (*L.*), 72, 73, 77, 78, 81-83, 85-92, 96-99, 104, 106,
 112.
pulcherrimum (*Web.*), 78, 83-85, 88, 92, 99.
- Trichocolea tomentella* (*Ehrh.*), 72-74, 77, 86-88, 90-92, 96-102,
 105, 109.
- Diplophyllum albicans* (*L.*), *except* 93.
taxifolium (*Wahlenb.*), 88, 89, 92, 97.
obtusifolium (*Hook.*), 89, 91, 97, 112.
ovatum (*Dicks.*), 73, 86-92, 97-99, 104-106.
- Scapania compacta* (*Roth.*), 73, 75, 76, 79, 83-92, 96-98, 101, 106,
 108, 110.
subalpina (*Nees*), 72, 73, 75, 76, 79, 83, 85, 87-92, 95-99, 101,
 105, 108-110, 112.
Bartlingii (*Hampe*), 90.
æquiloba (*Schwaegr.*), 76, 88, 89, 92, 95, 97, 98, 106.
aspera *Bernet*, 88, 90, 92, 97, 98, 104-106, 109, 110.
gracilis (*Lindb.*) (*S. resupinata* Carr.), *except* 72, 74, 76, 78,
 79, 80, 81, 84, 89, 93, 94, 95, 107.
crassiretis *Bryhn*, 88.
nemorosa (*L.*), 73, 83, 87, 88, 90-92, 95-99, 105, 106, 110.
nimbosa *Tayl.*, 88, 97.
ornithopodioides (*With.*), 88, 92, 94, 97-99, 102, 104.
purpurascens (*Hook.*) (*S. dentata* Heeg.), *except* 74, 80, 82, 93,
 94.
intermedia *Husnot*, 72, 75, 83, 87, 88, 97, 99, 102.
undulata (*L.*), *except* 74, 76, 80, 81, 84, 85, 86, 93, 94, 95.
uliginosa (*Swartz*), 88, 89, 92, 97, 103, 104.
irrigua (*Nees*), *except* 74, 75, 76, 77, 78, 80, 85, 87, 89, 93,
 94, 103, 107, 108.

- rosacea (*Corda*), 73, 88-92, 96-98, 108, 109.
 curta (*Mart.*), *except* 72, 74, 78, 80, 85, 86, 89, 93, 94, 95,
 100, 101, 103, 103, 104.
 umbrosa (*Schrad.*), 72, 73, 78, 81, 83-89, 91, 92, 97, 101,
 105-112.
- Radula voluta* *Tayl.*, 75.
aquilegia *Tayl.*, 73, 97, 98, 104, 105.
Carringtonii *Jack*, 97.
Lindbergii *Gottsche*, 73, 77, 85, 87, 88, 90, 92, 97-99, 101,
 105, 109.
complanata (*L.*), *except* 72, 74, 93, 100, 107, 112.
- Pleurozia purpurea* (*Lightf.*), 73, 74, 86-88, 90, 92, 96-99, 102-111.
Madotheca lævigata (*Schrad.*), 72-75, 77, 83, 85-89, 97-100, 103,
 105.
Thuja (*Dicks.*), 85, 103, 110.
platyphylla (*L.*), 72, 73, 80, 81, 83, 85-88, 90-92, 95, 98, 101.
rivularis *Nees*, 73, 75, 77, 78, 80-92, 95, 98, 99, 101, 109,
 112.
- Colurolejeunea calyptrifolia* (*Hook.*), 97, 98, 100, 104, 105.
Cololejeunea minutissima (*Sm.*), 97.
microscopica (*Tayl.*), 88, 97-99, 103-105.
calcareo (*Lib.*), 86, 88-90, 97, 98, 105, 109.
Rossettiana (*Massal.*), 81.
- Lejeunea cavifolia* (*Ehrh.*) (*L. serpyllifolia* *Lib.*), *except* 80, 82, 93,
 94, 112.
patens *Lindb.*, 73-76, 86-88, 97-105, 108-110, 112.
Macvicari *Pears.*, 97.
- Microlejeunea ulicina* (*Tayl.*), 73, 87, 88, 97, 98, 100, 102, 103,
 105, 110.
- Drepanolejeunea hamatifolia* (*Hook.*), 97, 98, 103-105, 110.
Harpalejeunea ovata (*Tayl.*), 97-99, 103-105, 110.
Marchesia *S. F. Gray.* (*Phragmicoma* *Dum.*).
Mackaii (*Hook.*), 74, 97, 102-104.
- Jubula Hutchinsæ* (*Hook.*), 97, 98, 100, 102.
Frullania Tamarisci (*L.*), *except* 93, 94.
microphylla (*Gottsche*), 74, 97.
fragilifolia *Tayl.*, 74, 83, 88-92, 95-99, 101, 103, 105, 109,
 110, 112.
germana *Tayl.*, 74, 85, 97-99, 101-105, 110, 112.
dilatata (*L.*), *except* 93, 94, 95, 107.
- Anthoceros lævis* *L.*, 75, 83, 84, 101, 109.
punctatus *L.*, 74, 80, 89, 92, 97, 102, 109.

ZOOLOGICAL NOTES.

Wild Cat in Argyllshire.—A fine male true Wild Cat (*Felis catus*) was trapped in the first week in January 1903 by Hugh Cameron at Arasaig, and is now in my possession at Dunipace.—J. A. HARVIE-BROWN.

Pine Marten in Sutherland.—A male Marten Cat (*Mustela martes*) is reported to me, as obtained on the Scourie shootings, Eddrachyllis, Sutherland, trapped by the gamekeeper there on 17th November 1903, and sent in the flesh to Mr. Kirk, Sauchiehall Street, Glasgow.—J. A. HARVIE-BROWN.

Badger in Linlithgowshire and Stirlingshire.—I have received for preservation two specimens of the Badger (*Meles meles*). The first from Williamsraig, Linlithgow, on 15th July; and the second from Rowardennan on Loch Lomondside. Both were taken in rabbit-traps.—CHAS. KIRK, Glasgow. [There is a colony of Badgers at Williamsraig, probably an offshoot from Dalmeny.—EDS.]

Occurrences of the Great Grey Shrike (*Lanius excubitor*).

CAITHNESS.—A fine male specimen was obtained at Keiss during the past autumn, which I have preserved and added to my collection.—JAMES SUTHERLAND, West Banks.

WEST ROSS-SHIRE.—On the 12th November I saw a Great Grey Shrike. It rose off the ground, where it was being attacked by a pair of Meadow Pipits, and settled on the telegraph wires above my head, and flitted along in front of me for some distance.—OSGOOD H. MACKENZIE, Poolewe.

MORAY.—A specimen was shot in the garden at Gordon Castle, Fochabers, on 7th November. There were two in the garden at the time, and the gardener saw one of them attacking a Blackbird in a plum tree.—GEORGE C. MUIRHEAD, Fochabers.

One was captured alive at Duffus early in November, and kept in a cage and fed readily on mice. It did not long survive, and was sent to me by Mr. Wm. Ogg on the 11th of November, and proved to be a bird of the year.—J. A. HARVIE-BROWN.

One has been flying about in the garden here for the past week. It appears to have only a single white bar on the wings.—W. STEUART MENZIES, Craig Ellachie, December 22.

SHETLAND.—One was observed at Halligarth, Unst, on the 15th October, in the act of devouring a Redbreast; and one, presumably the same bird, was seen in the neighbourhood on the 19th and 20th.—T. EDMONDSTON SAXBY, Balta Sound, Shetland.

Waxwing in Forfarshire.—A Waxwing (*Ampelis garrulus*) was brought to me on October 30, shot at Tarry, a mile from Arbroath.

It was said to have been one of three which were seen flying to and fro on the grounds there for several days.—THOMAS F. DEWAR, Arbroath.

Waxwings in the Lothians.—Although a few Waxwings (*Ampelis garrulus*) visit us every second or third winter, the bird is sufficiently rare and striking in appearance to continue to attract attention and keep up our interest in the records of its occurrence. A larger number than usual seem to have come to us this winter, the date of arrival of the majority being towards the middle of November. In the town of Haddington a flock of seven or eight were seen, on 12th November, feeding on yewberries in the cemetery, by the superintendent and others; and on or about the same date one came to the berries on a yew in front of Mr. Todrick's house in Court Street—its visits to this tree lasted, Mr. Todrick tells me, nearly a fortnight. On 27th October one was killed at North Berwick while feeding along with another on haws; and on 13th November two, one of which was caught with bird-lime, were observed devouring the berries of a Cotoneaster growing on the front of a cottage at Drem in the same neighbourhood. On the same day (the 13th) a bird-catcher noticed two feeding on elderberries at Musselburgh haugh, and by placing some limed twigs on the bush he managed to capture one of them, a remarkably fine male. On 30th November one was shot on a rose-bush—it was feeding on the hips—above Cramond ferry, and another caught at Tranent. Then on 4th December, one (a female) was killed by a cat in a garden at Levenhall at the east end of Musselburgh links, and a beautiful male was shot near Innerwick beyond Dunbar on the 16th. All of those captured have been examined by me, but my efforts to meet with the birds at large have so far failed. The three caught alive seem to be thriving very well in confinement, and are wonderfully tame. I hear of others, besides the above, having been seen in the Lothians, but I have not got the particulars. One was also reported from Orkney, another from Arbroath, and four from Comrie, and I have just seen a female shot at Galashiels on 17th December.

Since writing the above, I have had a long-standing desire gratified—I have seen a Waxwing at liberty. On 23rd December, having read in the morning paper that two were seen in a garden in North Berwick the previous day, I at once went down there, and, after fully three hours' watching in the neighbourhood, had the pleasure of seeing one of the birds quietly preening its feathers within three or four yards of me on a young tree in front of a cottage, where it had just been feeding on Cotoneaster berries. Its flight, when it left, was direct and rapid, much like that of a starling. On the same day one was seen feeding on dog-hips near Colinsburgh, Fife.—WILLIAM EVANS, Edinburgh.

The Ruby-crowned Wren in Lat. 53.24 N., Long. 30.15 W.—The Anchor Line s.s. "Furnessia" left New York bound for Glasgow on 24th October 1903. On the 31st *idem* in Lat. 53.24 N., Long. 30.15 W. a Ruby-crowned Wren (*Regulus calendula*) alighted on board. It died on the following day, and its skin was handed to me, on the arrival of the steamer, by Purser Bruce. Gales and squally weather had been experienced on the passage. The prevailing winds were—on 24th October N.N.W., 25th N.E., 26th N.W., 27th W., 28th W.S.W. and S.S.W., 29th S.S.W. and N.E., 30th S.W., 31st S.W. and W.S.W. It will be remembered that the late Dr. Dewar had an example of this species which he was said to have shot on Loch Lomondside, but which remained unidentified until recognised in his collection by Robert Gray some years later! The interest of the present record rests on this tiny American species reaching, on 1st November 1903, a point between say five and six hundred miles off the coast of Ireland.—JOHN PATERSON, Glasgow.

Black Redstart in Moray.—I shot a young male Black Redstart (*Ruticilla titys*) on the moor between Fochabers and Keith on 30th October. It was hopping about among the thin bleached stumps of a young pine wood that was burnt many years ago but has now grown up with heather. Mr. Harvie-Brown mentions the bird as of "doubtful record" in his Fauna of Moray.—GEORGE C. MUIRHEAD, Fochabers.

Kingfisher on Loch Leven, Argyllshire.—On the 4th November I saw a Kingfisher (*Alcedo ispida*) flying along the shore of Loch Leven, between the slate quarries and Ballachulish Ferry. I have known Glencoe intimately for over thirty years, but never saw or heard of a Kingfisher occurring there.—CHAS. H. ALSTON.

Roller, Glossy Ibis, and Spotted Crake in Perthshire.—Examples of these somewhat rare visitors to Scotland have been obtained in Perthshire during the past autumn, and were exhibited at a recent meeting of the Society of Natural Science in Perth. The Roller (*Coracias garrulus*), near Ballinluig on the 13th October; the Glossy Ibis (*Plegadis falcinellus*), was shot on the Earn in the neighbourhood of Perth on the 18th of October; and the Spotted Crake (*Porzana maruetta*), at Murthly on the 2nd November. The birds are now exhibited in the Museum of Natural History.—T. G. LAIDLAW, Perth.

Rough-legged Buzzard in the Outer Hebrides.—A Rough-legged Buzzard (*Archibuteo lagopus*) was trapped in N. Uist in the past autumn. This is the third I have known in N. Uist :—(1) One that frequented Loch Maddy for several days 12 or 13 years ago; (2) one I saw on Ben Ebhal, and now belonging to Archy M'Lellan; (3) the one now recorded.—ANDREW M'ELFRISH, Loch Maddy.

Rough-legged Buzzards in the Lothians, etc.—An unusually well-marked immigration of this large bird of prey into Scotland occurred last October, with the inevitable result that a good many were soon shot, trapped, or poisoned, and sent to the bird-stuffers. The first I saw was received in Edinburgh from Forfarshire on 9th October; then came one from Orkney on the 19th, and one from Dumfriesshire on the 20th. On the 26th one was seen near Gorebridge, while on the 31st I had the pleasure of seeing one on the wing at the head of Hope's Water, Lammermuir Hills, above Yester. By this time a number had settled down, as I afterwards learned, on the Pentland Hills. Three were first noticed there about the middle of October on a hillside near Logan House; a few days later four were observed, and then more. One was shot shortly after their first appearance, and a second on 5th November. On 7th November no less than eight were seen above Loganlee by one of the keepers, and on the same day a third was shot. On 15th November Messrs. Eagle Clarke and T. G. Laidlaw were up the glen and saw at least four, that number being in view at the same time, hunting the hillsides on the south of Glencorse Reservoir. Mr. Clarke having kindly told me what he had seen, I went out on the 16th as far as Loganlee at the upper end of the glen, and spent several delightful hours watching the birds as they moved to and fro in graceful circles or hung like giant Kestrels in the air—without any perceptible motion of its wings one poised itself head to wind over a particular spot for seventy seconds. Two always kept close together, but the others hunted far apart, so that I had never more than four in view at once. Mr. H. Raeburn, however, was more fortunate on the 20th, when he saw seven leave the rocks at Nether Habbie's Howe; it was blowing hard from the west, and no doubt they had congregated there for shelter. In order to ascertain if they were still frequenting the Pentlands, I went over to Loganlee again on 15th December and saw several—there were three if not five; and heard that another—the fourth—had been shot on 3rd December. A beautiful male, now in my collection, was found lying dead in a park at Mortonhall, close to Edinburgh, on 24th November, and on the 28th one was sent from Fife to be stuffed, as had been a second from Forfarshire on the 16th. Those frequenting the Pentlands have, I believe, been living largely on moles, which have been very abundant on some of the hillsides there of late, though no doubt a good many rabbits have also been taken by them. One of the birds when shot at dropped a mole, and I found two partly devoured moles on a grassy slope over which they were seen to hunt much. All the specimens I have examined seem to be immature birds.

Attention may be drawn to the fact that on 16th October a dozen Rough-legged Buzzards were seen in the neighbourhood of

Scarborough, as recorded in the "Zoologist" for November.—
WILLIAM EVANS, Edinburgh.

Heron nesting in the Outer Hebrides.—Mr. M'Elfrish, in a letter dated 18th November 1903, informs me that Mr. Richard Kearton assures him he saw a Heron (*Ardea cinerea*) sitting on the nest in N. Uist. This is the first good record of the fact of Herons nesting in the Outer Hebrides.—J. A. HARVIE-BROWN.

Gadwall in Wigtownshire.—In November my son shot a male Gadwall (*Anas strepera*) which flew over his head in company with three others. I have not known this species to occur before in Wigtownshire.—HERBERT MAXWELL.

Destruction of Fish Ova by Mergansers.—It is unfortunate that some of the most beautiful and interesting species of birds are also among the most mischievous. The Merganser (*Mergus merganser*) must be reckoned one of the worst of fish-poachers. One shot in November by Mr. Sykes, Borrobol, Helmsdale, contained 2 lb. weight of trout ova. The depredations of "sawbills" upon the fry and smolts of salmon are well known to anglers, but I was not aware that they robbed the spawning beds.—HERBERT MAXWELL.

Black-tailed Godwit in the "Forth" area.—On 10th October last, while passing along the south shore of the Tyne estuary, near Dunbar, I had an excellent view, through my binoculars, of a Black-tailed Godwit (*Limosa belgica*) feeding at the edge of the incoming tide. I got within about a hundred yards of it, and would no doubt have got nearer, had not two Curlews which were quite close to it taken wing. When its wary companions rose, it immediately followed them, uttering its peculiar call-note.—WILLIAM EVANS, Edinburgh.

Sabine's Gull on the Argyllshire Coast.—On 30th October I received for preservation from Belnahua, Easdale, an immature male Sabine's Gull (*Xema sabinii*), a facsimile of the one figured in Saunders' Manual (1st edition), p. 642. Only one occurrence of this Arctic species is recorded in the "Fauna of Argyll," namely an adult obtained in Mull.—C. H. BISSHOPP, Oban.

Audacity in Richardson's Skua.—It may be interesting to record that whilst trapping rabbits on Oronsay, one of the men had taken up a rabbit, which he threw behind him, and was re-setting the trap, when on turning round he saw a Richardson's Skua (*Stercorarius crepidatus*) eating the rabbit a few yards away. He threw the spade at it and was lucky enough to kill it.—C. H. BISSHOPP, Oban.

Large Perch in the River Earn.—A fine specimen of the Perch (*Perca fluviatilis*) was caught in the Earn on the 31st October last. The fish weighed $3\frac{1}{2}$ lbs., and was exhibited at the

November meeting of the Perthshire Society of Natural Science.—T. G. LAIDLAW, Perth.

Vanessa cardui in Edinburgh.—In view of the undoubted immigration of Painted-lady Butterflies (*Vanessa cardui*) into the eastern side of England last autumn, of which Mr. Eagle Clarke witnessed a part at the Kentish Knock Lightship on the night of 22nd September, as recorded by him in the December number of the "Ent. Mo. Mag.," it may be worth while to mention that I saw one in my little garden here in Edinburgh on 14th October, and that one was seen a short time before in the Meadow Walk, still nearer the centre of the city, by my friend Mr. K. J. Morton. Examples have also, I hear, been seen in Aberdeenshire and in Shetland.—WILLIAM EVANS, Edinburgh.

Convolvulus Hawk Moth in Moray.—In the beginning of September last a fine specimen of the Convolvulus Hawk Moth (*Phlegethontius (Sphinx) convolvuli*), was taken at Lossiemouth and forwarded to me by Mr. Allan, Chemist.—HENRY H. BROWN, Cupar, Fife.

Death's Head and Convolvulus Hawk Moths in Perthshire.—Several specimens of these fine moths, both of which are very rare in this county, were captured during the past autumn. Of *Acherontia atropos*, one was taken at an electric lamp in Perth on the 15th September; a second flew into a house at the Bridge of Earn on 1st October; and a third was picked up dead in front of a beeskep at Alyth on 10th October. Of *Sphinx convolvuli* a male was taken in the street in Perth on the 9th September, and another male at Pitlochry on the 10th.—ALEX. M. RODGER, Perth.

Crabro styrius, Kohl, and C. capitatus, Shuck., etc., in Scotland.—On 9th July 1901, I noticed two Crabros, one of which I captured, flying about some raspberry bushes in Castle Campbell Glen, near Dollar. On examining the specimen (a ♀) I thought it was probably referable to *C. tibialis*. Mr. Edward Saunders, however, on my showing it to him, said it was not that species, but the same as a specimen of his own which he had so far been unable to determine. He now tells me they are *C. styrius*, Kohl, an addition to the British list of Aculeata, and of which he is giving a description in the January "Ent. Mo. Mag." Of *C. capitatus*, Shuck., another addition to the Scottish list, I secured a male on the outskirts of a wood at Salton, East Lothian, on 12th August 1902. A female of *C. aphidum*, Lep., also a rare insect, was taken at same time as the last.—WILLIAM EVANS, Edinburgh.

BOTANICAL NOTES AND NEWS.

Juncus tenuis, *Wild.*, in Perthshire.—In July last I came upon a quantity of this rush on the bank of the Tay at Derry Island about four miles below Perth. It was growing in a sort of rut worn by the feet of the fishermen who haul their nets a short distance off. There were clumps of it growing pretty thickly along this rut for about twenty yards. It did not intermingle with the native vegetation, which, however, bordered it closely on either side. There was so much of it, and it was growing so vigorously, that I can hardly believe it to be the growth of a single year, but I am confident that it has not been there more than two or at the most three years. Derry Island is a place where casuals brought by the river are prone to lodge; and indeed along the bank of the Tay between Perth and it several aliens have become naturalised, e.g. *Aster Novi-Belgii* (in great beds), *Rudbeckia laciniata*, *Astrantia major*, *Solidago lanceolata*. There is no cultivated ground very near at hand, and it would appear that seed must have been brought to the spot by the river, though from what place I am quite unable to say. The rut occupied by the plant is within the reach of high tides and floods, and must have been during the present season repeatedly submerged; but the plant seemed to thrive under the process, as many of the flowering stems were over two feet long. From this submerging, or from the persistent wet weather, it probably resulted that about half of the flowers were barren, as I found when gathering the plant later in the season.

Mr. Arthur Bennett, to whom I sent specimens for corroboration, forwarded to me a few weeks afterwards a specimen of the same rush gathered in the beginning of September by Miss Eleanora Armitage in Glenfalloch. In response to a request for particulars regarding it, Miss Armitage writes:—"I found the plant, looking quite native, by the side of the road which goes down Glenfalloch from Crianlarich, about three miles, as far as I can remember, below that place. It was on the right hand side of the road along the grassy edge, beyond which was boggy grass land. The soil was moist from trickling water, and the plants grew in colonies along a short space of the road, rather by themselves than mixed with herbage, except of mosses and hepatics; but grasses and various herbs grew quite near it, and it certainly looked quite at home. It was not near the Falloch river." Judging from the specimen I have seen, the plant was not nearly so tall and luxuriant in Glenfalloch as on Derry Island. In the latter station it is certainly not native, and I should with great difficulty be brought to believe that it is anything but a very recent introduction in Glenfalloch.—
W. BARCLAY.

Arising from this finding of *Juncus tenuis* in Glenfalloch, Mr.

Bennett, in his letter to me, raises the question in what vice-county Glenfalloch should be placed. He says that some Botanists put it in Mid-Perth and others in West Perth. In my judgment the definition of these two vice-counties by Watson excludes it from both. Mid-Perth, according to him, is strictly confined to part of the basin of the Tay, West Perth to part of the basin of the Forth. Glenfalloch drains into the Clyde and ought therefore to go into Dumbarton. This was also the opinion of the late Dr. B. White, and in his flora of Perthshire he makes Glenfalloch a separate division by the name of "Lomond" because it drains into Loch Lomond. Watson would seem to have overlooked this little corner of Perthshire, or not to have attended to its drainage. Maps in his time were not what they are now. It strengthens the argument for joining Glenfalloch to Dumbarton when we consider that this is the only part of Perthshire where *Carum verticillatum*, a distinctly western plant, is found.—W. B.

Late Flowering of *Achusa sempervirens*.—In the course of a walk on 8th November, I noted a considerable number of plants of this species in flower near Hillend. The plants were not so luxuriant as earlier in the year, some being over a foot high.—JAMES WATERSTON, Edinburgh.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October-December 1903.

[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.

LATE OCCURRENCE OF SWIFT AND CUCKOO IN SCOTLAND. J. W. Payne. *Zoologist*, September 1903, pp. 350-351.—Swifts seen on 23rd August and Cuckoo heard on 1st July.

CUCKOO (*CUCULUS CANORUS*) IN SCOTLAND: CALLING IN JULY. Hugh Boyd Watt. *Zoologist*, October 1903, p. 391.—Heard up to 9th July in Braemar.

WATER-HEN CAUGHT AT SEA. A. C. Smith. *The Field*, November 7, 1903, p. 803.—A specimen captured by one of the Dundee trawlers sixty-five miles east of the Bell Rock.

SABINE'S SNIPE AT MULL. W. A. Churchman. *The Field*, 5th December 1903, p. 962.—A specimen shot on an island off Mull on 26th November.

A VISIT TO THE OUTER HEBRIDES IN SEARCH OF MOLLUSCA. Rev. G. A. Frank Knight, M.A., F.R.S.E. *Trans. Perthshire Soc. Nat. Sci.*, vol. iii. part v. (1902-03), pp. 193-217.—Contains several lists of species and a bibliography.

PAINTED LADY BUTTERFLIES IN SCOTLAND. "A. M." and H. M. Davidson. *The Field*, 17th October 1903, p. 676.—Notes on the occurrence of this species in Aberdeenshire between 20th September and 2nd October, and at Scalloway in Shetland in August.

COLEOPTERA IN SCOTLAND. T. Hudson Beare, F.E.S. *Ent. Record*, September 1903, p. 236.—Notes on species taken in the Forth district.

COLEOPTERA IN SCOTLAND. T. Hudson Beare, B.Sc., F.E.S., *Ent. Record*, November 1903, p. 285.—Notes on species taken in various localities.

COLEOPTERA AT RANNOCH. Theodore Wood. *Ent. Mo. Mag.*, October 1903, p. 253.—Thirty species recorded.

APHODIUS TESSULATUS, PAYK. T. Hudson Beare, F.E.S. *Ent. Record*, December 1903, p. 330.—Refers to its occurrence on Arthur Seat.

VESPA AUSTRIACA IN A NEST OF V. RUFA AT FORRES IN 1892. Arthur J. Chitty. *Ent. Mo. Mag.*; November 1903, p. 284.

VESPA AUSTRIACA AND V. RUFA IN SCOTLAND. William Evans. *Ent. Mo. Mag.*, December 1903, p. 299.—Note on dates of appearance of spring queens.

MICRODON MUTABILIS, L., AT ABERFOYLE, PERTSHIRE. A. E. J. Carter. *Ent. Mo. Mag.*, December 1903, p. 303.—Three specimens taken last July.

BOTANY.

BIOGRAPHICAL INDEX OF BRITISH AND IRISH BOTANISTS. By James Britten and G. S. Boulger (Second Supplement, 1898-1903). *Journ. Bot.*, 1903, pp. 343-346, 371-378.—Scottish botanists included are Dr. James E. T. Aitchison, Dr. John Anderson, John Baddeley, Rev. Andrew Baird, Andrew Brotherston, Rev. Thomas Brown, Wm. L. Brown, Hon. David Carnegie, Joseph Christie, Rev. George Davidson, Peter Gray, Rev. George Gunn, James Hardy, Charles Howie, Sir Charles Lawson, Rev. George Macfarlane, Robert Marnock.

OROBANCHE RUBRA, SM. By Arthur Bennett. *Journ. Bot.*, 1903, p. 380.—Notes this as from Kirkcudbright, Westernness, Ebudes (102), and Outer Hebrides.

NOTES ON RHINANTHUS. By G. Claridge Druce, M.A. *Journ. Bot.*, 1903, pp. 359-361. Enumerates forms and localities.

NOTES ON THE DRAWINGS FOR ENGLISH BOTANY (Supplement to *Journ. Bot.*, 1903, pp. 97-120). By F. N. A. Garry, M.A.—*Cnicus pratensis*, *Pyrola rotundifolia*.

ON A RAMBLE ON THE MOOR AT BLAIR-ATHOLL. By Mary L. Miles. *Trans. Perthsh. S.N.S.*, iii. pt. v. 1902-03, pp. 217-223.

THE BACTERIA, OR SCHIZOMYCETES, AND THEIR PLACE IN THE NATURAL SYSTEM. By John Lyell, M.D. *Trans. P.S.N.S.*, 1902-03, pp. 223-238.

PROCEEDINGS OF THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE.—Address by Henry Coates, the President, "Notes of Excursions in 1902," several rare or local plants being mentioned.

OBITUARY NOTICE OF CHARLES STUART, M.D. By Commander F. M. Norman. *Hist. Berwicksh. Nat. Club*, xviii. pp. 171-175.

BOOK NOTICES.

DIE VÖGEL DER PALÄARKTISCHEN FAUNA. Systematische Übersicht der in Europa, nord Asien und der Mittelmeerregion vorkommenden Vögel. Von Ernst Hartert. Heft I. Mit 22 Abbildungen. Berlin: Friedländer und Sohn, 1903.

It is admittedly a most difficult task to write a work on birds, especially one including our own, which is thoroughly original in the treatment of its subject. Mr. Hartert has succeeded in accomplishing this in a manner which is remarkable, not to say phenomenal, in his new book on the Palæarctic Birds. It naturally follows that there is much to discuss and to criticise. Here we can only state that there are features which we must accept with gratitude; while there are others which may be regarded as optionally at our service if we care to adopt them.

Regarding the former, Mr. Hartert has had the courage to tackle the extremely difficult task of defining the geographical races to be found among a number of the Palæarctic species. A knowledge of these is of the utmost importance, particularly so to all who are interested in the British avifauna, for our Islands are regularly receiving visitors from the Continent, and it is a decided gain to be able to determine whence some at least of them come; but, further than this, a fair number of our native species have peculiarities of plumage, etc., which are essentially their own, and to some of these attention is drawn for the first time. As to the optional features, the Author has given names, by a free use of trinomials, to all the racial forms he describes; has adopted the tenth edition of Linnæus's "Systema Naturæ" (1758) as a starting point for his nomenclature, and has adhered rigidly (and

rightly), to the law of priority as regards the names of genera and species. These methods and changes will, we are well aware, meet with strong disapproval in some quarters. There is, however, no necessity for adopting them on the part of those who do not care to do so.

In the writer's opinion it is impossible to over-estimate the value and importance of Mr. Hartert's work, and especially so since it affords information that has long been a decided desideratum in ornithological literature. The book is to be completed in eight parts of 112 pages, and the price is four shillings per part.

PARRAKEETS. A Handbook to the Imported Species. By David Seth-Smith, M.B.O.U., F.Z.S. With twenty coloured Plates and other Illustrations. London: R. H. Porter, 1903. Price 40s. net.

This handsome volume is written in the interests of the aviculturist; but it also contains matter of interest relating to the natural history of the smaller species of Parrots, of which no less than one hundred and thirty are treated of.

The author's aim has been to make the book a complete monograph of all the species kept in confinement, and to furnish concerning them full and reliable information on their management, treatment, etc.—an object which he has most successfully accomplished, and the book is to be regarded as our chief authority on the subject. In addition to the avicultural side of Parrakeet life, much interesting information is afforded on the habits of the various species in a wild state, their nesting, distribution, etc.; along with descriptions of and critical remarks on their plumages.

Not the least attractive feature of the book are the coloured portraits of thirty species, most of them of great beauty. These plates are really most excellent, and we are not using a mere figure of speech when we state that they leave nothing to be desired.

TURNER ON BIRDS: A SHORT AND SUCCINCT HISTORY OF THE PRINCIPAL BIRDS NOTICED BY PLINY AND ARISTOTLE. First published by Doctor William Turner, 1544. Edited with Introduction, Translation, Notes, and Appendix. By A. H. Evans, M.A. Cambridge: University Press, 1903. Price 6s. net.

Turner's book was published in the year 1544 at Cologne, where its author was then residing in order to avoid persecution on account of his religious beliefs.

He appears to have been a remarkable man in many respects, and his knowledge of birds was not by any means the least of his varied accomplishments. Thus his "History of Birds," a commentary on the species mentioned by Aristotle and Pliny and "all the best writers," is a work of peculiar value and interest, and especially so on account of Turner's original notes on many of the

species dealt with, which prove him to have been, for his day, a singularly accomplished ornithologist.

The work was reprinted in 1823, but is rare, and a modern translation edited by an ornithologist and scholar was much to be desired; and all will agree that Mr. A. H. Evans was eminently fitted for the task, which he has carried out in a manner that is entirely satisfactory.

The translation is practically a literal one, and occupies the right hand page; while on the left hand we have the corresponding text in Turner's original Latin. In addition Mr. Evans has furnished a suitable introduction, a number of critical notes, and an appendix.

The book should be in the hands of all who are interested in the classics of ornithological literature, in which it holds a place that is entirely unique.

ST. KILDA AND ITS BIRDS. By J. Wigglesworth, M.D., F.R.C.P., M.B.O.U. London: R. H. Porter, 1903. Price 2s.

In spite of the somewhat numerous accounts which have from time to time been written on the birds of St. Kilda, Dr. Wigglesworth's little book will, by reason of his attractive treatment of the subject, be acceptable to all interested in ornithology, and is of value because it brings our knowledge of the avifauna of the group down to date—several species having been added since the previous accounts were published. We trust that the author, who seems to be deeply interested in the ornithology of St. Kilda, will endeavour to obtain information on the species which visit the islands during the periods of passage, when we have little doubt that further additions will be made, and more light thrown on the western stream of migration which extends to the Flannan and Monach Isles and probably still further west. The book also contains accounts of the various isles, which form the group, and their birds, and is illustrated by process reproductions of several photographs of scenery and bird life.

MEMORIES OF THE MONTHS. Third Series. By the Rt. Hon. Sir Herbert Maxwell, Bart., M.P., F.R.S. London: Edward Arnold, 1903. 7s. 6d.

We have given favourable notices of the previous series of the "Memories," and have only to add concerning the present ones that a number of them relate to natural history subjects, and are treated of in an interesting and attractive style. There are six pretty plates in photogravure.

The Annals of Scottish Natural History

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1904

[APRIL

FROM A SOLWAY NOTEBOOK.

ROBERT SERVICE, M.B.O.U.

THERE have been few years, during the lifetime of any of us more remarkable in point of weather than 1903. Beginning with typical winter days in January, a February of abnormal storminess followed, and after that spring came on early, seeming to herald a season of precocity and fineness such as all the old meteorological proverb-makers believed should succeed a wild February.

The birds early began their northward flight—Lapwings were passing up during the whole of daylight on 12th February, and a big general movement of Curlews took place from 5 to 8 p.m. on 15th February, during a drizzling dark evening. The Swallows arrived on the Galloway coast so early as 23rd March (Kempleton, Kirkcudbright), and three days later they were seen at Lochmaben in Dumfriesshire.

These were probably members of a flock that had pushed their way up the Irish Channel in advance of the general body, for Swallows were reported in North Devon, and at Dublin on 22nd March. Rhubarb was gathered for table use by 15th March from the open field, and Gooseberries were in full flower by 1st April. But this was too

good to last, and a violent sandstorm on the Firth on 12th April was the opening fact in a long tale of disaster. Driven by a north-easter the sand on the great banks, that stretch for many a mile at low tide, was lifted up in thick clouds and wafted across to leeward, much of it blown into the channel, but vast quantities laid like deep snow-wreaths completely on the other side. Snow fell to a depth of some six inches on 14th April, and this was followed for a week thereafter by hard frosts that blasted the promise of flower and fruit for the remainder of the season.

My notes of the more interesting items may be most conveniently entered under different headings:—

MOLE (*Talpa europæa*).—Some nice varieties have been sent me. In addition to several of the ordinary pale yellow of various shades, and of those showing the orange yellow abdominal patch, I have a couple of others worth notice. One has a linear patch of yellow, of irregular shape, fully one inch in length along the middle line of belly. In addition to this, there is a similar but smaller patch across the chest, and quite detached from the other. The hind feet, fringes of fore feet, and about a $\frac{1}{4}$ inch of tip of tail, are pure white. It is a ♀, and was sent from Craigraploch, Rerrick, on 14th November. The other mole is of a variety I have not seen before, and my friend the catcher, who is a man of very long experience, says he has only seen some two of the same colour. The whole fur is of a glossy slaty black, with a strong suggestion of plum-blue in the metallic shading. The under fur, when the upper surface is parted, is a pure white all over the skin. This specimen is also a ♀, and came to me on 7th December from Talloquhairn, Kirkbean.

RABBIT (*Lepus cuniculus*).—On 3rd July I came upon a rabbit's nest placed a good bit above ground in the midst of some tangled old brown fronds of the Male fern in Craigend wood. It contained five young which, however, bolted when I put my hand amongst them. They were perhaps sixteen or seventeen days old, and a couple of them gave me a good bit of bother to catch. The nest was made of the usual gathering of breast down, and placed amongst the fern fronds quite neatly. There was no burrow near.

WATER VOLE (*Crossopus fodiens*).—On 16th February I had a very large ♀ sent me of the black variety. Although perfectly black it was non-lustrous. I got another ♀, but only two-thirds grown, from Auchencairn on 8th October. This is a beautiful glossy black, and a small spot on forehead, a larger one on breast betwixt the forelegs, right foretoes, some of the whiskers, and many

hairs near tip of tail, are white. The lips are fringed with pure white. Mr. Peacock, farmer in Airds of Newabbey, tells me he killed a family party of five perfectly black Water Voles in a potato pit that he had occasion to uncover on 11th November.

PORPOISES (*Phocæna communis*).—This has been a great year for these cetaceans in the Firth. The most remarkable visit they made was during the week preceding 26th April, when during every tide, many hundreds of these beasts were seen rolling inside Southernness Point. What they were feeding upon was not ascertained, so far as I know.

ADDER (*Pelias berus*).—Major Threshie of Barnbarroch informed me that on 6th July he dissected an adder that his gamekeeper had killed. It contained three moles, none of which was quite full grown.

LESSER REDPOLL (*Linota rufescens*).—At one part of our nursery grounds here, a small colony of Lesser Redpolls took up a location in February. Remaining on, instead of departing when spring advanced, they began to nest in May, and eventually reared about a dozen broods. Instead of being placed in Birches, Alders, and Honeysuckle as is their wont—and plenty of these trees were close at hand—the nests were all built in thickly branched little spruces, at heights from the ground varying from 4 to 9 feet. But the most interesting point of all, was in the fact that every nest was thickly lined with feathers. The down of the Willow catkins was plentiful within 300 yards of the colony, all the nests of which were within a radius of 120 yards. In the year 1879 we had a perhaps colder but not so wet a season, and in that spring I found the nests of the Redpoll lined with feathers. In reference to my observation of that year Mr. Harvie-Brown wrote “In northern countries—Norway and North Russia—Redpoll’s nests are very commonly, if not invariably, lined with feathers. Were these additions to the Redpoll population of Dumfries, birds crowded down from more northern countries, bringing their nest-building instincts with them; or were they simply native birds adapting their nest building to suit the unusually cold season?” (“Proceedings, Nat. Hist. Soc. of Glasgow,” vol. iv. p. 164). When watching these birds many a time I repeated Mr. Harvie-Brown’s question to myself. There was no doubt in my mind that they appeared to be grayer, or more mealy tinted, than usual, but, although not over-burdened with sentiment, I could not summon up enough courage to solve the question by making some “specimens.” The intention often was there, but when I looked over the rim of the nests, or saw the birds sitting within three or four feet so confidently, it evaporated. Another small colony several miles distant, that I have known since boyhood, had an odd feather or two in their nests, but nothing at all in the way

of *feather lining* in the full sense. Not a single bird of the Nursery colony remained after 10th July, all had gone elsewhere, and none has been seen since.

WHITE WAGTAIL (*Motacilla alba*).—A fine ♂ was seen by me, at a few feet distance, as it was catching flies on the margin of the Horsetrough at Four Mile House, on the Castle Douglas Road from Dumfries. At 7 a.m., morning of 9th October, I examined another White Wagtail tripping on one of the putting greens of the golf course here. Although difficult to make out in the autumn plumage, the bird's identity was established by a close scrutiny at a couple of yards distance.

HEN HARRIER (*Circus cyaneus*).—Mr. John Paterson informs me of a Hen Harrier shot near Tarff, Kirkcudbrightshire, early in November and sent to Glasgow. An old ♂ was taken in last week of October in Kirkbean.

ROUGH-LEGGED BUZZARD (*Archibuteo lagopus*).—Of these fine birds we have also had a small share, one having been shot near Tarff, as Mr. Paterson kindly tells me, early in November, and sent to Glasgow. Mr. Paterson exhibited it along with the Hen Harrier at the December meeting of the "Nat. Hist. Soc. of Glasgow." A second specimen of this Buzzard was shot in our area in November, at Auchencheyne, Glencairn, and sent to some of the Edinburgh taxidermists for preservation.

SHORT-EARED OWLS (*Asio accipitrinus*).—Since early in October odd specimens of these have been seen in many localities. There is little doubt these are immigrants.

STOCK DOVES (*Columba oenas*).—Although numerous enough now this is the first season in which I have seen these doves on what I should consider migration flight. Watching for migrants I saw at 7 o'clock a.m., 13th October, nine Stock Doves in two separate parties flying very swiftly due south. Again on 3rd December thirty-two of this species flew past in a compact flock, battling with a beam-storm of wind and rain—they were proceeding on a westward course.

JAYS (*Garrulus glandarius*).—For some years now Jays have been found in Nithsdale and in the Stewartry in odd birds or widely scattered pairs. One pair at least bred at a place a few miles from Dumfries, on the Galloway side of the Nith. Five birds frequented Terregles Park in March, but they disappeared subsequently without nesting. A single bird was shot in October near Dalbeattie. Probably we may now consider this species as an addition to our resident avifauna.

RAVENS (*Corvus corax*).—This is far from being a rare bird with us yet, though it goes without saying that this is not on

account of any immunity from persecution, which goes on in spite of the law. It was reported in the local papers in March that ten Ravens had been killed on Kenmure amongst other vermin—so called. One was also shot on Newtonairds about same time. A fortnight ago I handled a very handsome bird, the pet of the family, that had as a nestling fallen out of a nest on the sea-cliff in Rerrick and been then brought up by hand. It has complete liberty, and occasionally catches and devours one of the domestic pigeons. One morning in June while it was at some distance from home in a grass park, no less than four wild ravens appeared and were watched endeavouring, as was thought, to entice the tame individual away with them. He treated their overtures, however, with contempt.

SPOTTED REDSHANK (*Totanus fuscus*).—Mr. R. M'Call, Carsethorn, followed for some time a Spotted Redshank in October, but without success. As this gunner has shot this species before, and knows its appearance and call note, he is perfectly confident that he was not mistaken in the bird's identity.

RUFF AND REEVE (*Machetes pugna*x).—Mr. M'Call shot a specimen of each near Carsethorn on 10th October.

RED-NECKED GREBE (*Podiceps ruficollis*).—A fine ♂ was shot on the Nith on 6th October by a gunner named West, and was brought to me same evening. This is a rare species in Solway.

“WIRED” BIRDS.—In the aggregate telegraph and telephone wires must be accountable for a large amount of destruction to bird-life. I had a Barn Owl killed in this way at Lochanhead Station on 14th March, and a Spotted Crake, also picked up beneath the wires at Noblehill, Dumfries, on 3rd September, both given to me. Besides these, I picked up quite casually a Thrush in April, a Blackbird on 31st May, a Thrush on 30th September, a Blackbird on 2nd October, all in the early morning, some of them still warm. In addition to these I was shown two Nightjars, both of which had been picked up under the wires on the morning of 11th September, one at Killywhan Station, the other in Dumfries, places over eight miles apart.

STORM-DRIVEN BIRDS.—On 24th February a Guillemot was picked up in a meadow close to Maxwelltown, which is over six miles from the nearest part of the estuary, and much farther from the open Firth. The bird was in good bright feather, but its body was in the last stage of emaciation. Doubtless it had been blown inland by the fierce south-wester of the previous night. Various other storm-driven examples were got about same date. On the Caerlaverock bird nets many Puffins were also caught, and the Stewartry side of the Firth was strewn with Razorbills, and also Puffins and Guillemots. An exhausted and terribly emaciated Gannet was caught on the

shore opposite the garden-foot of Arbigland on 16th May. When captured it was sitting asleep with head under its shoulder feathers. It was confined in a mushroom house when I saw it the following day, and had recovered somewhat under the revivifying influences of a meal of small flounders. Gannets are scarce visitors to the Firth—at least inside of Southerness—although once perhaps in a season, two or three may be seen fishing at high tide.

STING RAY (*Trygon pastinæa*).—An unusual species in our waters. A good specimen from Carsluth was added to the nice little mounted and preserved collection of local fishes in the Kirkcudbright Museum in June.

SCAD OR HORSE MACKAREL (*Caranx trachurus*).—This is a species of uncommon occurrence in Solway waters. There is a specimen in the Kirkcudbright Museum from the estuary of the Dee; a second was sent me on 1st August 1898, by Mr. Pool, of the Port Ling fishery; and I can now record a third which I received from Mr. Harris, Carsethorn, on 11th November.

SEA BREAM.—Of very scarce and irregular occurrence in our waters. I received a small example in September from Carsethorn.

EQUOREAL PIPE FISH (*Nerophis aquoreus*).—On 28th March I had the pleasure of handling this species, a fish new to the Solway list. The specimen was a fine one, nearly 23 inches in length, and brightly coloured. The smell was of the strongest and fishiest. It had been caught in one of the paidle nets near Glencaple at the mouth of the Nith. Within the next few days every tide brought the same species in, in hundreds. The fishermen attributed the capture of such slender eel-like fishes to the amount of "floating rubbish" brought in by the strong swell caused by the stormy weather, which choked the nets, and so prevented such fish from getting through the meshes.

EELS (*Anguilla anguilla*).—The migration of young from the sea up the rivers took place unusually late. The first was noticed on 1st June.

GLOW-WORMS (*Lampyrus noctiluca*).—Unusual numbers of these attractive insects were observed at their rather widely spread localities in this area in early July. The moist atmosphere that prevailed at that time may have conduced to a greater electric display.

DEATH'S-HEAD MOTH (*Acherontia atropos*).—I have two occurrences to record. One was caught at Annan on 27th September, another, a beautiful example, which I set for its captor, was found in the kitchen of the farmhouse of Borland of Caerlaverock, on 18th October.



Photo by H. Evans.

COMMON RORQUAL (*BALÆNOPTERA PHYSALUS*), STRANDED AT KIRKCALDY, FIFE, 19TH FEBRUARY 1904.

CONVOLVULUS HAWK MOTH (*Sphinx convolvuli*).—Two of these fine insects were captured here this autumn. The first was got at Thornhill railway station on 29th August, the other at Troqueer Mills on 5th September.

PAINTED LADY BUTTERFLIES (*Vanessa cardui*).—These were seen in many widely scattered localities during the last week in September. They were bleached and battered, and were likely immigrants.

WINTER MOTHS.—Since October till the date of writing these moths have been in great plenty. I have not seen them so abundant in any former season.

ON THE OCCURRENCE OF THE COMMON RORQUAL (*BALÆNOPTERA PHYSALUS*, (L.)) IN THE FIRTH OF FORTH.

By WILLIAM EVANS, F.R.S.E.

PLATES II. and III.

SHORTLY after daybreak on Friday, 19th February 1904, a large whale was observed struggling in shallow water some two hundred yards off the west end of Kirkcaldy, on the north side of the Firth of Forth. It had evidently come inshore during high water in the early hours of the morning, and failing to make its way out of the bay in time, had been left stranded by the ebbing tide. Two men,—one of them an old whaler,—on hearing of the occurrence, at once went out to the animal and succeeded in killing it, the weapon used being an ordinary hedgebill. Notwithstanding the terrible wounds inflicted on the helpless creature, between two and three hours elapsed from the time it was attacked till it finally ceased to move. The requisite tackle having been procured, a strong rope was fastened round its tail, and, with the flow of the tide, it was hauled up the beach to high-water mark, where for a week it was an object of much interest to large crowds of people. Having been claimed by the Crown, the carcass was sold by public auction on 24th February for the small sum of £2, the purchaser being a manure merchant in Dunfermline.

Photographs of the animal, taken immediately after its death, show it lying at full length on the sands, back uppermost as one would expect. While being hauled ashore, however, it gradually turned over, and when finally beached lay more or less on its back, with the ventral surface fully exposed to view. It was in this latter position when I examined it, and took the photographs reproduced on the two plates accompanying this paper. These show well the long, slender form of the animal, and the longitudinal furrows on the throat and chest characteristic of the *Balænopteridæ*.

I first saw this whale the day after its capture, but the state of the tide (high water) at the time of my visit prevented me then making a close examination of it. That it was a Rorqual of some kind was, however, quite evident, and I felt pretty sure it was the species known as the Common Rorqual or Razorback—*Balænoptera physalus* (L.).¹ Two days later, with the tide out, I was able to make the desired examination, and satisfy myself that it was this species; the variegated baleen, the pointed form of the upper jaw, the relatively short narrow flippers, and other external characters all conforming to the descriptions. It was a female, and, to judge by its length,— $46\frac{1}{2}$ feet as against 60 to 70 feet in the adult,—immature. By the time the Crown authorities took possession of the carcass, it had suffered considerable mutilation at the hands of the visitors: the dorsal fin had been hacked off, the right fluke of the tail and the corresponding flipper materially shortened, pieces of the skin cut out, and much of the baleen taken away.

The following are some of the dimensions of the whale: they are from measurements made by myself, and may be taken as substantially correct:—

Entire length along middle of ventral surface	. 46 ft. 6 in.
(Along back to tip of snout about a foot less)	
Length of mouth (lower margin) about	. . . 9 ,, 6 ,,
Point of snout to flipper	. . . . . 13 ,, 6 ,,

¹ The nomenclature of the Whalebone Whales has been investigated by F. W. True in a paper published in the "Proceedings of the United States National Museum," vol. xxi. pp. 617-635 (1898), and one of the conclusions he arrives at is that *Balænoptera physalus* (L.) is the correct name for the species usually denominated *B. musculus*, the latter name being transferred by him to Sibbald's Rorqual.

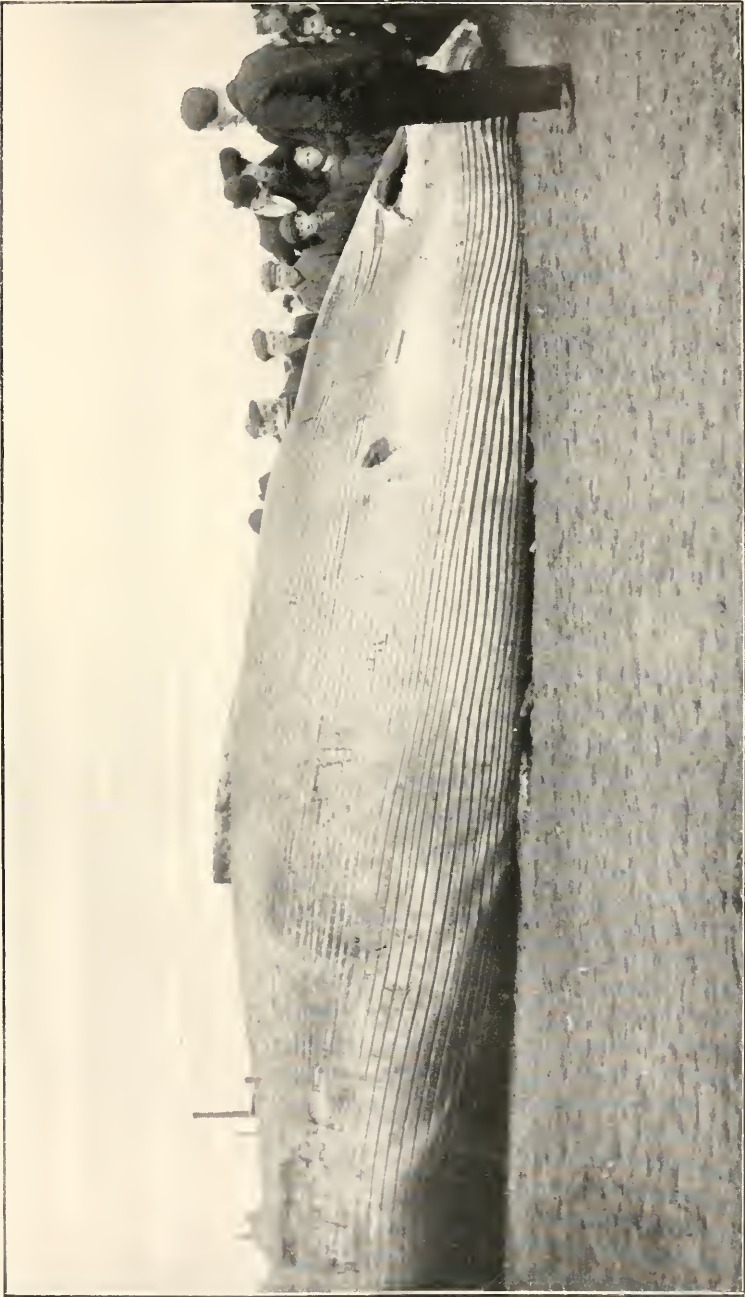


Photo by H. Evans.

COMMON RORQUAL (*BALÆNOPTERA PHYSALUS*), STRANDED AT KIRKCALDY, FIFE, 19TH FEBRUARY 1904.

Length of flipper along anterior edge barely	5 ft. 0 in.
Breadth of flipper at middle fully	1 " 0 "
Front of dorsal fin to end of tail about	12 " 0 "
Expanse of tail when entire (twice 4 ft. 9 in. being distance from centre of tail to tip of left fluke), say	9 " 6 "
Girth of body in front of flippers about	20 " 0 "
(A bystander told me he made it 22 ft. the day it came ashore.)	
Girth in front of dorsal fin	12 to 13 " 0 "
Girth in front of expansion of tail	5 " 4 "
Length of aperture of eye	0 " 3 "

The body was much compressed laterally from the region of the dorsal fin backwards, ending in a marked ridge both above and below. The longitudinal plicæ or folds on the throat and chest were very well seen, owing to the position in which the body lay. They constituted a series of parallel furrows or grooves from half an inch to one inch broad, with intervening flattened elevations or "ridges," varying in breadth from an inch on the forepart of the throat to two inches farther back. The longest of these ridges originated a little below the extremity of the lower jaw, and extended backwards for about 25 feet, or fully half the entire length of the animal. The shortest were the last or highest ones passing just under the flippers. Division of a ridge into two occurred here and there. Roughly counted, the number of ridges was set down at about sixty. The whole of the upper surface, that is of the head, body, tail, and flippers, was of a grayish black or dark slate colour, becoming darker and duller day by day, while the under surfaces of these parts was white or yellowish white, the two colours gradually merging into each other along the sides roughly in a line between the corner of the mouth and the ventral ridge at the tail. The skin in the grooves of the throat and chest was of a pinkish tint, except in the uppermost ones, where it was of a bluish. te colour. The middle plates of the whalebone or baleen might be described as slate coloured at the outer edge and yellowish white at the inner, each colour being gradually invaded by a series of vertical intrusions and bands of the other, thus producing the variegated and striped appearance that characterises

the baleen of this species. Proceeding backwards, the dark portions of the plates increased in extent, while forwards they decreased, finally vanishing in the short front rows. The long hair-like processes on the inner ends of the plates were dirty yellowish white. The enormous tongue was dull bluish black.

Although this species is of more frequent occurrence on the British coasts, at all events in the south, than any other of the baleen whales, no example, so far as I am aware, has been obtained in the Firth of Forth since 1808, when, on 23rd October, a male 43 feet long was stranded in the upper part of the estuary, near Alloa, a description of which is given by Dr. P. Neill in the "Memoirs" of the Wernerian Society (vol. i. p. 201). To this form are also now referred the whale, 46 feet long, stranded to the west of Burntisland on 17th November 1690, and minutely described by Sir R. Sibbald in his "Phalainologia" (p. 29), and that other of the same size captured there on 10th June 1761, and described by Dr. P. Walker (Neill, *op. cit.* p. 212). Van Beneden, in his "Histoire naturelle des Cétacés des mers d'Europe," speaks of an example in the Firth of Forth in April 1880, but, as mentioned in my "Mammalian Fauna of the Edinburgh District" (p. 99), this is doubtless the result of some error. In January 1848 a female 54 feet in length was cast ashore about three miles east of St. Andrews (R. Walker, "Scottish Naturalist," vol. i. p. 107), but the locality does not fall within the limits of the "Forth" area.

WHALING IN SHETLAND.

By R. C. HALDANE.

FOR some forty years the Norwegians have gone after whales in small steamers, from which the harpoons are fired from a gun in the bows, an improvement upon the old plan of following the whales in boats.

After whaling off the Norwegian coast, the industry was started in Iceland and in the Faroes. Lately the

The Shetland Company began operations first, unfortunately before their factory was ready, and killed six whales, most of which were lost. A flensed whale does not smell badly in salt water, but the smell of an unflensed whale is very bad. The Norrna steamer came in on 13th June, with two Finners or Rorqual (*Balænoptera musculus*), the largest of which was 68 feet long, a bull. The result of the first nine days was five Finners.

On 26th June, 1903, Captain Castberg sent me a message to come and see a big whale. On getting to the station we found a Sperm Whale, the dimensions of which were given to me as, length 68 feet, girth 40 feet. As is always the case in these waters, it was a bull, one out of a school of five, but he gave some trouble to secure, and the others went off. My friend took some photographs of him. He was an enormous animal. In the lower jaw there were 24 teeth, one, which I afterwards measured, was 8 inches long and $6\frac{1}{4}$ in circumference. His stomach was full of the remains of a cephalopod, which, from the size of the pieces, must have been of very large dimensions. There were a number of beaks of the "squid," one before me is $1\frac{1}{2}$ inches in length, but there was no ambergris. The outer skin resembled black oil silk, and was translucent. I am unable to state the amount of oil and spermaceti obtained, but the value of the whale came to about £300.

Some time afterwards another species of whale was killed, the peculiarity being that this one is always covered with barnacles. It was cut up when I saw it and I was unable to identify it.

Later on the whales seemed to get larger, and one was killed 84 feet in length. This I did not see, but was told it was a Finner (*B. musculus*). From the size I should have thought it to be Sibbald's Rorqual (*B. sibbaldii*), but was told not. Late in the year two of these were seen going south at a great speed, but, so far as I know, none were killed.

On 3rd July 1903, the whaler "Suderöe" came to Ronas Voe, from Faroe. I went on board and was shown a blade of whale-bone about seven feet long taken from a Greenland Right Whale (*Balæna mysticetus*) killed in latitude 61° N. and 4° W. longitude, shortly before.

steamers had to go further south to find whales, and it occurred to Captain Castberg of Sandefjord that Shetland would be a good place for a whaling station. He formed the Hvalfangeraktieselskabet Norrna, and erected a station at the extreme end of Ronas Voe, Northmaven, in 1903; while directly opposite to this the "Shetland Company" formed another station the same year. The requirements necessary for a whaling station being level land, plenty of fresh water, and a good natural harbour.

The cost of forming a station may be taken at about £8,000. The steamers will cost £4,200, lines and harpoons £500, the factory and dwelling house £2,500, labour and coal £800.

The steamer is a fast little vessel, able to steam 12 knots, and to turn in her own length, which is about 95 feet. There is only a foremast, on which is a "crow's nest" of canvas for the look-out man. In the bows is a heavy swivel gun with back and fore sights, very strongly made. The charge is about half-a-pound of powder. The harpoon is about four-and-a-half feet long, with a diamond-shaped head in which the flukes are hinged. These are brought back and lashed to the stock, and below them is a shell, which explodes on striking the whale, when the flukes fly out. The after part of the stock is divided in two for nearly the whole length, to allow an iron ring to run, to this ring is fastened the line of strong manilla, about two inches in diameter. When the harpoon is put in the barrel of the gun the ring is just clear of the muzzle. The weight of the harpoon is considerable, and whales are not fired at over fifty yards away.

The factory has about six boilers, some 12 feet in height, a revolving knife for cutting blubber, a settling vat. Below the factory is a wooden slip going down into the sea up which the carcasses of the whales are drawn to be cut up. This is done by flensing knives, with keen blades fitted on long handles. The whale is drawn up by a steam winch towards the factory, an incision is made close to the head, a wire cable with a hook at the end is fixed in the "blanket" of blubber which is drawn up, the flenser following with his knife to see that no blubber is left on the flesh.

Of the whales killed at Ronas Voe last year, with the exception of the Sperm Whale, the one with barnacles, and a "Bottle-nose," all the rest were Rorquals (*B. musculus*).

Few people have any idea how destructive Finner Whales are to herring. In one they found about ten barrels of quite fresh herring, besides about ten barrels of semi-digested herring. In another, killed just after taking its last mouthful, were three barrels of freshly swallowed herring.

About July, I am told Finners cease to feed on herring, and for a fortnight fall off in condition, they then live upon crustacea and soon become fatter than ever.

The two stations at Ronas Voe ceased working at the end of September the "Norrna Company" had 63 whales, and the "Shetland Company" 61. Besides these stations there will be next year, at the Brig of Collafirth, the "Alexandra Station," and two new stations are going up about Voe.

The stations expect to begin work in April next, when I hope to be in a position to obtain regular and accurate returns, as well as photographs of the most interesting specimens obtained.

ON THE WHALE FISHERY FROM SCOTLAND, WITH SOME ACCOUNT OF THE CHANGES IN THAT INDUSTRY AND OF THE SPECIES HUNTED.

By THOMAS SOUTHWELL, F.Z.S., etc.

PLATE IV.

THE year 1903 has witnessed the inauguration of a new industry so far as the Scottish Islands are concerned, the bounteous ocean has been made to yield yet one more product to swell the harvest of the sea, and that apparently a very important one. I refer to the Fin-whale fishery established in the spring of last year at Ronas Voe on the Mainland of Shetland. It is true the pursuit of these

giant animals did not originate in Scotland, nor is it by natives of our own country that it has been established here ; but as it seems probable that the new departure will speedily be naturalised and its operations considerably extended, perhaps not altogether without opposition from some other interests supposed to be involved, it seems desirable to put on record the results of the first seasons's fishing, and at the same time briefly to trace the origin of the Fin-whale fishery in the Arctic seas off the Norwegian coast, its spread to Iceland, the Faroes, and the Shetland Isles, and to add a short description of the animals hunted and some of the features by which each species may be easily recognised.

But before proceeding further, in order fully to understand how it came about that this family of Cetaceans, so long regarded as too worthless, or as beyond the power of man to subdue, came to be seriously hunted, it may be well to revert to the long past and review very briefly the origin and progress of the whale fishery of the North Atlantic and the Polar seas. This is the more desirable as there seems to be even in the present day, and among writers of repute, a want of appreciation as to the changes which have taken place in this industry, and a curious amount of confusion with regard to the species of whale pursued at different periods. As an instance of this, perhaps I may be allowed to quote from a charming book written by a master of science, as well as a deservedly popular exponent of nature, entitled "The Beauties of Nature," wherein at p. 343 the writer tells us that whales (presumably referring to the Polar Right Whale) have been gradually driven farther and farther north in avoiding the pursuit of man, and this appears to be the generally received opinion, whereas both the nature of their food and the character of the seas essential to their well-being render it impossible for this ice-loving species ever to have (under present conditions) inhabited the seas washing our shores ; they could no more exist in the tepid waters of the Bay of Biscay or of the Mediterranean than the Ptarmigan could thrive on the chalk Downs of the south of England.

What, then, was the species of the whale hunted in times long past by the inhabitants of the Basque provinces

of France and Spain? It is to Professors Eschricht and Reinhardt¹ that we are indebted for establishing beyond a doubt that this animal was a distinct species, confined to the temperate waters of the North Atlantic, spending the winter season as far south as the Bay of Biscay, entering the Mediterranean, and in summer migrating to the seas about Iceland, the North Cape, and Cape Farewell, also extensively hunted by the Basques at the end of the sixteenth century off Newfoundland and in the Gulf of St. Lawrence. This whale they named *Balæna biscayensis*, and it is quite certain that any Right Whale (*Balæna*) found on our shores belonged to this species. I have not space to enter upon the intensely interesting early history of the pursuit of this whale, but must refer the reader to Professor Eschricht's exhaustive account, and to an excellent paper by Sir Clements Markham, who visited Spain for the express purpose of studying the subject, and who communicated the result to the Zoological Society, in whose "Proceedings" for 1881 it will be found printed. I may add that, although practically fished out, this species still occurs at rare intervals within precisely the same limits which it frequented when it formed the quarry of the hardy Basque fishermen. How much more extensive its range really is cannot be discussed here, but should the Cetacean known as *B. australis* (and rejoicing in many other synonyms) be identical with this Atlantic species, as seems more than probable, then its range will be vastly more extensive than was supposed to have been the case. With the failure of this species the first period of the whale fishery may be said to have come to an end.

By the discovery of the Spitzbergen group by the Dutch navigator Barents in 1596 on his third Arctic voyage, followed in 1607 by the intrepid Hudson in the "Hopewell," a new era in the whale fishery was established. The home of the Greenland Whale, a far more valuable species from a commercial point of view than that which had hitherto been hunted, was first invaded, and the whales were found in astonishing abundance.

¹ "Recent Memoirs of the Cetacea," by Professors Eschricht, Reinhardt, and Lilljborg, translated by Professor W. H. Flower, Ray Society, 1866.

At first, so easy of approach and capture were these confiding animals, that the seas of Spitzbergen soon swarmed with vessels, first British, then of other nationalities, particularly the Dutch, who for a long time ran us hard in our whaling enterprise. But the brave Basques had not lost their cunning, and although they do not appear to have fitted out expeditions of their own to enter the icy seas they were largely employed as harpooners and in other offices where skill and experience were required. Extermination went on at a furious rate—the whales being at first attacked from the shore and the blubber landed to be tried out at settlements, each nationality having its recognised portion of the fore-shore; but soon the whales became shy and forsook the shore, rendering it necessary to follow them into the ice. Vain, however, were their efforts to evade their enemy man, and in the seas where there were at that time great whales innumerable not one has been seen for several years.

The Davis Strait fishery was initiated by the Dutch in 1719. They at first killed large numbers of whales; the British followed later, and still frequent these waters, but although a fair quantity of whales are seen, comparatively few, owing to various causes, are captured. It is the opinion of many experienced whalers that the introduction of steam gave the death-blow to the industry, especially in the Greenland waters.

The task of tracing the decay of this once important industry is a tempting one, but cannot be indulged in on the present occasion. As, however, the enterprise is now a purely Scottish one, and has long been confined to the ports of Peterhead and Dundee, perhaps I may be allowed to quote a few facts illustrating its rapid decline. For the first quarter of the nineteenth century scarcely a seaport of any importance on the east coast of England was unrepresented in the Arctic seas; from Scotland, Berwick, Leith, Kirkcaldy, Dundee, Montrose, Aberdeen, Peterhead, Kirkwall, Greenock, and for a time Banff and Bo'ness, all took part in the whale fishery. Gradually, one by one, they fell off, till only Peterhead, which sent out her first whaler in 1788, and Dundee in 1790, were left. In 1893 Peterhead, which in 1857 sent out 34 vessels, ceased to be represented in the industry,

leaving Dundee in possession of the field. Dundee sent out its largest fleet in 1885—16 vessels; in the past season of 1903 she was represented by 5 vessels only, one of which was wrecked. Mr. Robert Kinnes of Dundee tells me that between the years 1814 and 1823 12,907 whales were killed in Greenland and Davis Strait by British vessels; between 1824 and 1833, 9,532 were killed; and between 1834 and 1843 only 1221. The numbers gradually decreased till the introduction of steam. In the ten years ending 1902 only 172 whales were killed, 21 of which were obtained in Greenland, which once favoured locality has now been deserted.

The great *Balaena mysticetus* has been represented as being circumpolar in its distribution; but that can hardly be said to be the case, at least in the present day. We have seen how scarce it has become in the seas to the east of Greenland. I cannot find that it passed east of Spitzbergen, and it was apparently not met with between 10° and 170° E. longitude, where, at Cape Schelagskoi, we come in contact with the bowhead of the American whalers. On the other side Bering Strait these whales do not appear to penetrate much farther east than Cape Bathurst, and it seems highly improbable that there is any inter-communication between those at that point and the whales in Baffin Bay. On the other hand, the whales on the east side of Davis Strait do not descend so far south as Cape Farewell, nor are those in the Greenland Sea known to pass westward round that Cape. It seems therefore that, although their range as a species is undoubtedly extensive longitudinally, the localities they inhabit are greatly restricted, each being frequented by a local race differing from the others in some slight degree, only of racial value, although they may possibly be species in the making. I have elsewhere¹ gone at length into the distribution of this interesting animal and given my reasons for arriving at the conclusions above stated, my belief being that actual extermination is taking place within the fixed limits which each race has always inhabited, and that no change of habitat can have or has taken place in the past.

¹ 'On the Migration of the Right Whale,' "Natural Science," vol. xii. pp. 397-414.

Having briefly reviewed two phases of the whale fishery, each perfectly distinct from the other, and each practically obsolete, it is time to speak of the Fin Whales, which form the object of the new departure. And yet there is really nothing new in the capture of some species of whale in these northern seas, for there is evidence that a thousand years ago such captures were effected by the Norwegians in the waters of Scandinavia.

The mention of this early fishery, although by what method it was effected we know not, occurs in a sadly misunderstood passage in King Alfred's account of Ohthere's voyage to the White Sea which has given rise to almost endless comments. Quoting from Dr. Joseph Bosworth's translation, the passage runs as follows: "Ohthere told his lord King Alfred . . . that he chiefly went thither [to the shores of the White Sea], in addition to the seeing of the country, on account of the horse-whales [walruses], because they have very good bone in their teeth: of these teeth they brought some to the King; and their hides are very good for ship-ropes. This whale is much lesser than other whales: it is not longer than seven ells; *but, in his own country, is the best whale-hunting; they are eight and forty ells, and the longest fifty ells long*; of these he said that he [was] one of six, who killed sixty in two days." The translation given in Hakluyt (edit. 1885, i. 53) is practically to the same effect. Much ink and much ingenuity have been expended to reconcile this apparently impossible feat with Ohthere's known veracity, but, as Professor Skeat says,¹ "the true answer is extremely simple when you know it." Disregarding the misleading punctuation, and reading the portion printed in italics parenthetically, "any one acquainted with the colloquial character of Anglo-Saxon narration" will at once see that it is the Horse Whales (Walruses) of which he with five others killed sixty in two days. But the point I wish to emphasise is that although Ohthere states the whales found on the Norwegian coast, and which afforded "the best whale-hunting," were from 96 to 100 feet long (which would seem to indicate that they were Finners of the largest kind), I have not-

¹ "Notes and Queries," 7 S. vi. 44 (1888).

withstanding a shrewd suspicion that they were in reality a much less formidable animal,—the Atlantic Right Whale before referred to, and not the fierce and active Finners, which, with the appliances available at that date, it must have been beyond the power of man to subdue.

Hitherto the whalers had to deal with animals of a timid, inoffensive nature. A fighting Polar Whale was of rare occurrence, and such casualties as occurred were almost entirely accidental; but in the members of the family of Balænopteridæ quite a different state of things prevailed, and notwithstanding Ohthere's supposed example the modern whalers left them severely alone. The rush of these animals when wounded is tremendous, and their vitality so strong, that attacking them in the old fashion from open boats was too dangerous and the prize not sufficiently valuable to warrant the risk involved in their pursuit. And yet the Right Whales having become so scarce, we can imagine the disappointment which the presence of so many of these huge beasts, altogether beyond their power to capture, must have caused the hardy Norwegian walrus-hunters. At length it occurred to Herr Svend Foyn to try the effect of an explosive projectile, which, if effectively delivered, would place the whale at once *hors de combat*; and after expending a very considerable amount of money and time in experimenting, he finally perfected a bomb harpoon with a suitable gun for its delivery, and mounting it in the bow of a small but powerful steam-vessel, he, I believe in the year 1865 or 1866, made his first successful voyage. Twenty years later no less than 34 similar vessels were at work off the Finmarken coast, and a great industry was firmly established, which has spread to Iceland, the Faroes, and finally to the Shetland Islands, and will be still further extended in the spring of 1904. The fishery from all these localities has hitherto remained entirely in the hands of the Norwegians, who have in the past season established two stations at the head of Ronas Voe on the north-west side of the Mainland of Shetland, whence they send out steamers to kill the whales and tow them in to be disposed of at the shore station. Commencing in the months of May and June, they worked up to the 9th of

September, when the fishing was discontinued, the whales having left the shore. The result was that the "Norröna," belonging to the Norröna Whaling Company, killed 64 whales, and the "Frithjof," belonging to the Shetland Whaling Company, captured 62—126 whales in all. This first success is to be followed by a new station at Collafirth, and doubtless others will soon be added. An unlooked-for capture by one of the whalers was a male Sperm Whale, 68 feet long, which was killed out of a "school" of 5, the other 4 making their escape. A considerable "school" of these valuable animals, estimated by some at 30 individuals, visited the seas in the neighbourhood of Iceland in the past season, and some 6 or 7 were killed in all by the whalers.

A writer in the "Shetland News" states that the Finmarken whaling fleet is now owned by half-a-dozen companies sending out 20 steamers; that at Iceland by ten companies supplied by 30 steamers; and four or five firms fishing from the Faroes employ 7 other vessels. The same authority states that these stations in the season of 1902 disposed of nearly 2500 whales of various species, 1300 of which fell to Iceland. To these must now be added the two Shetland vessels with 126 whales. The apparatus employed and the mode of proceeding have frequently been described, and there is no need to repeat it here. The Fin Whales have been met with hitherto in altogether surprising numbers, but how long the severe strain to which they are subjected can be sustained, who can tell? The value of the Norwegian fishery has already fallen from 72,633 kronen in 1897 to 27,390 kronen in the year 1900. Great complaints have arisen from the Norwegian fishermen as to the disturbance produced in their legitimate occupation by the operations of these whalers, and as the result of an official inquiry by that government whaling along the Norwegian coast has been forbidden within seven kilometres from the land for the next ten years. Probably it is owing to these complaints, which are not of recent origin, that the fishery has been extended to Iceland and the Faroes, and it will be interesting to learn what the Shetland fishermen have to say on

the subject, especially if the "krangs" are towed out to sea and sent adrift, as has been done in the past season.

A very successful fishery for Fin Whales was established at St. John's, Newfoundland, in 1897, on the same lines as the Norwegian, and so far does not appear to have met with any opposition from the line fishermen.

It remains to give a brief account of the species of the whales which form the objects of pursuit in this third phase of the whale fishery, and to point out certain features by which they may readily be recognised.

The great order of marine mammals known as the Cetacea is divided, very unequally so far as the number of species is concerned, into two sub-orders: the Mysticoceti, in which teeth are absent, but their place, in the upper jaw, is taken by a wonderful series of laminae, graduated in size, known as baleen, or popularly as "whalebone"; in the second sub-order, Odontoceti, teeth more or less numerous are present, and this latter division comprises all the toothed whales, from the giant Sperm Whale to the smallest Dolphin. It is with the first sub-order that we have to do, and this is again divided into two families—Balænidæ and Balænopteridæ. The first family consists of only two species, found in the North Atlantic—the Polar Right Whale and the so-called Atlantic Right Whale (*Balæna biscayensis*). In the second family are the great Hump-backed Whale (*Megaptera longimana*) and four species of Balænoptera known as the Common Rorqual or Finback (*B. musculus*): Sibbald's Rorqual (*B. sibbaldii*), the "Blue Whale" of our whalers and the "Sulphur-bottom" of the Americans; and two smaller species, Rudolphi's Rorqual (*B. borealis*) and the Lesser Rorqual (*B. rostrata*). All these latter may at once be distinguished by the curious furrows, like the "ribs" in knitted stocking, extending longitudinally from the throat to the abdomen, admitting of a vast integumentary expansion of these regions.

With the Polar Right Whale we have nothing to do, as it is not found in the regions visited by the Fin-whalers; but although the ATLANTIC RIGHT WHALE (*Balæna biscayensis*, or *australis* as it is now more generally called) is never likely to form any considerable item in the whalers' returns, it must not be passed over unnoticed. As before stated, this is the species which was formerly hunted by the Basques and was long believed to be virtually exterminated; but there is no doubt certain whales seen in Peterhead Bay in the years 1806 and 1872 belonged to this species, and the late Captain D. Gray told me of other instances in which similar whales were observed in about the latitude of Cape Farewell. It has also been met with in the harbour of St. Sebastian and in the Gulf of Taranto.

Subsequently, as might be expected, on the establishment of the Fin Whale fishery, it appeared evident that if any of these whales were still frequenting their former summer quarters they were almost sure to be met with by the Norwegian whalers, and such proved to be the case; for in 1882 Dr. Guldberg discovered the remains of this species on the Finmarken coast and expressed the opinion, from reports and circumstances brought to his notice, that "considerable numbers again yearly appear" on that coast.¹ In 1889 one was taken by the Norwegian whalers south of Iceland; in 1890 six were killed, in 1891 ten. Others may have been killed, but of that I have no information till 1902, in July of which year one was killed, and finally last season (1903) three others, all in the neighbourhood of Iceland. It is thus evident that the chance of survival of this species in these waters is very slight.

The Atlantic Right Whale may at once be recognised by its more bulky head, shorter in proportion than that of the Greenland Whale, and by a curious warty growth ("the bonnet") said always to be present on the snout; it is also generally much infested by barnacles. The "bone," though much longer than that of any of the Fin Whales, averages about 7 feet only, some two-thirds that of its Polar relative; it is also coarser, and therefore much less valuable (Fig. 1, Plate IV.).

The great HUMP-BACKED WHALE (*Megaptera longimana*, Rudolphi), the Knöl, Pukkalhval, or Troldhval of the Norwegians. This whale is the only representative of its genus, and derives its trivial name from its low, fleshy dorsal fin. It is a bulky, ungainly-looking animal, from 40 to 50 feet long, black, with the exception of the under surface of the tail and some white patches on the chest. The flippers are very long and narrow, about 13 feet, black above, white on the inner surface, strongly notched along the inferior margin, and forming a very remarkable feature. The baleen is short, the longest slip being about 2 feet long; the bristles may be gray or yellowish (Fig. 2, Plate IV.). Its food consists of small fish and "Kril" (*Thysanopoda inermis*), with other small crustaceans, but one found dead after indulging too freely in Cormorants, having swallowed six, is supposed to have choked itself with the seventh.

Although not difficult of approach, this species is not a favourite with the whalers. It sinks when killed, and is difficult to recover, in addition to which it yields only a small quantity of oil. Those of us who remember the protracted struggle made by a whale of this species which too confidently frequented the mouth of the Tay in the last days of 1883 will appreciate both its tenacity of life and powers of resistance. It is usually much infested with a parasitic Cirripede (*Diadema coronula*) and a whale louse (*Cyamus*).

¹ "Nature," vol. xxx. p. 148 (June 1884).

The COMMON RORQUAL, or Finner (*B. musculus*, Lin.), or, as it is often called from its attenuated appearance, the "Razor-back," is the Fin Hval, or Rörhval = Reed Whale, of the Norwegians. It is too well known on our own coast to need much description.

The males, which are perhaps slightly the larger, are from 60 to a little over 70 feet long. There is a variety which is regarded by the Norwegian whalers as a hybrid between this and the Blue Whale, which is said to be larger than this species and of a lighter colour.

The colour of this whale when living is grayish black on the upper surface, changing to black after death—a change to which all whales are subject. The throat, belly, and flippers black, under parts white. The whalebone does not exceed 3 feet in length, is slate gray veined with darker colour and fading to a yellowish colour in the bristles, and short anterior plates (Fig. 3, Plate IV.). It is a great fish-feeder and is sometimes known as the "Herring" Whale, and although so emaciated in appearance it yields a fair quantity of oil.

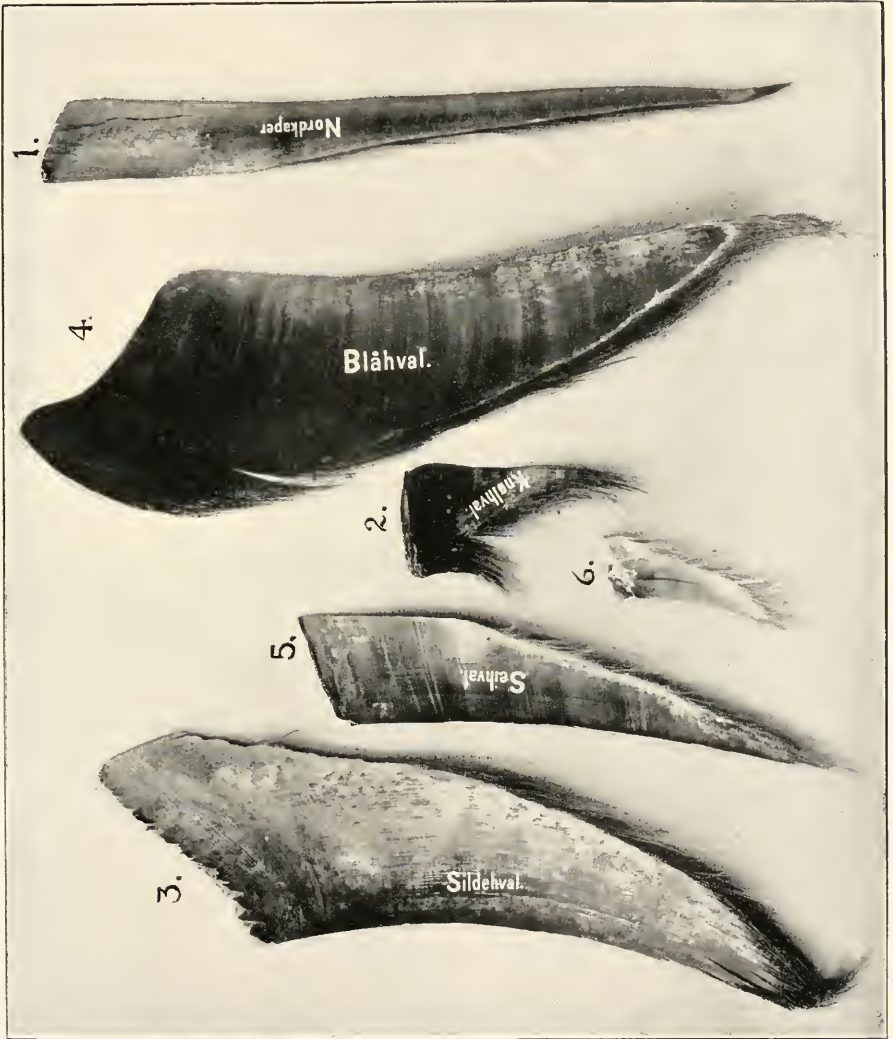
The BLUE WHALE (*B. sibbaldii*, Gray), Blaaival of the Norwegians, is the largest of the Rorquals, and the whaleman's chief prize. Although reaching the enormous length of 80 feet and perhaps more, it is a fairly robust and shapely animal, very active, and capable of attaining great speed. Before the invention of the bomb harpoon it would have been hopeless to attempt its capture. One harpooned by a Newfoundland whaler in Placentia Bay in March 1903, not being struck in a vital part, towed the steam whaler "Puma" a distance of 122 miles, the screw being reversed at full speed the whole time, and not until 26 hours had elapsed was it exhausted and killed. On the west side of the Atlantic it is known as the "Sulphur-bottom," from a tinge of yellow which is sometimes present on the under part, but the general colour is dark bluish gray on the upper surface, lighter on the sides, the throat and belly more or less flecked with white. The flippers are dark above, with the lower edge and under surface white; the dorsal fin low and placed far back; and the baleen, including the bristles, black, under 3 feet long—the largest slip Mr. Cocks ever saw was 34 inches long and over 24 inches broad at the gum (Fig. 4, Plate IV.). The baleen is frequently infested with a species of copepod known as *Balenophilus unisetus*. Its food consists almost entirely of small crustacea: it does not therefore enter into competition with the fishermen. Dr. Guldberg is of opinion that the Blue Whale does not reproduce its species oftener than once in three years; it is thus easy to predict its speedy extirpation, more especially as many of those killed are gravid females.

The small whale known as RUDOLPHI'S RORQUAL (*B. borealis*, Lesson), the Sildehval (Herring Whale) or Sejhval (Colefish Whale) of

the Norwegians, although very uncertain in its numbers (771 were killed in the Finmarken fishery in 1885, but sometimes it is scarce), is, upon the whole, the most numerous species found off the Finmarken coast. Until of late, it was considered a very rare species. It seldom exceeds 48 feet in length, and is coloured bluish black above, which becomes jet black after death, with more or less white beneath, very unevenly distributed. The flippers are coloured like the back on the outer surface, but lighter on the inner. The baleen (Fig. 5, Plate IV.) is black, with the bristles white. Professor Collett gives the length of the longest slip as from 550 to 600 mm. ($23\frac{1}{2}$ inches): the longest slip in an example killed in the river Crouch is given by Sir W. H. Flower as 12 inches, degenerating in front to mere hairs. This species appears late on the Finmarken coast, generally in the beginning of June, and departs early in August; probably the duration of its stay depending upon the presence of its principal food, which consists at that time of *Calanus finmarchicus* and "Kril" (*Euphausia inernis*), which also form the food of the Blue Whale. Owing to its small size and yield of oil as well as of bone, this species is not a favourite of the whalers. Of course these are mere baby whales compared with the giant Blue Whale, and Mr. Cocks states that the heavy harpoon used has been known to pass quite through their bodies and explode on the other side.

The LESSER RORQUAL (*B. rostrata*, Fab.), the Vaagehval (Bay Whale) of the Norwegians, does not figure in the returns of that country's fishing; indeed, it is far from common there. It has a more southerly habitat, the latitude of the Faroes being about its normal limit; but on the English and Scottish coasts it is by no means uncommon. Sir William Turner has published, in the "Proceedings of the Royal Society, Edinburgh" (Session 1891-92, p. 36), an elaborate description of a specimen which came ashore at Granton in January 1888; and, although I have examined several in the flesh, I cannot add much to his excellent account of its external characters.

It is the smallest of the Fin Whales, rarely exceeding 30 feet in length. The head is flattened and pointed, hence one of its popular names the "Pike Whale," the body slender but symmetrical, the dorsal fin far back and falcate; the flippers are about 4 feet long. The baleen is very short,—Sir Wm. Turner gives the length of the longest slip of the Granton whale as $8\frac{1}{4}$ ins. long and 3 ins. wide at the gum,—and the colour is yellowish white (Fig. 6, Plate IV.). The general colour of the body is black on the upper parts, with a grayish tinge merging into white below. The flipper is black on the outer side, crossed by a bar of white—a feature by which it may be readily distinguished from Rudolphi's Rorqual. This species feeds on small fish, and is known by our fishermen as the "Sprat Whale."



BALENS OF THE BRITISH MYSTACOCETI.

In the above descriptions I have given the Norwegian names of the different species, as they are those probably used by the men of that country at present fishing from Scotland.

It would be interesting to know the dates of arrival and departure of the various species on our coast, also the relative numbers of each kind killed. It is stated that of 3664 whales killed by the Finmarken whalers in four years, 9.22 per cent were Blue Whales, 51.83 Common Rorquals, 32.51 Rudolphi's Rorquals, and 6.44 per cent Hump-backs. It does not, however, follow that each species occurs in these proportions; for the hunters would naturally select those which are most profitable, to the exclusion of the others, and the numbers of each which put in an appearance in any given year are by no means constant.

One is often disappointed on reading the announcement of a "whale ashore" at finding that not a single feature is mentioned by which its species could be determined; and as all those mentioned above may be met with in Scottish waters, I hope that the particulars here given may be found serviceable in their identification.

I am greatly indebted for many of the above particulars to the excellent papers on the "Norwegian Fin Whale Fishery" published from time to time by Mr. Alfred Heneage Cocks and by Professor Collett of Christiania, both of which gentlemen have enjoyed (?) the privilege of examining, under the most favourable circumstances, many of these animals at the factories there; and the value of their investigations will be appreciated by those who have experienced the difficulty of making a critical examination of such specimens as have been stranded from time to time on our shores.

EXPLANATION OF PLATE IV.

Fig. 1.	<i>Balena biscayensis</i> (Nordkaper)	97 cm. long,	10.5 cm. broad.
„ 2.	<i>Megaptera longimana</i> (Knölhval)	34 „	16 „
„ 3.	<i>Balenoptera musculus</i> (Sildehval)	85 „	34 „
„ 4.	<i>B. sibbaldii</i> (Blahval)	95 „	43 „
„ 5.	<i>B. borealis</i> (Seihval)	72 „	17 „
„ 6.	<i>B. rostrata</i> (Vaagehval)	25 „	10 „

These are the actual measurements of the specimens figured, but Dr. James A. Grieg, of Bergen, to whom I wish to express my great indebtedness for the photograph from which the plate is reproduced, has also kindly supplied me with the following measurements of specimens of baleen in the Bergen Museum:—

	Long.	Broad.
<i>Balena biscayensis</i>	215 cm.	21 cm.
<i>Megaptera longimana</i>	73 „	24.5 „
<i>Balenoptera sibbaldii</i>	110 „	43 „
<i>B. borealis</i>	78 „	25 „

[TABLE.]

TABLE OF DISTINGUISHING FEATURES OF THE BRITISH MYSTACOCETI (WHALEBONE WHALES).

SPECIES.	Colour.		Belly and Throat.	FLIPPERS.	Dorsal Fin.	Baleen.		Total Length.
	Upper Parts.	Under Parts.				Length.	Colour.	
<i>Balena mysticetus</i> , Greenland Right Whale. (For comparison only.)	Dark gray.	Throat white.	Without plicae.	Black.	None.	Narrow, 10 to 13 ft. long, 11 in. to 13 in. broad at gum.	Blackish gray.	50 to 60 ft.
<i>Balena biscayensis</i> (<i>australis</i>). Atlantic Right Whale.	Uniform black.	Black.	Smooth.	Black.	None.	About 7 ft. long.	Black.	Over 50 ft. (?)
<i>Megaptera longimana</i> , Hump-backed Whale.	Jet black.	Mostly black, under side of tail white.	Plaited (plicae).	Outer side black, under side white. About 13 ft. long.	Low.	About 2 ft., 5 in. broad at the gum.	Black, with yellowish bristles.	About 40 to 50 ft.
<i>Balenoptera musculus</i> , Common Rorqual.	Grayish slate colour.	White.	Plaited.	Blackish above, white beneath, the inferior margin white. About 6 ft. long.	About 15 inches high.	About 3 ft., breadth at gum 1 ft.	Slate coloured veined with darker, bristles pale yellow.	60 to 70 ft.
<i>Balenoptera sibaldii</i> , Sibald's or Blue Whale.	Dark bluish gray.	Small white spots on breast.	Plaited.	Black above, lower edge and inside white. 10 ft. or more.	Low and small.	About 3 ft., 2 ft. broad.	Black, also bristles.	80 to 85 ft.
<i>Balenoptera borealis</i> , Rudolphi's Rorqual.	Dark gray-blue.	More or less white to the vent.	Plaited.	Black above, lighter on under side.	High and falcated.	About 20 in.	Black, with white bristles.	40 to 50 ft.
<i>Balenoptera rostrata</i> , Lesser Rorqual.	Grayish white.	White.	Plaited.	Black above, with broad band of white, under side white.	High, deeply falcated.	About 8 in.	Yellowish white.	25 to 30 ft.

SULE SKERRY, ORKNEY, AND ITS BIRD-LIFE.

By JAMES TOMISON.

(Continued from p. 26.)

III. REGULAR AUTUMN AND WINTER VISITORS.—

Under this heading are: Song Thrush (*Turdus musicus*), Redwing (*T. iliacus*), Fieldfare (*T. pilaris*), Blackbird (*T. merula*), Ring Ouzel (*T. torquatus*), Wheatear (*Saxicola œnanthe*), Robin (*Erithacus rubecula*), Pied Wagtail (*Motacilla lugubris*), Twite (*Linota flavirostris*), Common Bunting (*Emberiza miliaria*), Snow Bunting (*Plectrophenax nivalis*), Starling (*Sturnus vulgaris*), Merlin (*Falco æsalon*), Heron (*Ardea cinerea*), Golden Plover (*Charadrius pluvialis*), Lapwing (*Vanellus vanellus*), Turnstone (*Streptopus interpres*), Woodcock (*Scolopax rusticula*), Snipe (*Gallinago gallinago*), Purple Sandpiper (*Tringa striata*), Redshank (*Totanus calidris*), Curlew (*Numenius arquata*), Glaucous Gull (*Larus glaucus*), Iceland Gull (*Larus leucopterus*), Little Auk (*Alca alle*), Meadow Pipit (*Anthus pratensis*).

Most of the above are only seen for a day or two during migration. The Song Thrush, Redwing, Fieldfare, Blackbird, and Ring Ouzel, are sometimes seen in great rushes in October and November, especially the Redwings and Fieldfares. They very seldom call on the way north, in spring, but occasionally they are seen for a day or two in April. Wheatears are common in large flocks in August and September. Very few seen in spring. The Pied Wagtail is a very irregular visitor, sometimes seen for a few hours at intervals from May to the end of September. The latter month is the time they are most in evidence.

The Robin calls every year in the end of August and through September. The Twite is most commonly seen in April and May, sometimes in large flocks, staying for a few days and then disappearing. A few call in August and September, and I have seen them in November. The Starling is not at home on the island. I have seen a few for a day and a night in every month of the year with the exception of December and January. Ten is the greatest number I have

seen at one time. They occasionally remain all night roosting on the dome of the lantern, but always depart the following morning.

The Common Bunting is by no means a regular visitor. In December 1899 a large flock remained for most of the month, one of them becoming so tame that it came regularly into the workshop for food. The Snow Buntings are first seen in September. In October and November large flocks rest on the island for a day or two, and scores of them lose their lives on the lantern at night. Very few are seen in December, January, and February. In March and April they visit us on their way north, but never in crowds. I have seen solitary specimens in May in summer plumage, and on 2nd June 1901 I saw three.

The Merlin is always on the hunt where there are plenty of small birds about. Two and three are almost constantly present from August till November, and a straggler is seen occasionally in spring.

The Heron is a very uncertain visitor, having been seen almost every month in the year, but August, September, and October is the time they are most common. As a rule they are unsociable birds, and love to travel alone. It is rare to see more than one at a time, but on one occasion—15th October 1899—no less than 5 were seen on the island.

‡ The Golden Plover is always seen and heard during the autumn migration. A few are seen during the day, but large flocks pass at night, their cry being heard in all directions. On a heavy dark night I have seen scores of them flying round the lantern, but only once saw one strike against the windows.

The Lapwing does not seem to take the Sule Skerry route on its way south. Very few are either seen or heard in autumn, a few stragglers appear in August, September, and October. In February and March, if there is a continuance of easterly and south-easterly winds, flocks of from 6 to 12 very often rest for a few days.

The Turnstone and Purple Sandpiper are well known winter friends, the former arriving in August, and the latter in September. Both depart in April for their breeding

haunts. The Turnstones in particular are great favourites, and are most carefully preserved. They have become almost as tame as barn-door fowls, and will come from all parts of the island for food when they see any one outside after dinner. I am perfectly satisfied the same birds come back to us year after year. In July and August occasional flocks call when passing south before our own birds return, and are easily recognised as strangers by their fear of man's approach. But immediately our friends return they are at home, turning small stones, in search of worms, close to the Tower. About 40 to 50 always winter on the island.

The Purple Sandpiper spends most of its time along the seashore, and though quite fearless of man's approach, is not so sociable.

The Snipe and Curlew are winter residents arriving in August and September, and departing in April. In other parts of Orkney the familiar cry of the Snipe, only heard in spring and summer, is first heard about the end of February or 1st March—I heard it on 26th February last year at Pentland Skerries—but though they are on Sule Skerry till April, this cry is never heard on the island.

The Redshank is a very erratic visitor, being seen almost in every month of the year for a day or two at the time. August, September, and October are their favourite months.

The Glaucous and Iceland Gulls are fairly common in November, December, and January. In November immature specimens of the former are seen every year, and in December a few adult birds never fail to turn up. On 25th December 1901 a flock of over 50, nearly all old birds, were seen resting all day on the outlying rocks. Most of them left on the 26th, but 7 remained till the 30th. The Iceland Gull is not so common a visitor.

Flocks of the Little Auk usually make their appearance off the island in January, especially after a northerly gale. On 16th January 1898, I found one dead at the foot of the Tower.

IV. OCCASIONAL SPRING AND SUMMER VISITORS,—
Lesser Black-backed Gull (*Larus fuscus*), Chaffinch (*Fringilla cœlebs*), Jackdaw (*Corvus monedula*), Rook (*C.*

frugilegus), Hooded Crow (*C. cornix*), Fulmar (*Fulmarus glacialis*), Black-headed Gull (*Larus ridibundus*), Dunlin (*Tringa alpina*), Swift (*Cysetus apus*), House Sparrow (*Passer domesticus*).

The Lesser Black-backed Gull is not a common visitor, and when it does call, only remains for a very short time, usually in May.

A few specimens of the Chaffinch make their appearance in May, but are by no means regular callers. I have seen one or two in November, but this is uncommon.

The Jackdaw, Rook, and Hooded Crow are sometimes driven out of their course by S.E. winds, and at intervals make the island a resting place in spring. The largest rush of them was seen on 3rd March 1901, when over 100 Rooks, 1 Jackdaw, and 6 Hooded Crows made their appearance. They must have arrived in the night, for none were seen the previous evening, and at daylight they were spread all over the island, busily engaged hunting for food. The wind in the early morning was S.E., strong breeze. About half of them disappeared on the 5th, and the remainder on the 6th—wind W., gale. A few Hooded Crows call at intervals in April and May. I just remember seeing one Rook in autumn. Regarding the Rooks I have been informed that in the autumn large flocks congregate on the west side of Hoy, the nearest point to the mainland, and it has been distinctly observed that they only cross the Firth at slack water. Any one who has seen Pentland Firth knows that, when the tide is running in full force, it presents the appearance of a river during a spate, but for about an hour at high or low water it is comparatively smooth. This is the time the crows cross.

The Fulmar was first seen at Sule Skerry on 23rd February 1901. It flew about the island for half-an-hour and then disappeared. The next visit was on 23rd March, when one was seen for a short time. On 15th April, 7 remained flying about all day. In May, one and two at a time were seen frequently. In 1902, several were seen in April, May, and June. In 1900 they were observed nesting in Hoy Head. In 1901 about 30 to 40 nests could be seen, and in 1902 over 50.

The Black-headed Gull is only seen for a day or two in the middle of summer.

The Dunlin comes periodically; in 1901, 6 arrived in the end of May, and remained all June. In 1900, 2 were seen for a few hours in June.

The Swift is not often seen. In August 1897 one was captured on the lantern at night. In August 1899, 2 were seen flying about all day, and at night they rested on the house window. On 4th July 1901, 11 were seen rapidly approaching from E. at 8 P.M. They circled twice round the Tower, and then disappeared in the direction of Cape Wrath. One was seen on the 11th of same month.

The House Sparrow, so common everywhere, is only a very irregular visitor to Sule Skerry, being seen at intervals for a few days about midsummer.

V. OCCASIONAL WINTER VISITORS.—Mallard (*Anas boscas*), Teal (*Querquedula crecca*), Wigeon (*Mareca penelope*), and Water Rail (*Rallus aquaticus*).

A pair of Mallards are seen sometimes during the winter, remaining for a day or two. The Teal is not so common; but almost every year from 2 to 6 Wigeons spend some time feeding in the fresh-water pools on the island.

I have seen one or two Water Rails on several occasions during winter.

VI. RARE VISITORS.—Cuckoo (*Cuculus canorus*), Chiffchaff (*Phylloscopus rufus*), Long-tailed Duck (*Harelda glacialis*), Pied Flycatcher (*Muscicapa atricapilla*), Bar-tail Godwit (*Limosa lapponica*), Slavonian Grebe (*Podiceps auritus*), Red-breasted Merganser (*Mergus serrator*), Tufted Duck (*Fuligula cristata*), Fork-tail Petrel (*Occanodroma leucorhoa*), Mealy Redpoll (*Linota linaria*), Wren (*Troglodytes parvulus*), Garden Warbler (*Sylvia hortensis*), Lesser White-throat (*Sylvia curruca*), Willow Warbler (*Phylloscopus trochilus*), and Greenish Willow Warbler (*P. viridanus*).

On 8th May 1900, a bird very like a Hawk in appearance, was seen hovering near the Tower. It was accompanied by nearly all the Pipits on the island, and as it was within easy range of a gun, it was shot. It

turned out to be a Cuckoo, the only specimen seen on Sule Skerry.

A Chiffchaff was captured on the lantern on 10th September 1901, and was identified by Mr. Eagle Clarke.

A young Long-tailed Duck was shot on 19th October 1901.

On 5th November 1901 there was a large rush of birds, and amongst these was one Pied Flycatcher. It was found dead on the balcony. On the same occasion one Mealy Redpoll was captured alive. Wind south, light breeze, haze.

On 13th May 1902 a Bar-tail Godwit was seen sitting on the island about fifty yards from the Tower. I examined it through the telescope, and was perfectly sure of its identity. It sat for about half-an-hour pruning its feathers, and then disappeared in a north-easterly direction.

A Slavonian Grebe was shot in October 1897, and another was seen in December 1901.

The Red-breasted Merganser, and the Tufted Duck only once ventured to visit the island.

The Fork-tailed Petrel has been captured on the lantern on several occasions, first in September 1898. On 3rd May 1902 one struck the lantern at midnight. On August 4, 7, 27, and 31, 1902, a specimen was got on the lantern on each date.

The only Wren I have seen was in September 1900.

The Garden Warbler and Willow Warbler were seen in September 1901 and 1902. They may visit the island more frequently than we are aware of, but I have never seen them during the day time. At night when they come in contact with the lantern they seem quite exhausted, and sit on the trimming paths in a dazed condition.

The Lesser Whitethroat struck against the light on 17th September 1902. On the same occasion there were several other small birds flying about, Wheatears and Meadow Pipits. Wind S., fresh breeze, haze.

On 5th September 1902 I noticed several birds flying about the lantern from 9 P.M. to midnight. It was what might be called a good night for birds striking, and I

was on the look-out for anything that might come. About 10 o'clock I got a Garden Warbler, and very shortly after I heard a gentle knock on the window. From the inside I could see another Warbler lying almost dead on the path outside. It was easily seen it was not a Garden Warbler, but after handling it and comparing it with the description of other Warblers, I was unable to name it. So I preserved it in methylated spirits, and despatched it to Mr. Eagle Clarke on 6th October. He identified it as the Greenish Willow Warbler, an adult male, in brilliant plumage. This is the first recorded occurrence in Scotland, and the second for the British Isles. ("Annals," 1903, p. 22).

The Solan, or Gannet (*Sula bassana*), deserves to be classed as a Sule Skerry bird, though its haunt is on the Stack, four miles distant. Every year one or two land on the Skerry to die, apparently from sheer old age. I never saw one alight on the island when in full health and strength. Those that do rest are quite unable to fly, and generally die in three or four days. Early in the year they begin to assemble in the vicinity, and in March crowds are seen ashore on the Stack. From then on till September the rock is simply covered from the water edge to summit, and thousands continually on the wing going to and returning from fishing. In September they begin to diminish in numbers, and gradually decrease during October and November. Very few are seen in December.

At one time Sule Skerry was the home of thousands of seals, but when man took possession of it they gradually left for other localities where they are less likely to be disturbed. The first winter we were there from 50 to 60 were still resident, and landed almost every day on outlying points. When they were the sole inhabitants they wandered all over the island, and there were distinct tracks in all directions showing that when travelling from one place to another they were in the habit of keeping to one road or track. These tracks were deep hollows worn down through the grass and even into the ground, leading to and from accessible places from the sea. The female lands in October and November to give birth to her young, and I noticed that she always

came as far as she possibly could venture so as to be out of reach of the heaviest winter sea. When newly born, the young one is covered with a coat of yellowish fur, which in a month or six weeks gives place to the short bristly hair common to the adult. There were several births during my first winter there, and I noticed that the young never attempted to go near the sea until they were a month old. In fact they seemed to keep as far away from it as possible. I have thrown one into a pool, where it exhibited the most abject signs of fear, gasping, and struggling to get out again. It spends the whole day sleeping, except when the mother pays it a visit. This she usually did once a day, taking every precaution to see that no one was near, but in spite of her watchfulness I have frequently got to within a dozen yards of her to observe the feeding operation. She exhibited the greatest symptoms of affection by fondling her offspring with her flippers and keeping up a low crooning sound. Now there are only about a dozen about the island, which land occasionally on outlying rocks.

DIPTERA SCOTICA : III.—THE FORTH DISTRICT.

By PERCY H. GRIMSHAW, F.E.S.

(Continued from p. 33.)

Family DOLICHOPODIDÆ.

444. *DOLICHOPUS ÆNEUS*, *Deg.*—Musselburgh (A. E. J. Carter).
 445. *ARGYRA ARGENTINA*, *Mg.*—Aberfoyle, July 1903 (A. E. J. Carter).
 446. *HYDROPHORUS NEBULOSUS*, *Fln.*—On wet spots, Currie Moor, 9th April 1902, and Seenes Law, on wet peat, 31st October 1903 (Wm. Evans).

Family PIPUNCULIDÆ.

447. *CHALARUS SPURIUS*, *Fln.*—Gosford Park, 4th June 1896 (P. H. G.).

Family SYRPHIDÆ.

448. CHILOSIA GROSSA, *Flu.*—Dollar, 17th April 1897, and Callander, 22nd April 1900.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.
449. CHILOSIA ALBIPILA, *Mg.*—♂, Swanston Hill, Pentlands, 1st June 1899.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.
450. PLATYCHIRUS PODAGRATUS, *Ztt.*—3 ♀ ♀, Balerno, 19th June 1897 (P. H. G.).
451. PYROPHÆNA GRANDITARSA, *Forst.*—Luffness, 19th July 1898; Culross, 13th July 1900; Aberdour, 14th August 1902; and Ratho, 30th July 1903 (Wm. Evans).
452. ISCHYROSYPHUS LATERNARIUS, *Müll.*—♂ near Kirknewton, 10th July 1900.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 248.
453. SYRPHUS LUNULATUS, *Mg.*—Drumshoreland, June 1900.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.
454. SYRPHUS BIFASCIATUS, *Fab.*—Corstorphine Hill, 24th May 1901.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.
455. SYRPHUS PUNCTULATUS, *Verr.*—Slateford, 12th May 1896 (P. H. G.).
456. SYRPHUS COMPOSITARUM, *Verr.*—Gosford Bay, 12th September 1893 (P. H. G.).
457. BACCHA ELONGATA, *Fab.*—Leven, August 1893, and Dalmeny, 10th June 1903.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.
458. ASCIA PODAGRICA, *Fab.*—Heriot, June 1898, and Kinghorn, September 1900.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.
459. ERISTALIS INTRICARIUS, *L.*—Penicuik, July 1893, Morning-side, June 1899, and Avonbridge, August 1903 (Wm. Evans).
460. MYIATROPA FLOREA, *L.*—Longniddry, June 1899; Braid Burn, July 1899, and near Midcalder, July 1899 and July 1900.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.
461. HELOPHILUS HYBRIDUS, *Lw.*—♀, Luffness Marsh, 9th August 1898.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.
462. XYLOTA FLORUM, *Fab.*—Two, Forest Mill, near Dollar, 13th July 1901.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.

Family CONOPIDÆ.

463. MYOPA BUCCATA, *L.*—Three, Forest Mill, on *Vaccinium myrtillus*, 21st May 1901.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.

Family TACHINIDÆ.

464. SOMOLIA REBAPTIZATA, *Rond.*—Gosford Bay, 26th August 1895 (P. H. G.).
465. ECHINOMYIA FERA, *L.*—♀, L. Doine, Balquhidder, 29th August 1902—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.
466. SARCOPHAGA SIMILIS, *Mead.*—Smeaton-Hepburn, 22nd June 1897 (Sir A. Buchan-Hepburn).

Family MUSCIDÆ.

467. MYIOSPILA MEDITABUNDA, *Fab.*—Slateford, 12th May 1896; Glencorse, 21st May 1896, and Kinghorn, 29th May 1896 (P. H. G.).

Family ANTHOMYIIDÆ.

468. HYETODESIA VARIABILIS, *Flu.*—Smeaton-Hepburn, 22nd June 1897 (Sir A. Buchan-Hepburn).
469. SPILOGASTER PROTUBERANS, *Ztt.*—Both sexes, Aberlady, 3rd July 1897 (P. H. G.).
470. MACRORCHIS MEDITATA, *Flu.*—Smeaton-Hepburn, 22nd June 1897 (Sir A. Buchan-Hepburn).
471. TRICHOPTICUS HIRSUTULUS, *Ztt.*—Balerno, 19th June 1897 (P. H. G.).

Family HELOMYZIDÆ.

472. HELOMYZA RUFA, *Flu.*—Roslin, 3rd June 1899 (P. H. G.).

Family SCIOMYZIDÆ.

473. SCIOMYZA PALLIDIVENTRIS, *Flu.*—Gosford Park, 4th June 1896 (P. H. G.).
474. PHÆOMYIA FUSCIPENNIS, *Mg.*—Oakley, 13th August 1898 (Wm. Evans).

Family PSILIDÆ.

475. PSILA ATRA, *Mg.*—1 ♂ and 2 ♀ ♀, Balerno, 19th June 1897 (P. H. G.).

Family MICROPEZIDÆ.

476. MICROPEZA CORRIGIOLATA, *L.*—One, Polmaise, 4th July 1903.
—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 247.

Family ORTALIDÆ.

477. PTEROPÆCTRIA FRONDESCENTIÆ, *L.*—Kirknewton, Allermuir Glen, Oakley, etc.—Wm. Evans, "Ann. Scot. Nat. Hist.," 1903, p. 249.

Family TRYPETIDÆ.

478. TEPHRITIS LEONTODONTIS, *Deg.*—Dalmahoy Hill, 28th May 1898 (Wm. Evans).
479. EUARESTA CONJUNCTA, *Lw.*—Lundin Wood, near Dunfermline, 9th October 1897 (Wm. Evans).

Family LONCHÆIDÆ.

480. PALLOPTERA UMBELLATARUM, *Fab.*—Gosford Bay, 26th August 1895 (P. H. G.); Oakley, 13th August 1898 (Wm. Evans).

Family SAPROMYZIDÆ.

481. LAUXANIA ÆNEA, *Fln.*—Swanston, 8th September 1897 (Wm. Evans).

Family OPOMYZIDÆ.

482. OPOMYZA GERMINATIONIS, *L.*—Gosford Bay, 26th August 1895 and 4th June 1896 (P. H. G.); Balerno, 29th July 1896 (P. H. G.).

Family SEPSIDÆ.

483. SEPSIS PUNCTUM, *Fab.*—Roslin, July 1893 (Wm. Evans).
484. SEPSIS CYNIPSEA, *L.*—Morningside, July 1893 (Wm. Evans).

Family PIOPHILIDÆ.

485. PIOPHILA CASEI, *L.*—Slateford, 12th May 1896 (P. H. G.).

Family GEOMYZIDÆ.

486. ANTHOMYZA GRACILIS, *Fln.*—Aberlady, 4th June 1896 (P. H. G.).
487. GEOMYZA OBSCURELLA, *Fln.*—Gosford Park, 4th June 1896 (P. H. G.).

488. *DIASTATA PUNCTUM*, *Mg.*—Gosford Park, 4th June 1896 (P. H. G.).

Family EPHYDRIDÆ.

489. *PHILHYGRIA FLAVIPES*, *Fln.*—Aberlady, 4th June 1896 (P. H. G.); Smeaton-Hepburn, 22nd June 1897 (Sir A. Buchan-Hepburn).
490. *SCATELLA SIBILANS*, *Hal.*—Aberlady, 4th June 1896 (P. H. G.).
491. *SCATELLA ÆSTUANS*, *Hal.*—Aberlady, August 1896 (Wm. Evans).

Family DROSOPHILIDÆ.

492. *SCAPTOMYZA GRAMINUM*, *Fln.*—Gosford Park, 4th June 1896 (P. H. G.).
493. *NOTEROPHILA GLABRA*, *Fln.*—Gosford Park, 4th June 1896 (P. H. G.).

Family CHLOROPIDÆ.

494. *CENTOR CERERIS*, *Fln.*—Swanston, 8th September 1897 (Wm. Evans).
495. *CHLOROPS TÆNIOPUS*, *Mg.*—Gosford Bay, 26th August 1895 (P. H. G.).
496. *OSCINIS ALBISETA*, *Mg.*—Aberlady, 4th June 1896 (P. H. G.).

Family AGROMYZIDÆ.

497. *AGROMYZA FLAVEOLA*, *Fln.*—Gosford Bay, 26th August 1895 and 4th June 1896 (P. H. G.).
498. *CERATOMYZA DENTICORNIS*, *Pz.*—Gosford Bay, 26th August 1895 and 4th June 1896 (P. H. G.).

Family BORBORIDÆ.

499. *BORBORUS GENICULATUS*, *Mcq.*—Balerno, 29th July 1896 (P. H. G.).
500. *LIMOSINA LIMOSA*, *Fln.*—Balerno, 29th July 1896 (P. H. G.).

ALIEN FLORA OF THE LOWER PART OF THE SPEY.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S.

IN 1899 I spent the month of August at Craigellachie, beside the Spey; and, the weather being all that could be wished, a good deal of time was spent botanising in the neighbouring parishes of Banffshire (94) and Elginshire (95). Several more or less rare and local plants were found, including additions to the records for both counties; but in this paper will be included only the results of visits paid to the extensive beds of shingle exposed along both banks of the river and to the banks close to the water.

In such situations along the Dee, even to within a few miles of its mouth, alpine and subalpine plants occur here and there, though less frequent than in former years owing to the extension of the lupines (*Lupinus nootkatensis*). There seemed reason to anticipate that similar species would be found along the Spey near Craigellachie, brought from the Cairngorms and other mountains. The shingle beds and the banks seemed very well suited to favour their growth, and no such immigrant as the lupine was seen that could limit their extension. My anticipations were, however, disappointed, as very few alpinines were seen (*Arabis petraea* being the chief) and few even of the subalpinines.

But though disappointed in my search for these plants, I was much interested to find along the river *Asperula arvensis*, *Galium tricorne*, and other species, clearly not natives of Scotland, yet some of them in fair abundance and ripening their seeds. While a few were showy enough to owe their presence perhaps to outcasts or escapes from gardens, most were far too inconspicuous to have been introduced intentionally by man, while they could not be regarded as field-weeds of the usual class. The "aliens" extended along both sides of the river for a number of miles, though more frequent in some parts than elsewhere. Some I could not recognise or name from the books I had with me, but those that I could name suggested south-eastern

Europe as at least a probable source for some, while others seemed to have been brought from elsewhere.

As some appeared not unlikely to establish themselves permanently along the Spey, I sought to discover the modes and periods of their arrival, and at last succeeded in tracing the chief source to the grain brought to the distilleries, especially to Dailuaine, in the parish of Aberlour, about two miles above Aberlour village. Near that distillery I found a number of the species that grew by the Spey, along with a few that had not reached the river. Beside other distilleries I added a few others; but very few aliens occurred near any of those along the Fiddich. Some of the species that grew near the Spey were not observed near distilleries, but had probably been distributed from them in former years.

Specimens of all the aliens found were dried, but some remained unnamed until last winter, when a comparison of them with specimens in Kew Herbarium permitted of the identification of all except two or three of the *Chenopodiaceæ*. I have to thank Mr. S. T. Dunn, B.A., F.L.S., now Superintendent of the Botanical and Afforestation Department in Hong Kong, for aid most kindly given to me while engaged in this work.

As a contribution to the "alien" flora of Scotland, as well as of the valley of the Spey more especially, all the species that could be determined with confidence are enumerated below.

Malcolmia africana, R.Br.—One near Dailuaine.

M. maritima, R.Br.—Rare on shingle near Aberlour.

Sisymbrium pannonicum, Jacq.—Near Dailuaine.

Erysimum cheiranthoides, L.—Two or three on shingle in Rothes.

Brassica.—Of this genus *B. campestris* and *B. Rapa* both occurred on shingles and near Dailuaine, but probably rather as field-weeds than from distillery rubbish. *B. juncea*, Coss., occurred among the latter at Dailuaine.

Alyssum (probably *campestre*).—One near Dailuaine.

Lepidium virginicum, L.—One or two at Dailuaine.

Rapistrum rugosum, All.—One or two at Dailuaine.

Reseda lutea, L.—At Dailuaine, and on shingle near Aberlour.

- Silene Cucubalus*, Sm.—Here and there on shingle in the parishes of Aberlour, Knockando, and Rothes, almost certainly from distillery rubbish.
- S. anglica*, L.—One or two on shingle near Aberlour.
- Gypsophila porrigens*, Boiss.—Two on shingle near Aberlour.
- Medicago sativa*, L. and *Melilotus officinalis*, Lam.—Rather frequent in the shingles on both sides of the river, and also near Dailuaine.
- Trigonella cærulea*, Ser.—Frequent on the shingles.
- Pisum arvense*, L.—A good many on shingle in Rothes parish, perhaps from field refuse.
- Vicia hirsuta*, S. F. Gray.—On shingles and on rubbish at Dailuaine, almost certainly from distillery refuse; but it appears to be native elsewhere in the district.
- V. lutea*, L.—Among rubbish at Dailuaine.
- Lathyrus inconspicuus*, L.—A good many on shingle in the parishes of Aberlour and Rothes.
- Caucalis latifolia*, L.—Two or three at Dailuaine.
- Galium tricorne*, Stokes.—Plentiful on shingles along the Spey.
- Asperula arvensis*, L.—Frequent on shingles and on the river banks.
- Chrysanthemum Parthenium*, Bernh.—Frequent along the river on banks and shingles, probably from garden outcasts.
- Anthemis arvensis*, L.—Occasionally on shingles and at Dailuaine.
- Anacyclus radiatus*, Loisel.—One on shingle in Rothes parish.
- Helianthus tuberosus*, L.—On shingle in Rothes, probably outcast.
- Centaurea Cyanus*, L.—On shingles and at Dailuaine.
- Anagallis cærulea*, Schreb.—Occasionally on shingles and at Dailuaine.
- Asperugo procumbens*, L.—On shingle near Aberlour and at Dailuaine.
- Anchusa hybrida*, Tenore.—One or two on shingle in Rothes, and at Dailuaine.
- Lithospermum arvense*, L.—On shingle in Aberlour and Knockando, and at Dailuaine. This can scarcely be regarded as indigenous anywhere in North Scotland at least.
- Convolvulus arvensis*, L.—On shingle near Aberlour.
- Lycopersicum esculentum*, Mill.—Two young plants on shingle in Rothes, probably from a stray fruit out of some garden.
- Linaria Elatine*, Mill.—Rare, on shingle near Aberlour and in Rothes.

Mentha piperita, L.—Here and there, probably as an outcast.

Sideritis montana, L.—Occasionally on shingle in Aberlour and Rothes parishes.

Chenopodium Bonus-Henricus, L.—On shingle near Aberlour. This is a not very scarce denizen in N.E. Scotland.

Cannabis sativa, L.—On shingle near Aberlour.

Lolium temulentum, L.—On shingle in Rothes, rare. The common cereals (oats, barley, and rye) also occurred on the shingles; but their presence might of course have been due only to their being grown as field crops near the Spey.

ALIEN PLANTS NEAR EDINBURGH.

By JAMES FRASER.

DURING the summer of 1903 the following "introduced" or "alien" plants were gathered in the neighbourhood of Edinburgh.

The localities or districts in which they were mainly found were five in number.

No. 1 is a spot to the west of the city (the indefiniteness is intentional) near a pig and poultry farm, where these animals' food seems to consist mainly of refuse from breweries and distilleries. Growing around is a great variety of plants, Crucifers, Leguminous plants and Grasses being the most common. *Bromus arvensis*, L., has established itself in a small field close by among the native grasses.

No. 2 lies north-west of the city, a small area where the refuse of ships, quays, and roads is dumped. *Coriandrum sativum*, L., and a few crucifers are its main feature.

No. 3 lies north-east of the city. It consists of a strip of ground about a hundred yards long by a dozen broad, partially reclaimed from the sea and being filled up with refuse from leather factories, flour and paper mills, etc. The outstanding feature of this district is the great variety of Medicks, Trifoliums, and Trigonellas.

No. 4 is a piece of low-lying waste ground within the

city, which is being levelled up with the refuse from shops, streets, railway stations, stables, demolished buildings, etc. Grasses and Crucifers are its main features.

No. 5 lies within the Leith Dock gates, is about a mile long, and varying from a few yards to one-third of a mile broad. It consists of ground which has been reclaimed from the sea during recent years, and which is lying waste and vacant, while it is being levelled up to prepare it for the buildings, timber stacks, and railway lines which will cover it when the new Imperial Dock is opened for trade. All the refuse from roads, quays, ships, railway waggons, etc., within the Dock gates, and perhaps a good deal from without, has for years been emptied into the hollows of this large area, and the number of alien plants which have sprung up in it is enormous. All those in the list, with the exception of about a score, were gathered here. Crucifers, Grasses, and plants of the Pea-flower family were the most prominent and plentiful, *Sisymbrium altissimum*, L. (*S. Pannonicum*, Jacq.), *S. Irio*, L., *Erysimum cheiranthoides*, L., *Melilotus indica*, All., and *Matricaria discoidea*, DC., being very abundant.

The numbers, 1 to 5, attached to the species indicate the localities (mentioned above) in which they occur, and their relative abundance is expressed, as suggested by Professor Trail, by the Greek letters thus: α = once found; β = twice or thrice, but rare; γ = neither rare nor frequent; δ = frequent; ϵ = abundant.

The sign † indicates that there is a shadow (only) of doubt as to the plant's identity, owing to the specimen being immature, over-mature, starved, or without fruit.

RANUNCULACEÆ.

Ranunculus arvensis, L.	5, β .	Ranunculus parviflorus, L.	5, α .
R. muricatus, L.	5, β .	R. sceleratus, L.	5, β .

PAPAVERACEÆ.

Chelidonium majus, L.	2, β .	Papaver argemone, L.	5, β .
Glaucium corniculatum, Curt.		Rœmeria violacea, Medic.	5, β .

5, α .

CRUCIFERÆ.

- Alyssum calycinum, *L.* 5, β .
 A. incanum, *L.* 5, β .
 Barbarea vulgaris, *R. Br.* 1, 5, β .
 Brassica alba, *Boiss.* 5, *a*; 1, β .
 B. Erucastrum, *L.* 5, *a*.
 B. juncea, *Coss.* 5, γ .
 B. Napus, *L.* 1, 5, δ .
 B. oleracea, *L.* 1, 2, 5, γ .
 Cakile maritima, *Scop.* 5, *a*.
 Camelina sativa, *Crantz.* 5, δ .
 Conringia orientalis, *Dum.* 5, γ .
 Diplotaxis tenuifolia, *DC.* 5, γ .
 D. muralis, *DC.* 5, γ .
 Enarthocarpus lyratus, *DC.* 1, *a*.
 Eruca sativa, *Mill.* 1, 5, δ .
 Erucaria aleppica, *Gartn.* 1, β .
 Erysimum cheiranthoides, *L.* 5, ϵ .
 E. repandum, *L.* 5, *a*.
 Lepidium campestre, *R. Br.* 5, β .
 L. Draba, *L.* 1, 5, δ .
 L. ruderales, *L.* 5, β .
 Lepidium sativum, *L.* 5, β .
 L. Smithii, *Hook.* γ *Kinghorn*.
 L. virginicum, *L.* 5, γ .
 Malcolmia africana, *R. Br.* 5, β .
 Myagrum perfoliatum, *L.* 3, 5, β .
 Nasturtium palustre, *DC.* 5, γ .
 N. sylvestre, *R. Br.* 5, γ .
 Neslia paniculata, *Desv.* 5, γ .
 Raphanus sativus, *L.* 1, 5, β .
 Rapistrum glabrum, *Host.* 5, β , \dagger .
 R. perenne, *All.* 5, β .
 R. rugosum, *All.* 5, *a*.
 Senebiera coronopus, *Poir.* 5, β .
 S. pinnatifida, *DC.* 5, δ .
 Sisymbrium altissimum, *L.* 5, ϵ .
 S. Irio, *L.* 5, ϵ .
 S. Loeselii, *L.* 5, β , \dagger .
 S. orientale, *L.* 5, β .
 S. Sophia, *L.* 1, 5, β .
 S. Thalianum, *J. Gray.* 5, *a*.
 Thlaspi arvense, *L.* 5, γ .

CARYOPHYLLEÆ.

- Gypsophila muralis, *L.* 5, *a*.
 G. porrigens, *Boiss.* 5, β .
 Lychnis Githago, *Scop.* 5, γ .
 Saponaria Vaccaria, *L.* 1, 5, γ .
 Silene gallica, *L.* 5, β .
 S. noctiflora, *L.* 5, δ .

PORTULACEÆ.

- Claytonia perfoliata, *Donn.* δ , in nurseries.

LINEÆ.

- Linum usitatissimum, *L.* 5, δ .

AURANTIACEÆ.

- Citrus Aurantium, *L.* 5, *a*, in leaf only.

GERANIACEÆ.

- Erodium malachoides, *Willd.* 5, *a*.

LEGUMINOSÆ.

- Astragalus glycyphyllos, *L.* 5, α .
 Ceratonia Siliqua, *L.* 5, γ , in
 leaf only.
 Lathyrus Aphaca, *L.* 1, 3, 5, δ .
 Lens esculenta, *Mench.* 5, β .
 Medicago apiculata, *Willd.* 3,
 5, β .
 M. arabica, *All.* 5, α .
 M. denticulata, *Willd.* 1, 3, 5,
 β .
 M. echinus, *DC.* 5, α .
 M. sativa, *L.* 5, δ .
 M. tuberculata, *Willd.* 1, 3, 5,
 β .
 Melilotus alba, *Desr.* 5, β .
 M. indica, *All.* 1, 5, δ .
 M. officinalis, *Willd.* 1 to 5, δ .
- Pisum arvense, *L.* 5, γ .
 Trifolium arvense, *L.* 3, 5, β .
 T. hybridum, *L.* 3, 5, δ .
 T. lappaceum, *L.* 3, β .
 T. resupinatum, *L.* 3, α .
 Trigonella cœrulea, *Scr.* 1, 3,
 5, β .
 T. Fœnum-græcum, *L.* 3, 5, β .
 T. purpurascens, *Lam.* 5, α .
 T. monspeliaca, *L.* 3, α .
 Vicia Cracca, *L.* 1, 3, 5, β .
 V. Faba, *L.* 1, 3, 5, β .
 V. gemella, *Crantz.* 5, β .
 V. hirsuta, *Gray.* 5, β .
 V. hybrida, *L.* 5, β .
 V. lutea, *L.* 5, α , in 1902.
 V. sativa, *L.* 5, β .

ROSACEÆ.

- Potentilla norvegica, *L.* 5, β . Potentilla recta, *L.* 5, β .

UMBELLIFERÆ.

- Æthusa Cynapium, *L.* 2, 5, γ . Coriandrum sativum, *L.* 2, 5, β .
 Bifora testiculata, *Roth.* 1, 5, β . Daucus Carota, *L.* 1, 5, γ .
 Bupleurum protractum, *Hoff. and*
Lk. 1, β . Fœniculum vulgare, *Mill.* 5, α .
 Carum Carui, *L.* 5, α . Myrrhis Odorata, *Scop.* 2, 5, ϵ .
 Caulis daucoides, *L.* 1, 5, β . Peucedanum sativum, *Benth. and*
H. f. 5, β .
 C. latifolia, *L.* 5, β . P. graveolens, *Benth. and H. f.*
 C. nodosa, *L.* 5, γ . 5, β .
 Conium maculatum, *L.* 1, 2,
 5, γ . Scandix Pecten-Veneris, *L.* 1,
 5, γ .

RUBIACEÆ.

- Asperula arvensis, *L.* 5, β . Galium tricornis, *Stokes.* 1, 5,
 Galium Mollugo, *L.* 5, α . γ .

VALERIANACEÆ.

- Centranthus ruber, *DC.* ϵ , Burntisland.

COMPOSITÆ.

- | | | |
|--|---|---|
| Ambrosia artemisiæfolia, <i>L.</i> 5, | <i>a.</i> | Centaurea solstitialis, <i>L.</i> 5, <i>a.</i> |
| <i>A. trifida</i> , <i>L.</i> 5, β . | | Chrysanthemum coronarium, <i>L.</i> 5, β . |
| Anthemis arvensis, <i>L.</i> 1, 5, δ . | | <i>C. Parthenium</i> , <i>Pers.</i> 5, β . |
| <i>A. Cotula</i> , <i>L.</i> 1, 5, δ . | | <i>C. segetum</i> , <i>L.</i> 5, γ . |
| <i>A. maritima</i> , <i>L.</i> 5, γ . | | Cichorium Intybus, <i>L.</i> 1, 5, |
| <i>A. tinctoria</i> , <i>L.</i> 5, β . | | β . |
| Artemisia Absinthium, <i>L.</i> 5, γ . | | Erigeron canadense, <i>L.</i> 5, <i>a.</i> |
| <i>A. annua</i> , <i>L.</i> 5, <i>a</i> , \dagger . | | Helianthus annuus, <i>L.</i> 5, β . |
| <i>A. campestris</i> , <i>L.</i> 5, <i>a.</i> | | Hemizonia Kelloggii, <i>Greene.</i> 5, <i>a.</i> |
| <i>A. scoparia</i> , <i>Kt.</i> 5, <i>a.</i> | | <i>H. pungens</i> , <i>Torrey and Gray.</i> β , Colinton. |
| Callistephus hortensis, <i>Cass.</i> 5, | β . | Matricaria disciformis, <i>DC.</i> γ , Inveresk. |
| Carduus arvensis, <i>v. latifolius</i> , <i>Bab.</i> 5, γ . | <i>v. setosus</i> , <i>Bab.</i> (?) 5, γ . | <i>M. discoidea</i> , <i>DC.</i> 5, ϵ . |
| Centaurea Calcitrapa, <i>L.</i> 1, <i>a.</i> | | Petasites fragrans, <i>Presl.</i> γ , Polton. |
| <i>C. Cyanus</i> , <i>L.</i> 5, β . | | Tragopogon porrifolius, <i>L.</i> 5, <i>a.</i> |
| <i>C. melitensis</i> , <i>L.</i> 5, γ . | | |

PRIMULACEÆ.

- Anagallis arvensis, *L.* 5, β . *A. cærulea*, *Schreb.* 5, β .

POLEMONIACEÆ.

- Gilia achilleæfolia, *Benth.* 5, *a.*

BORAGINEÆ.

- | | |
|---|---|
| Amsinckia lycopoides, <i>Lehm.</i> 1, β . | Echinosperrnum Lappula, <i>Lehm.</i> 5, β . |
| Anchusa arvensis, <i>L.</i> 5, β . | Lithosperrnum arvense, <i>L.</i> \dagger 5, β . |
| Asperugo procumbens, <i>L.</i> 1, 5, β . | Symphytum asperrimum, <i>Donn.</i> δ , East Lothian. |
| Cerinthæ minor, <i>L.</i> 5, β . | |

CONVOLVULACEÆ.

- Convolvulus tricolor, *L.* 5, β .

SOLANACEÆ.

- | | |
|---|---|
| Solanum Dulcamara, <i>L.</i> 5, β . | <i>S. nigrum</i> , <i>L.</i> 5, <i>a.</i> |
| | Hyoscyamus niger, <i>L.</i> 5, <i>a.</i> |

SCROPHULARINEÆ.

Antirrhinum Orontium, <i>L.</i>	5, <i>a.</i>	Scrophularia vernalis, <i>L.</i>	γ,
Linaria Cymbalaria, <i>Mill.</i>	5, γ.	Aberlady.	
<i>L. repens</i> , <i>Mill.</i>	5, β.	Verbascum Thapsus, <i>L.</i>	5, β.
<i>L. viscida</i> , <i>Mærch.</i>	5, δ.	Veronica Chamæpitys, <i>Griseb.</i>	
		1, <i>a.</i>	

LABIATÆ.

Ballota nigra, <i>L.</i>	5, β.	Marrubium vulgare, <i>L.</i>	1, <i>a.</i>
Dracocephalum parviflorum,		Nepeta Cataria, <i>L.</i>	5, <i>a.</i>
<i>Benth.</i>	5, <i>a.</i>	Origanum vulgare, <i>L.</i>	5, <i>a.</i>
Lamium amplexicaule, <i>L.</i>	1,	Cramond, γ.	
	5, γ.	Salvia verticillata, <i>L.</i>	5, β.
Leonurus Cardiaca, <i>L.</i>	5, <i>a.</i>	Sideritis montana, <i>L.</i>	5, <i>a.</i>

PLANTAGINACEÆ.

Plantago Lagopus, <i>L.</i>	1, 5, γ.	<i>P. Psyllium</i> , <i>L.</i>	<i>a.</i> , Balerno.
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ILLECEBRACEÆ.

Herniaria glabra, <i>L.</i>	5, <i>a.</i>	Scleranthus annuus, <i>L.</i>	5, β.
<i>H. hirsuta</i> , <i>L.</i>	5, β.		

AMARANTACEÆ.

Amaranthus retroflexus, <i>L.</i>	5, β.
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CHENOPODIACEÆ.

Beta maritima, <i>L.</i>	5, <i>a.</i> ; St. David's, <i>a.</i>	<i>B. vulgaris</i> , <i>L.</i>	5, β.
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EUPHORBIACEÆ.

Mercurialis annua, <i>L.</i>	<i>a.</i> , Burntisland.
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POLYGONACEÆ.

Fagopyrum esculentum, <i>Mærch.</i>	5, <i>a.</i>	<i>P. Bellardi</i> , <i>All.</i>	5, δ.
Polygonum alpestre, <i>C. A. Mey.</i>	5, <i>a.</i>		

URTICACEÆ.

Urtica pilulifera, <i>L.</i>	1, <i>a.</i>
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LILIACEÆ.

Asphodelus fistulosus, <i>L.</i>	5, β.
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GRAMINEÆ.

- Alopecurus agrestis*, *L.* 5, δ .
Anthoxanthum odoratum *v.* *vil-
 losum*, *Dum.* 5, *a.*
A. Puelii, *Lecoq and Lam.* 5, β .
Apera Spica-venti, *Beauv.* 1 to
 5, δ .
Avena barbata, *Brot.* 5, β .
A. fatua, *L.* 5, γ .
A. sterilis, *L.* 5, β .
A. strigosa, *Schreb.* 5, γ .
Brachypodium distachyum,
Beauv. 5, β .
Briza minor, *L.* 5, β .
B. maxima, *L.* 5, *a.*
Bromus arvensis, *L.* 1, 4, 5, δ .
B. commutatus, *Schrad.* 1, 4,
 5, γ .
B. madritensis, *L.* 5, β .
B. patulus, *Mert. and Koch.* 1,
 5, *a.*
B. rigidus, *Roth.* 1, 5, β .
B. secalinus, *L.* 1, 4, 5, γ .
B. squarrosus, *L.* 1, 5, β .
B. tectorum, *L.* 1, 3, 5, γ .
B. unioloides, *H. B. K.* 5, γ .
Cynosurus echinatus, *L.* 5, *a.*
Dactylis hispanica, *Roth.* 5, *a.*
 [*Demazeria loliacea*, *Nyman.*
 2, γ .]
Echinaria capitata, *Desf.* 5, *a.*
Elymus Caput-medusæ, *L.* 1,
 5, β .
E. europæus, *L.* 5, *a.*
Festuca ligustica, *Bertol.* 5, β .
F. sciuroides, *Roth.* 1 to 5, δ .
 [*F. sylvatica*, *Vill.* δ , Roslin
 Glen.]
F. uniglumis, *Soland.* 5, *a.*
- Gastridium australe*, *Beauv.* 5, *a.*
Gaudinia fragilis, *Beauv.* 5, β .
Glyceria distans, *Wahlenb.*
 5, ϵ .
Hordeum bulbosum, *L.* 5, β .
H. distichum, *L.* 5, β .
H. hexastichum, *L.* 5, β .
H. jubatum, *L.* 5, *a.*
H. marinum, *Huds.* 5, β .
Lagurus ovatus, *L.* 5, *a.*
 [*Lepturus filiformis*, *Trin.* ϵ ,
 Aberlady.]
Lolium arvense, *With.* 5, β .
L. rigidum, *Gaud.* 5, γ .
L. temulentum, *L.* 1, 3, 5, β .
Panicum capillare, *L.* 5, β .
P. miliaceum, *L.* 5, β .
Phalaris canariensis, *L.* 1 to
 5, δ .
P. cœrulescens, *Desf.* 1, 5, β .
P. minor, *Retz.* 5, β .
P. paradoxa, *L.* 1, 5, β .
Phleum arenarium, *L.* 5, β .
Poa Chaixii, *Vill.* β , Pentlands.
P. nemoralis, *L.* 1, 3, 5, δ .
P. palustris, *L.* (*P. fertilis*, *Host.*).
 1, 4, 5, γ .
Polypogon monspeliensis, *Desf.*
 5, β .
Secale cereale, *L.* 5, δ .
Setaria italica, *Beauv.* 5, β .
S. viridis, *Beauv.* 5, β .
Triticum cylindricum, *Ces.* 1,
 5, β .
T. triaristatum, *Gren. and Godr.*
 5, β .
T. vulgare, *L.* 5, δ .
Zea Mays, *L.* 5, β , in leaf only.

NOTES.

Diplotaxis tenuifolia, DC. (growing to the height of five feet),
Peucedanum sativum, Benth. and Hook. f. (very luxuriant), *Barbarea
 vulgaris*, R. Br. and *Melilotus officinalis*, Lam., are thoroughly
 established and very abundant at St. David's, Fife; the last-named

and *Lepidium Draba*, L., are common and apparently established in old quarries, on railway embankments, etc., throughout the county of Edinburgh.

Claytonia perfoliata, Donn, is a recurring and troublesome weed in nurseries to the north of the city.

Petasites fragrans, Presl, has established itself for half a dozen yards by the side of a burn at Polton; it is evidently a garden outcast.

Mercurialis annua, L., one small but perfectly developed plant was found at Burntisland, Fife, in July 1902.

Polypogon monspeliensis, Desf., was gathered in Leith Docks district in 1902, and also in 1903.

Poa palustris, L. (*P. fertilis*, Host), is common throughout the Leith district, and at Slateford Railway Station.

Demazeria loliacea, Nyman, is by no means an alien, but it may be interesting to record that the only locality in the county of Edinburgh, where it was plentiful in July 1903 is now beneath a huge railway embankment.

Poa Chaixii, Vill., in small quantity, was gathered on the border of some pasture land on the slopes of the Pentlands.

[*Festuca sylvatica*, Vill., often confounded with the above, but very distinct, is plentiful and luxuriant in a limited area in Roslin Glen. This is the only spot in the county where its presence is known.]

Apera Spica-venti, Beauv., was seen in each of the five localities above mentioned, and in several others.

Trifolium hybridum, L., besides the common type, one luxuriant plant was seen in the Leith district, having numerous globular heads, with abortive petals, and barren.

I am indebted for much assistance in preparing the above list to two fellow-members of the Edinburgh Naturalists' Field Club, Mr. Alistair Murray¹ and Mr. James M'Andrew. Through the instrumentality of the latter a number of the grasses were named for me by Professor Hackel, and of the other plants by Mr. Arthur Bennet, to both of whom I beg respectfully to tender my thanks. I am also greatly indebted to Professor Balfour, Regius Keeper of the Edinburgh Botanic Gardens, where through his courtesy and kindness many of the plants were named, and every facility was granted for comparing my specimens with those in the Herbarium. My thanks are also due to Mr. Arthur Smith, Grimsby, who very kindly named and verified a number.

¹ Died 6th February 1904, to the deep regret of a wide circle of friends.

PLANTS OF PERTHSHIRE.

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

IN the August of 1902, in company with the Rev. H. J. Riddelsdell, we visited the Sow of Atholl in order to see *Phyllodoce taxifolia*, and were fortunate enough to find it at that late season of the year in sparing flower; but the old specific name (*carrulea*) is misleading, since the tint cannot be called blue, a pinkish purple being nearer the colour. It was associated at 2400 feet with *Alchemilla alpina*, of which some plants had rather blunter leaf-segments, which were slightly less divided, than in the type, and *Epilobium alpinum*, *Gnaphalium supinum*, *Vaccinium Vitis-idea*, *Gnaphalium sylvaticum*, var. *alpestre*, *Sibbaldia*, *Thalictrum alpinum*, were in the close vicinity. *Phyllodoce* grows on rather a steep slope of shaly rock, and in nearly full exposure. On this date, August 10, we were met with a sharp shower of sleet, and the temperature was little above freezing point. On the hill we also saw *Alchemilla vulgaris*, vars. *alpestris* and *filicaulis*, *Cornus succica*, *Rubus Chamæmorus*, and *Orchis maculata*, var. *ericetorum* (Linton), and on the wet moorland, *Euphrasia gracilis*, *E. scottica*, *E. brevipila*, and *E. borealis*.

On another occasion we walked from Dalnaspidal to Struan along the railway, as the banks were covered with a profuse growth of Hawkweeds, and appeared very promising. Rarely have I seen such a display as we met with, one plant which was in profuse flower the Rev. A. Ley names **Hieracium diaphanum*, Fries., which is not recorded for Scotland in the recent list published by Prof. Trail; we also gathered *H. Pictorum*, var. *dasythrix*; *H. cæsium*, var. *Smithii*, which was common and in good condition—this plant is now called *H. flocculosum*, var. *Bakeri*, by Mr. Williams. With it there occurred a plant of smaller size and narrower leaves, which the Rev. A. Ley names *H. cæsium*, var. **alpestre* (*H. flocculosum*, var. *alpestre*). *H. murorum* occurred as the varieties **subulatidens*, Dahlst (*H. silvaticum*, Gouan, var. *subulatidens*); var. **sanguineum*, A. Ley (*H. silvaticum*, var. *sanguineum*); var. **pulcherrimum*, F. J. Hanb.

(*H. silvaticum*, var. *pulcherrimum*), the latter especially in fine flower. These three varieties were new to the Scottish flora at that time. *H. gravestellum*, var. *rhomboides*, was rare, and *H. auratum* also scarce. A pansy which grew on the railway embankment about two miles from Dalnaspidal is said by Mr. E. G. Baker to be near to *V. lepida*, Jord., and *V. carpatica*, Borbas, but differs from both in having narrower upper petals.

Arenaria leptoclados, Guss., grew near Struan; and very luxuriant *Sagina subulata* grew on the permanent way.

**Thymus Chamædrys* grew not only on the permanent way, but on undisturbed ground on its borders, and this record puts its occurrence for the county for the first time with certainty.

Festuca rubra, L., occurred in handsome growth two to three feet high on the railway near Dalnaspidal, and its culms were of a rich purple colour. The luxuriance of *Deschampsia flexuosa* was also a beautiful feature. *Festuca vivipara* was very common, and *Poa subcærulea* rather frequent. *Juncoides multiflorum*, Kuntze, var. *congestum*, Druce (*Luzula congesta*) was very typical, good specimens growing on the embankment occasionally. *Anthyllis Vulneraria* occurred with sub-simple leaves. *Buda rubra* grew on the ballast near Struan, and *Reseda lutea* on the embankment there. *Sedum Telephium* grew about three miles from Dalnaspidal, and *Ranunculus Steveni*, *Rumex domesticus*, *Deschampsia cæspitosa*, var. *brevifolia*, and *Lepidium Smithii* were also seen. *Rubus Selmeri* grew near Struan, and *R. britannicus* with the former species at Comrie. *Senecio viscosus* was common at Perth (V.C. 88), and at Murthly Junction (89) **Rhinanthus stenophyllus*, Schur, grew by the railway at Dalnaspidal and near Comrie (89), and also near Perth (88). On Lochan Larige (88) *Ranunculus Steveni*, Andr., forma *humilis*, grew at 3400 feet, as also in Glas Thulachan (89) as a large-flowered form. *Circæa intermedia*, Ehrh., Loch Tay side, not a hybrid, but either a variety or distinct species, I believe. *Galium sylvestre*, Poll., var. *alpestre*, Koch, Syn. 335 (1837), Ben Lawers; also a form in Glas Thulachan (89). In *G. sylvestre* the panicles are terminal; in *G. hercynicum* (*G. saxatile*) they are truly lateral.

THE RUBIACEÆ OF KINCARDINE, ABERDEEN, AND BANFF.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S.

I HAVE been able to add a good deal to my knowledge of the distribution of the species of *Galium* in these counties during the past year or two, and a brief statement of their distribution, as far as known to me, may be not without interest.

G. boreale, L. (Northern Bedstraw).—Is plentiful along the Dee, occurring still as far down as the Bridge of Ruthrieston, though artificial changes in the course of the Dee have destroyed it nearer the mouth of the river. A few years ago I saw a patch on the sandy links east of Old Aberdeen. That patch seems to have been destroyed by recent alterations made on the links; but in August 1903 I found another habitat on sandy links, about five miles north of Aberdeen, the plant there covering two or three square yards. It has been found in only a very few localities in Aberdeenshire, beyond the valley of the Dee. In Kincardineshire it is very rare beyond the valley of the Dee; though I have seen it on the links of St. Cyrus, and in Banff it is also very local.

G. Cruciata, Scop. (Cross-wort Bedstraw).—In marked contrast to its abundance in many parts of southern Scotland, this plant is extremely scarce in the counties round Aberdeen. In Murray's "Northern Flora" (1836), it is said to have been found "in Buchan," but the record has not been confirmed. In Dickie's "Botanist's Guide" (1860) it is said to grow "in a hedge at the Manse of Keith, Rev. Mr. Cowie," but the record is erroneous, the plant being *Asperula taurina*, a garden escape. *G. Cruciata* has for several years been known to grow in two places within the municipal boundaries of Aberdeen, over two miles apart. In these it seems to be indigenous. I do not know of any other locality for it in the district.

G. verum, L. (Lady's Bedstraw).—Is one of the most frequent of wild-flowers. On the coast sand-dunes it often occurs in a very dwarf prostrate form with few flowers.

G. Mollugo, L. (Great Hedge Bedstraw).—A plant is recorded under this name in the "Botanists' Guide" as "rare," and two localities are enumerated for it in Kincardine, two in S. Aberdeen, and one in Banff, east of the Deveron, all as communicated by correspondents. Of these localities I have seen

the plant in characteristic form only in a hedge near Castleton in Braemar. There it is true *Mollugo*, but may not be "native." "At the Printfields, Aberdeen," I have not seen it, and probably the locality has been built upon. From the habitats given the records probably apply to the next form, not distinguished from *Mollugo* in the "Botanist's Guide." In the end of September 1903 I found a plant of *G. Mollugo* near Tillyfourie Station on Donside.

- G. erectum*, Hudson (Erect Bedstraw).—I had no record of this plant within South Aberdeenshire until a few weeks ago, when I saw a large patch of it growing by a pond at Broomend in Kintore. Dr. Tait told me that the spot had been laid a good many years ago with turf, so that it may not be indigenous there, but that the turf was brought from the neighbourhood, within the parish of Kintore.
- G. ochroleucum*, Syme.—Described from the sandhills at Deal as a variety of *verum*, or as a possible hybrid between it and *Mollugo*, along with which it grew, it has not to my knowledge been recorded from Scotland. I was therefore much pleased to find a strong plant of it in the end of July, growing by a rough road about eleven miles north of Aberdeen. It was growing with abundance of *verum*; but of *Mollugo* or of *erectum* I could see no trace. In stems, leaves, and flowers it differed markedly from *verum*. The habitat is about three miles distant from that of *erectum* at Broomend.
- G. saxatile*, L. (Smooth Heath Bedstraw).—Extremely common on uncultivated ground from sea-level to a great altitude. It is very often galled by mites (*Eriophyes sp.*), especially on the hills.
- G. sylvestre*, Poll. (Slender Bedstraw).—Was found by me, as already recorded in this Journal, in one or two localities on the coast of Aberdour in N. Aberdeenshire, and of Gamrie in Banffshire, but was not known to occur elsewhere in the counties around Aberdeen, though I had often sought for it. But in July of this year I found it in small quantity in a railway cutting a little to the north of Aberdeen. It appears to be very rare in the district.
- G. palustre*, With. (Marsh Bedstraw).—Is abundant in ditches and wet meadows and swamps. The variety *Witheringii* (Smith) is more frequent than the smooth-stemmed form; and var. *elongatum* (Presl.) also occurs.
- G. uliginosum*, L. (Rough Marsh Bedstraw).—Is present in many swamps and wet heaths, often in plenty, though seldom so conspicuous as *G. palustre*. Occasionally they grow intermixed; but other localities show only one or the other.

- G. Aparine*, L. (Goosegrass or Cleavers).—Wide-spread in the “agrarian region” of the counties, and often locally abundant in thickets and hedges and among coarse herbage. Though a common weed of cultivated ground, there seems no good reason to regard its presence in the north-east of Scotland as due to man’s aid, though its distribution has been extended by agriculture, especially by the fruits sticking to animals. A prostrate and often dwarf form is frequently abundant on stony sea-beaches.
- G. spurium*, L., and *G. Vaillantii*, DC.—These two are by some regarded as distinct, though nearly allied, species; by others *G. Vaillantii* is held to be a variety of *G. spurium*; while others look on both as varieties or sub-species of *G. Aparine*. From it both differ in the smaller and pale greenish corolla, and in the fruits, which in *G. spurium* are glabrous, and in *G. Vaillantii* are covered with bristly hairs not arising from tubercular bases. *G. spurium* is noted in Babington’s *Manual* as found at Forfar (but there is little doubt that it was only a casual there). I find no other record for it from Scotland; but in August 1903 I met with a characteristic example on an embankment in course of formation along the beach near Aberdeen among other casuals. *G. Vaillantii* has been recorded as a casual from Midlothian. I had no other note of its occurrence in Scotland; but in September 1903 I found a large plant of it on rubbish near the railway station at Kintore (S. Aberdeen, 92), and a number of slender plants among tares near Inverurie (N. Aberdeen, 93); and in October it occurred on rubbish near Aberdeen, not far from where *G. spurium* had been found.
- G. tricornis*, Stokes.—On page 105 I record this from shingle by the Spey, as brought in grain to distilleries; but I had not seen it from any other locality in Scotland until September 1903, when I found it on rubbish near Aberdeen, and near the railway station at Kintore (S. Aberdeen), and along with *G. Vaillantii* among tares near Inverurie (N. Aberdeen). It thus appears to be spreading as a casual in N.E. Scotland.
- Asperula odorata*, L. (Woodruff).—Native in all the counties near Aberdeen. Though local, it is plentiful in some wooded glens. Occasionally it may be found growing in open situations by roadsides; but in such situations it is only an outcast or escape from some garden.
- A. taurina*, L.—Already mentioned under *Galium Cruciatum*, as found growing in a hedge beside the garden of the manse in Keith, Banffshire, no doubt as an escape or outcast.

A. arvensis, L.—Like *Galium tricornue*, this is recorded on p. 105 as found by the Spey in 1899. In September 1903 I found it near Inverurie among the tares with *Galium Vaillantii* and *G. tricornue*.

Sherardia arvensis, L. (Field Madder).—A frequent weed in dry fields throughout the “agrarian region” of N.E. Scotland. Though occurring also on dry uncultivated banks these are generally near fields. It has certainly been much distributed by agriculture; and its claim to be native in N.E. Scotland is not beyond suspicion. The calyx teeth on the fruits are usually subulate here; but I have found near Muchalls in Kincardineshire, and also near Aberdeen, examples with the teeth almost wanting, which seem to belong to the variety *Walravenii*, Wirtg., to which attention was first called in Britain by Mr. G. C. Druce (“Journ. Bot.,” 1894, pp. 240-243).

ON THE DISTRIBUTION OF THE ATLANTIC SPECIES OF HEPATICÆ IN SCOTLAND.

By SYMERS M. MACVICAR.

THE Atlantic species of Hepaticæ are those which are confined, or almost so, to the west coast of Europe, including a short distance inland, and the Atlantic islands, a few extending along the Mediterranean, and still fewer being also found in subtropical and tropical America, the West Indies, and other parts of the world. These species are more plentiful in the British Isles than in other parts of Europe, some being known only from our islands. It must be remembered that several of them are among our smallest forms and are easily overlooked, but Scotland has in the last few years been sufficiently examined to give at least the main outlines of the distribution of these species.

The first fact to be noted is that the prevalence of the Atlantic species in Scotland is, in general, proportionate to their proximity to the west coast, the further one goes eastward the rarer they become. The actual proximity of the sea on the east coast does not favour their occurrence except in a very few cases to be afterwards mentioned. The distribution of Hepaticæ is mainly dependent on

climate, the chief requisite being moisture. In the case of nearly all the Atlantic species this must be combined with an equable temperature. This combination does not extend far from the west coast, and the distance to which it extends marks the point to which these species are prevalent. Next to moisture in the atmosphere the most important requisite is the physical condition of the soil. Where the nature of the rocks is such that their disintegration does not form a moist and retentive soil, it will be found that, even under the otherwise most favourable conditions on the west coast, Atlantic species are scarce or absent. This is very noticeable in ravines running through sandstone and some volcanic rocks. Nearly all species of hepatics are scarcer in such ravines, but the Atlantic species, being the most delicate, are affected in a more marked manner.

The next point in treating of the distribution of these species is that too much importance must not be given to the watershed dividing Scotland west and east. Watersheds in themselves have no relation to the distribution of Hepaticæ, whatever they may have in the case of phanerogams. The north and east sides of the watershed, with their constantly moist ground, have hepatics in plenty, while the dry sun-exposed south and west sides have few. An instructive instance can be seen where our main watershed divides Argyllshire to the west and Perthshire to the east, at the part of the latter county where its eastern watershed lies nearest to the west coast. This is at Tyndrum and Ben Laoigh. The west, or Argyllshire side, is dry and sun-exposed, with little suitable ground for hepatics, while the east and north sides, both belonging to the watershed of the German Ocean, have abundance of hepatics, among which are the characteristic Atlantic species *Clasmatocolea cuneifolia*, *Mastigophora Woodsii*, *Scapania nimbosea*, and *Cololejeunea microscopica*, which have not been found elsewhere except on our western watershed. It is the proximity of the Atlantic, not the watershed, which is of consequence, provided that there is moisture and shelter for these species. It is only in places with such moisture and shelter that the low ground species of the Atlantic type extend eastward from the west coast. These conditions prevail a short

distance over the western watershed in the Trossachs, and this is the most eastern point in the centre of Scotland where the hepatic flora is rather western than eastern. Owing to the configuration of Scotland, especially with its south coast being practically on the Atlantic, longitudinal lines for the whole of the country cannot be satisfactorily quoted.

Those species of Atlantic hepatics which are confined to the mountains have in several cases a more extended distribution eastward. This is so principally with those which occur on moist rock ledges, some of which are found in the Aberdeenshire Grampians. The wet climate of the mountains approximates more to that of the west coast, and these species are able to withstand a considerable amount of cold. On the other hand our only alpine Atlantic species confined to dry rocks, *Gymnomitrium crenulatum*, while it is a common plant on the west coast, becomes gradually rarer as it extends to the east, until it becomes exceedingly rare on the Aberdeen Grampians. There does not appear to be much sheltered ground on our north coast, but it has not yet been well searched except in the Caithness portion. None of the characteristic species of the west coast have been found there, but one Atlantic species, *Pleurozia purpurea*, which affects wet exposed moors, is found in quantity in the northern part of the mainland.

Our Atlantic species may be divided as follows, as far as our knowledge of their distribution allows in the meantime.

1. Species known only on the western watershed :

Sphenobolus Pearsoni.	Colurolejeunea calyptrifolia.
Acrobolbus Wilsoni.	Cololejeunea minutissima.
Plagiochila tridenticulata.	Lejeunea Macvicari.
Adelanthus decipiens.	Drepanolejeunea hamatifolia.
Lepidozia pinnata.	Harpalejeunea ovata.
Radula voluta.	Marchesia Mackaii.
R. aquilegia.	Jubula Hutchinsii.
R. Carringtonii.	Frullania microphylla.

Sphenobolus Pearsoni extends inland to the Kells range of hills in Kirkcudbrightshire. This minute subalpine and alpine species, which is apparently confined to granite, will perhaps be found on the Eastern Grampians. *Radula aquilegia* extends inland to New Galloway. *Harpalejeunea ovata* is more frequent inland, and extends rather further than the others of its group.

2. Species also on the east coast near the sea-shore, but not inland :

Lophocolea spicata.

Frullania germana.

The first of these is almost confined on the west coast to rocks on the shore. The only known locality for it on the eastern side is in a ravine close to the shore in Berwickshire. The second is frequent on rocks on the shore of the west coast. Its eastern locality is on the Isle of May.

3. Species extending for a short distance over the western watershed into the eastern :

Plagiochila punctata.

Scapania nimbosa.

Clasmatocolea cuneifolia.

Cololejeunea microscopica.

Mastigophora Woodsii.

Plagiochila punctata extends further inland than the others, reaching to Killin. I should have felt inclined to include *Microlejeunea ulicina* here. It is a western species in Scotland extending inland to the Trossachs, but it has been found in several places in the centre of Europe. It prefers a dryer and less sheltered situation than the undoubted Atlantic species of its family, and is probably of a more robust constitution.

4. Species common on the west coast, continuing frequent in some parts of central Scotland, but becoming very rare towards the east coast :

Metzgeria hamata.

Lepidozia Pearsoni.

Gymnomitrium crenulatum.

Scapania gracilis.

Plagiochila spinulosa.

Pleurozia purpurea.

Saccogyna viticulosa.

5. Subalpine and alpine species common to the western watershed and the Eastern Grampians :

Gymnomitrium crenulatum.	Herberta adunca.
Marsupella Stableri.	Scapania gracilis.
Jamesoniella Carringtoni.	S. ornithopodioides.
Anastrophyllum Donianum.	

Anastrophyllum appears to have its headquarters in the Eastern Grampians unless further search shows this to be in Sutherland. *Herberta* seems to be confined in the Eastern Grampians to the Forfarshire hills. The *Marsupella* is a minute species with its distribution very imperfectly known. The others are much more plentiful on the western watershed.

One recent addition to our flora, *Lophozia atlantica*, has been found only in a single locality in Caithness. It cannot be classed at present in any of the above divisions.

Comparing the Atlantic species in Scotland with those in England and Ireland as regards their distribution, we find—

1. Species which occur in Scotland but have not been found in England :

Jamesoniella Carringtoni.	Mastigophora Woodsii.
Anastrophyllum Donianum.	Scapania nimbosa.
Lophozia atlantica.	Radula Carringtonii.
Acrobolbus Wilsoni.	Pleurozia purpurea.
Clasmatocolea cuneifolia.	Lejeunea Macvicari.

2. Species which occur in Scotland but have not been found in Ireland :

Marsupella Stableri.	Lophozia atlantica.
Jamesoniella Carringtoni.	Sphenolobus Pearsoni.
Anastrophyllum Donianum.	Lejeunea Macvicari.

3. Species found in England, but not in Scotland :

Dumortiera irrigua.

4. Species found in Ireland, but not in Scotland :

Dumortiera irrigua.	Radula Holtii.
Plagiochila ambagiosa.	Lejeunea flava.
Cephalozia hibernica.	L. Holtii.
Bazzania Pearsoni.	Microlejeunea diversiloba.

If *Plagiochila exigua* be considered distinct from *P. tridenticulata* it must be added here.

All the European Atlantic species have been found in the British Isles, and the following have not been found elsewhere in Europe :

Marsupella Stableri.	Radula Holtii.
Acrobolbus Wilsoni.	Lejeunea flava.
Plagiochila ambagiosa.	L. Holtii.
Cephalozia hibernica.	L. Macvicari.
Bazzania Pearsoni.	Microlejeunea diversiloba.
Scapania nimbosa.	Frullania microphylla.
Radula voluta.	

To these might be added *Metzgeria hamata*, *Jamesoniella Carringtoni*, *Mastigophora Woodsii*, and *Frullania germana*, which have been found elsewhere only in the Faroe Islands. The flora of these islands is generally admitted to be British rather than Continental. It will be noticed that seven of the species peculiar to the British Isles have been found only in Ireland.

The species common to the west of Norway and west of France are :

Plagiochila punctata.	Lepidozia pinnata.
P. spinulosa.	Scapania gracilis.
Saccogyna viticulosa.	Harpalejeunea ovata.
Adelanthus decipiens.	

Norway has the following, which have not been found in France :

Gymnomitrium crenulatum.	Clasmatocolea cuneifolia.
Anastrophyllum Donianum.	Herberta adunca.
Lophozia atlantica.	Scapania ornithopodioides,
Sphenolobus Pearsoni.	Radula aquilegia.
Plagiochila tridenticulata (as	R. Carringtonii.
P. exigua).	Pleurozia purpurea.

The following have been found in France, but not in Norway :

Dumortiera irrigua.	Drepanolejeunea	hamati-
Lophocolea spicata.		folia.
Colurolejeunea calyptrifolia.	Marchesinia	Mackaii.
Cololejeunea minutissima.	Jubula	Hutchinsia.

Cololejeunea microscopica has been reported from Belgium.

The Atlantic species are the most interesting of our Hepaticæ. They differ from our other groups, Northern, Continental, and Mediterranean, in that their origin in our country cannot be traced to any known geological period. The peculiar British species, and some of the others, are subtropical or tropical, or they have their nearest allied forms in these regions. Further investigation will doubtless alter our views on some of these species, and it is with some hesitation that I have included the generally accepted Atlantic species *Gymnomitrium crenulatum* and *Herberta adunca*, as they have been recorded from Alaska. Perhaps all the alpine Atlantic species may be found to be in a different category from the species peculiar to sheltered places on the low ground, but here as with other groups there are always a few species which are difficult to classify.

Some of the species mentioned in this paper will doubtless be differently grouped as our knowledge extends. Not only are several of them minute, but their required conditions prevent their occurrence being otherwise than local.

ZOOLOGICAL NOTES.

Bat in Shetland.—In the "Vertebrate Fauna of Shetland," published 1899, Messrs. Evans and Buckley state (p. 57) that "as far back as 1774 Low mentions that Bats were seen in Unst, though very rarely; and in 1806 John Laing . . . noticed them as inhabiting the Shetlands: but in neither case was any species mentioned." As this appears to be all that is known concerning the occurrence of any of the Cheiroptera in the islands, it is interesting to record that in January last a hibernating Bat was found in a peat stack at North Roe, and was sent to Mr. Malloch of Perth, but was too far gone for preservation. Mr. Malloch pronounced it to be of the "common Short-eared species" [*V. pipistrellus*].—JOHN S. TULLOCH, Lerwick.

Jays in Argyllshire.—When shooting with Colonel Brinckman at Stonefield on the 6th instant, a Jay (*G. glandarius*) was shot by

one of the party, Mr. Mackenzie of Carradale, and examined by me. On the following day another was heard and seen by myself. On making inquiries, Colonel Brinckman informed me that two of these birds had been killed the year previously (1903)—one on 5th January at Stonefield, and another the next day at Escart,—both were recorded in his game book. I believe the above are the first undoubted records of Jays in Argyllshire, and it is much to be regretted that they were destroyed.—HEATLEY NOBLE, Temple Combe, Henley-on-Thames.

Hawfinch in East Lothian.—An adult female Hawfinch (*Coccothraustes vulgaris*) was found dead—starved—in Tynninghame Garden during the third week of February last.—CHRIST. C. TUNNARD, Tynninghame.

[This record is of considerable interest, and, when taken in conjunction with the information contained in Mr. Berry's communication in the last number of the "Annals," warrants us in concluding that this species is now a colonist in south-east Scotland.—EDS.]

White Wagtail at Peterhead.—After careful observing, I have at last noted the White Wagtail (*Motacilla alba*) in this district. Perhaps nowhere in Scotland are Pied Wagtails more abundant during August than around Peterhead. Often as I had gone out to examine the birds, it was not till the early morning of the 27th August that I observed a few White Wagtails among the rocks in the South Bay. They had been noted previously on the east coast on the shores of the Forth.—WILLIAM SERLE, Duddingston.

Late Stay of the Swift at Duddingston.—The Swifts stayed with us an abnormally long time in the past season. On the 5th August there were many more flying around the church tower than are usually seen then, and up till the 12th I saw them common enough. I was till the end of the month absent from Duddingston, but on my return on the 30th there were several pairs flying high in the air, while over the loch *Hirundo rustica* and *urbica* were very abundant; and these several pairs of Swifts I had a look at daily up till the 10th day of September.—WILLIAM SERLE, Duddingston.

Kingfishers in Argyllshire.—Those birds have been often noticed by Mr. Mackenzie on the river Carradale, and Colonel Brook informs me he saw one on the shores of West Loch Tarbert in October 1903.—HEATLEY NOBLE, Temple Combe, Henley-on-Thames.

Great Spotted Woodpecker in Roxburghshire.—In connection with the notes on the recent extension of this bird's distribution in south-east Scotland, I should like to record the occurrence of a young bird near the village of Roxburgh, which was caught on 22nd August. After examining the bird and taking particular notice of the red head and the short bill—indications of immaturity—I set it

at liberty, and watched it fly away strong on the wing.—HENRY D. SIMPSON, Edinburgh.

Glossy Ibis in Orkney.—A Glossy Ibis (*Plegadis falcinellus*) was shot about a mile west of Stromness on the 19th of September last. The above information, along with a photograph of the bird, was most obligingly sent to me by Mr. N. A. M'Intosh of Stromness. According to our present knowledge of the fauna of the Orkneys, this appears to be the second occurrence there of this wanderer to the British Isles, one having been obtained near Kirkwall in September 1857.—W. EAGLE CLARKE.

Gadwall in East Renfrewshire.—A Gadwall (*Anas strepera*), which we saw in the flesh on the 4th of December 1903 had been shot at Dunwan Dam, Eaglesham, by one of the keepers of Mr. Allan Gilmour, Yr. This is an addition to the birds of East Renfrewshire, and indeed in Clyde only two records exist in addition to this, viz. a recent one referring to Loch Lomond and an old one to Ayrshire.—JOHN PATERSON and JOHN ROBERTSON, Glasgow.

Great Crested Grebe in West Sutherland.—The Great Crested Grebe (*Podiceps cristatus*) appears to be a rare visitor to the north of Scotland, and when the first volume of the series of works on the "Vertebrate Fauna of Scotland" was published some sixteen years ago, no record was given of the occurrence of this species in West Sutherland. It may therefore be interesting to know, that on 7th May last year I saw a fine specimen of this Grebe, in full breeding plumage, on Loch Borrolan, near the famous trout-fishing centre of Aultnagealgach, in West Sutherland. The proprietor of the hotel said he had noticed a pair of these birds on the loch since the February before, and that they were quite unknown to him, he never having seen birds like them on the lochs in these parts. Trout fishing was just beginning on the loch in the second week in May, and the bird I saw soon left. It is usual, I believe, for these birds to arrive at their breeding quarters in February or March, so it seems quite possible that their species is extending its range, and that the birds in West Sutherland were looking for new nesting haunts.—F. L. BLATHWAYT, Lincoln.

Little Auk at Duddingston Loch.—On the 17th of February there was the largest collection of wild-fowl on the loch for this season. Scaup (*Fuligula marila*) were in the majority. Close behind a Shoveller (*Spatula clypeata*) which was feeding at the water's edge I noted a Little Auk (*Mergulus alle*), of which I had a very close view for a little time.—WILLIAM SERLE, Duddingston.

The Loach (*Nemachilus barbatulus*) in the East of Scotland.—In the recently published "Vertebrate Fauna of Dee," the Ichthyological portion of which relates to the East of Scotland from Wick to Edinburgh, the author,—Mr. G. Sim,—after quoting Parnell and

Howden with regard to the Loach, says: "I have never seen a specimen nor heard of one having been obtained, and all other writers are silent on the point." In view of this, I should like to state that in July 1890 I found the Loach in considerable numbers in a stream close to St. Andrews, Fife; and that on 21st March 1896 I caught one in the stream which runs out of Kinghorn Loch, also in Fife. Forty years ago, when a boy at school at East Linton, Haddingtonshire, I caught many a "beardie" in the Tyne there; and I used to see them also at that time in Beil Burn in the same county. For Midlothian, I have a note of having more recently seen this little fish in the Lothian Burn, a few miles south of Edinburgh. Pollution has no doubt exterminated it in many streams where it was formerly plentiful.—WILLIAM EVANS, Edinburgh.

The Greater Fork-beard (*Phycis blennoides*) off the Firth of Forth.—An example of this fish, which I purchased from an Edinburgh fishmonger, was trawled beyond the May Island on 4th March this year. It was $21\frac{1}{4}$ inches in length, greatest depth about 5 inches, and it weighed about $3\frac{1}{2}$ lbs. Length of ventral fin $6\frac{7}{8}$ inches.—WILLIAM EVANS, Edinburgh.

Sapromyza affinis, Zett., Nycteribia latreillii, Leach, and other Diptera from the Edinburgh District.—Since my last note on Diptera ("Annals," 1903, p. 247) Mr. J. E. Collin, to whom I am indebted for most of the names, has kindly returned specimens of the following flies sent by me for Mr. Verrall's inspection:—

Sargus cuprarius, L.—♂, Levenhall quarry, near Musselburgh, July 1901; var. *nubeculosus*, Ztt., ♂ and ♀, Levenhall quarry, July 1901. *S. iridatus*, Scop., ♀, banks of Water of Leith, near Gorgie, June 1895.

Theriopectes solstitialis, Mg.—♀, Forest Mill, July 1901. The specimens recorded by me in "Annals," 1901, p. 53, as "probably" *T. tropicus*, Mg., will, I expect, also turn out to be this form, though Mr. Verrall did not then so regard the Aberfoyle one.

Psilopus platypterus, F.—♂, Polton, June 1901.

Argyra argyria, Mg.—A good many, Polton, June 1901.

Lonchoptera lutea, Pz.—Several in flood refuse, Bavelaw pond, October 1903.

Pipiza fenestrata, Mg.—Two specimens (♀'s) taken in Corstorphine Hill wood on 24th May 1901, are referred by Messrs. Verrall and Collin to this form.

Chilosia grossa, Flh.—♂, Kirknewton, Midlothian, 5th May 1900.

Syrphus torvus, O.S. (*topiarius*, Auct.)—♀, Corstorphine Hill, 24th May 1901.

Stevenia maculata, Fln.—One, in market garden, Aberlady, 27th July 1901.

Dryomyza decrepita, Ztt.—♀, Bavelaw, August 1898.

Loxocera aristata, Pz.—2 ♂'s, Luffness Links, July 1898.

Micropeza lateralis, Mg.—♀, Polton, August 1901.

Scoptera vibrans, L.—♂, Salton, August 1902.

Urophora solstitialis, L.—♀, Luffness Links, July 1898.

Sphenella marginata, Fln.—♀, near Balerno, August 1898.

Euaresta conjuncta, Lw.—♀, Thornton, Fife, August 1898; ♀, near Dunfermline, October 1897.

Sapromyza affinis, Ztt.—♀, Newpark, Midlothian, 11th July 1900; taken from a *Crabro varius* which was carrying it to its burrow. The species is not in Verrall's list of British Diptera, but Mr. Collin, to whom I am indebted for the identification of my specimen, tells me he has examined several other British examples which he is recording.

Baliophora tripunctata, Fln.—Near Roslin, October 1900; in flood refuse, Cramond, October 1903. *B. combinata*, L., ♀, Thornton, August 1898.

Pelethophila lutea, Fln.—♀, Linlithgow, August 1899.

Meromyza læta, Mg.—Gullane, July 1898.

Chlorops taniopus, Mg.—♀, Craigentenny, August 1898; Heriot, June 1898. *C. speciosa*, Mg.—Two ♀'s, Dreghorn, July 1893.

Besides the above, I find I have also in my collection specimens of the following interesting species:—

Paragus tibialis, Fln.—Two ♂'s taken 10th June 1902, at a bank near Aberdour, Fife, in which small *Halicti*, with which the species is supposed to have some connection, had their burrows.

Microchrysa polita, L.—Aberlady, August 1896; Morningside, August 1898. *M. flavicornis*, Mg.—Luffness, July 1898.

Beris chalybeata, Forst.—Near Roslin, May 1895.

Empis tessellata, F.—Drumshoreland, June 1900.

Anthomyia pluvialis, L.—Near Falkland, August 1895.

Calobata petronella, L.—Polton, June 1901.

Spilographa zoë, Mg.—Duddingston, 24th May 1895.

Acidia cognata, W.—Roslin, July 1896. *A. heraclei*, L.—Linlithgow, August 1899.

Nycteribia latreillii, Leach.—In June 1891, I took—and fortunately preserved—a specimen of this curious little insect off a Daubenton's Bat from Dunbar.—WILLIAM EVANS, Edinburgh.

Chrysonotus bipunctatus, Scop., in the Tweed District.—It is with pleasure that I am able to record the capture of a female specimen of this rare species of Dipteron by my friend Mr. J. W. Bowhill, in the month of August 1902. So far as I am aware, there

is no Scotch record of this species since those given by Duncan in the "Magazine of Zoology and Botany," vol. i. (1837), p. 163. It is there mentioned as having been taken at Jedburgh by Rev. William Little, and curiously enough Mr. Bowhill's specimen was taken within a mile or two of the same town.—PERCY H. GRIMSHAW, Edinburgh.

BOTANICAL NOTES AND NEWS.

Topographical Botany of Scotland.—A very important source of information with regard to the distribution of the flora of Scotland has been made readily accessible by the publication in "Notes from the Royal Botanic Garden, Edinburgh" of the late Professor John Hutton Balfour's 'Excursion Diaries' during the years 1846 to 1878 inclusively, followed by a very full index of names of places referred to. The names of plants jotted down in the diaries have been arranged for publication in the order of the "London Catalogue of British Plants," ed. 9, which much facilitates reference to them; but otherwise the entries are published unchanged. The volumes of the Edinburgh Botanical Society's "Transactions" contain numerous papers based upon some of these excursions, but not a little additional is contained in the notes now made available to all students of Scottish botany. Few could claim as extensive and intimate a knowledge of our country as the late Professor Balfour.

Gall upon *Sagina ciliata*, Fr.—Among a few examples of this plant picked by me, in July 1902, on the coast about two miles north of Stonehaven, and taken, though rather withered, because of the locality not having been previously known for it, one had on a short leafy shoot a stem gall about 4 by 3 mm. in size; oval, dull purple, and apparently rather fleshy in texture, with the leaves crowded on it, as the gall had evidently prevented the elongation of the internodes. It looked much like the work of a gall-midge, but in the wish to rear the maker I did not open the gall, which decayed during my absence from home. No species of *Sagina* is on record as bearing galls, so far as I can ascertain.—JAMES W. H. TRAIL.

Aliens among Tares in Aberdeenshire.—Cereals have long been noted as a frequent means of introduction of weeds into a country, and an examination of any local flora reveals the names of many weeds, especially among the *Labratæ*, that exist only in cultivated soils, and disappear if cultivation is given up for any cause. But these are often immigrants of so old standing as to find an acknowledged place in our descriptive floras. Recent immigrants that have not yet passed the grade of *casuals*, seldom showing a power of establishing themselves in a locality, I find in this district

more often among tares than among cereals alone. *Agrostemma Githago* is one of the most frequent of such casuals, and is often plentiful among tares, but seldom reappears next year on the same ground. Last September I met twice in one week with casuals, not previously seen by me in Scotland, among tares in North Aberdeen. In a small field about a mile N.W. from Inverurie were growing together with the tares the following :—*Saponaria Vaccaria*, L. (a not infrequent casual near Aberdeen); *Galium Vaillantii*, DC.; *G. tricorne*, Stokes; *Asperula arvensis*, L.,—all four in fair quantity,—and one specimen of a slender *Astragalus* (?) too young to permit of identification. None of the species had been previously noticed in North Aberdeen (93). On inquiry I learned that the seed had been purchased in Inverurie.

Three days later, in a patch of tares in Culsalmond, several miles north-west of the other locality, I noticed a peculiar tare among the common *Vicia sativa*, with greenish petals, and close to it found another, also new to me, with narrow purple flowers. A reference to Reichenbach's "Icones Floræ Germanicæ et Helveticæ" enabled me to identify the first as *Vicia melanops*, Sibth., a native of Southern Europe, and the second as *Vicia dasycarpa*, Ten., also from Southern Europe; and with the type occurred a variety of *glabrescens* (Koch). The seed in this case I was told had been purchased at a shop in a small village a mile or two distant; but the aliens indicated that the seed in both localities had been imported from the continent of Europe.—JAMES W. H. TRAIL.

On *Poa laxa* and *Poa stricta* of our British Floras.—Under this heading Mr. Druce contributes to the Linnean Society's Journal ("Botany," xxxvi. pp. 421-429, 30th July 1903) a valuable paper on the true relations of these grasses to one another and to other forms. After examination of the type specimens and of the plants in their native habitats, he arrives at the conclusion that there are only two forms clearly distinguishable, with the following synonymy :—

POA ALPINA, L., var. AUCTIFOLIA, G. C. Druce = *P. stricta*, Syme (in "E. B." t. 1793) = *P. flexuosa*, Knapp, Don, and Parnell, all *pro parte* = *P. laxa*, Bab. Man. = "*laxa* proper" (Hooker's "S. F." 1870).

P. LAXA, Hænke, var. SCOTICA, G. C. Druce = *P. minor*, Bab. Man. = "*P. flexuosa*, Sm." of Syme = *P. eulaxa*, Syme (in "E. B." t. 1764) = *P. laxa*, var. *minor* (Hooker's, "S. F." 1870) = "*P. laxa* proper" (Hooker's "S. F." 1886).

These two are described, and the history of the various changes in the nomenclature that they have been known by in Britain is treated of with considerable fulness.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—January-March 1904.

[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.

WEIGHT OF SCOTCH HARES. A. G. Cameron. *The Field*, 9th January 1904, p. 50.—Gives particulars of six hares shot in North Argyll. The weights vary from $7\frac{1}{4}$ lb. to 8 lb. 5. oz.

SPERM WHALES IN THE NORTH ATLANTIC. R. L. *The Field*, 23rd January 1904, p. 151.—Refers to various specimens killed near the Shetlands, with measurements and yield of oil. See also Thomas Southwell and A. H. Cocks. *The Field*, 30th January 1904, p. 188, and W. L. Calderwood, *l.c.* p. 278, for further particulars.

RAMBLES AMONG THE WILD BIRDS (No. III.) By the Rev. F. L. Blathwayt, M.A., M.B.O.U. "On Highland Lochs." *Agricultural Magazine* (November 1903), new series, vol. ii. No. 1, pp. 30-36.—Notes on the Black-throated Diver and other birds found breeding last May on some lochs in West Sutherland.

SOME ABERRATIONS OF COMMON MOTHS. Francis E. Woodbridge. *Entomologist*, January 1904, pp. 9-10.—Refers to a male specimen taken at Dunkeld in June 1900.

HYMENOPTERA (TENTHREDINIDÆ AND ACULEATA) IN DUM-BARTONSHIRE; WITH SOME ADDITIONS TO THE CLYDE LIST. J. R. Malloch. *Ent. Mo. Mag.*, February 1904, pp. 41-43.—Notes on thirty-five species.

TWO NEW SPECIES OF BRITISH ACULEATE HYMENOPTERA. Edward Saunders, F.R.S. *Ent. Mo. Mag.*, January 1904, pp. 10-12.—One of the species is *Crabro* (*Cœlocrabro*) *styrius*, Kohl, and among the specimens recorded is one taken at Dollar in July 1901 by Mr. William Evans.

CRABRO CARBONARIUS AT AVIEMORE. J. R. Malloch. *Ent. Mo. Mag.*, March 1904, p. 62.—Refers to two specimens, a ♂ and a ♀, taken by Mr. King on 9th July and 12th August respectively.

OXYCERA DIVES, Lw., AT ABERFOYLE, PERTHSHIRE. A. E. J. Carter. *Ent. Mo. Mag.*, January 1904, p. 16.—Three specimens captured in July 1903.

LOXOCERA FULVIVENTRIS, MG., NEAR FORRES. F. Jenkinson. *Ent. Mo. Mag.*, January 1904, p. 17.—A female taken on 31st August.

ASTEIA ELEGANTULA, ZETT., A SPECIES OF DIPTERA NEW TO BRITAIN. F. Jenkinson, M.A. *Ent. Mo. Mag.*, January 1904, p. 4.—A specimen captured on 1st September on the banks of the Findhorn.

DRAGONFLIES IN 1902 AND 1903. W. G. Lucas, B.A., F.E.S. *Entomologist*, February 1904, pp. 29-34.—Refers to a specimen of *Agrion hastulatum* taken by Mr. King at Aviemore in 1903.

AGRION HASTULATUM, ETC. W. J. Lucas. *Entomologist*, March 1904, p. 85.—Refers to a specimen in the possession of Mr. C. W. Dale, taken by Mr. Richard Weaver in Sutherlandshire in 1842.

NOTES ON WIGTOWNSHIRE COLEOPTERA. J. G. Gordon, F.E.S. *Ent. Record*, 1st March 1904, pp. 78-80.

RETROSPECT OF A COLEOPTERIST FOR 1903. Prof. T. Hudson Beare, B.Sc. *Ent. Record*, 15th February 1904, pp. 29-32.—Scottish records referred to.

COLEOPTERA IN THE PEEBLES DISTRICT IN 1903. James E. Black. *Ent. Record*, 15th January 1904, pp. 17-18.—Nineteen species mentioned.

ON A SECOND GENERATION OF OUR FORRES TRIPHÆNA COMES, HB. Louis B. Prout, F.E.S. *Ent. Record*, 15th January 1904, pp. 1-5.

BOTANY.

NOTES ON SOME ADDITIONS TO THE BOTANY OF AYRSHIRE. By Andrew Gilchrist. Reprinted from *Kilmarnock Glenfield Ramblers Annals*, 1901-1904.—Several additions to flora of Ayrshire, of which *Subularia aquatica*, *Corallorhiza innata*, and *Ceterach officinarum* are native, and the others are casuals probably.

REPORTS ON EXCURSIONS OF GLASGOW NATURAL HISTORY SOCIETY, 7/9/01-23/8/02. *Trans. Nat. Hist. Soc. Glasg.*, VI. (N.S.), part iii. pp. 333-355, published December 1903.—These contain numerous references to native plants and cultivated trees and bushes observed, with dimensions of large trees at Arniston, Craigends, Cambusnethan House, Dalziel House, Milton Lockhart, and Galston, and a list of fungi seen in the neighbourhood of Arniston and Temple along the South Esk in Midlothian.

PROCEEDINGS OF THE NATURAL HISTORY SOCIETY OF GLASGOW, 24/9/01-26/8/02. *Trans. Nat. Hist. Soc. Glasg., l.c.*, pp. 356-388.—Several notes on Scottish plants, especially on *Nasturtium sylvestre* from Renfrew and Dumbartonshires, *Carex disticha* from

Bute, and on *Lithothamnion glaciale* (Kjellm.) found at Port Bannatyne, Bute, by Mrs. David Robertson, an addition to the British list of Algæ.

METEOROLOGICAL NOTES AND REMARKS UPON THE WEATHER DURING THE YEAR 1901, WITH ITS GENERAL EFFECTS UPON VEGETATION. By James Whitton. *Trans. Nat. Hist. Soc. Glasg., l.c.*, pp. 313-329.—Compiled from records kept at Queen's Park, Glasgow, with notes on effects of the weather on plant life.

REPORT ON THE STATE OF THE ALPINE FLORA IN BREADALBANE DURING THE LAST WEEK OF JULY 1902. By Peter Ewing, F.L.S. *Trans. Nat. Hist. Soc. Glasg., l.c.*, pp. 330-332.—Record of an extremely backward season.

BOTANICAL EXCURSIONS MADE BY PROFESSOR JOHN HUTTON BALFOUR IN THE YEARS FROM 1846 TO 1878 INCLUSIVELY. *Notes from the Royal Botanic Garden, Edinburgh*, vol. ii., 1902, pp. 21-497.

ON *POA LAXA* AND *POA STRICTA* OF OUR BRITISH FLORAS. By G. Claridge Druce, M.A., F.L.S. *Journ. Linn. Soc. Bot.*, xxxvi. pp. 421-429.—See p. 131 of this issue.

BOOK NOTICES.

THE LIFE-HISTORY OF BRITISH LIZARDS AND THEIR LOCAL DISTRIBUTION IN THE BRITISH ISLES. By Gerald R. Leighton, M.D., F.R.S.E. (Edinburgh: George A. Morton. London: Simpkin, Marshall and Co., 1903.)

This is a companion volume to the one on British serpents which we have already noticed, and it seems to us that it would have been better to have published a single work on British reptiles and amphibians to occupy the place so long held by Bell's admirable volume. The book before us, though full of interesting notes and observations, includes much irrelevant matter which should properly be given in a general work, and the information afforded is very diffusely treated and not particularly well arranged. The illustrations are not by any means up to the level of those in the volume on serpents, and raise doubts as to the value of the half-tone process for illustrating such species as these. The author, though an enthusiastic field-observer, has his limitations, which tell on the usefulness of his book to scientific students. He gives no synonymy and no bibliography, and, strange to say, so little notice has been taken of what has been written on the subject that Bell's classic work on the British reptiles is never once alluded to.

The volume treats of five species, two of which are *not* British, but, occurring in the Channel Islands, belong zoologically to the French fauna.

The chapters on distribution leave much to be desired. A thorough search of the literature of the subject would have enabled the author to have added considerably to the details of distribution, and a condensation here and there of diffuse wording of the notes given would have saved space without omitting any single item of value.

Dr. Leighton gives many notes on life-history and habits, but we find no information of the length of time which the eggs take to hatch.

Although we find the work an interesting one, yet in reading it one is always conscious of the necessity for judicious rearrangement of the subject matter, condensation of verbiage, and omission of a good deal that pertains more to a general treatise on reptiles.

W. D. R.

THE DIRECTION OF HAIRS IN ANIMALS AND MAN. By Walter Kidd, M.D., F.Z.S. pp. 154 + viii. (London: Adam and Charles Black, 1903.)

The examination of the direction of the "hair-streams" on various parts of the animal body is no new thing. As long ago as 1837, Eschricht devoted much minute attention to the hairy covering of the human body, and since that date the literature has been enriched from time to time by many workers. Dr. W. Kidd has himself contributed many articles to the scientific journals within the last few years, and, in the book now before us, has collated his facts and elaborated his theories. As he states in his preface, the purposes of his latest publication are "to co-ordinate the scattered facts of the direction of the hair in the lower animals and man, to furnish interpretations of most of them on mechanical principles, and to supply an answer to the question: Can acquired characters be inherited?" The last purpose is, naturally, the most important from the biologist's point of view; and any one who has read Dr. Kidd's pamphlet on "Use-Inheritance" will be in no doubt that the answer is in the affirmative. His views are strongly contrary to any theory of selection—Weismannic or otherwise. It is asserted that there is a primitive type of hair-direction, in which the slope is from the tip of the nose to the caudal extremity of the animal; such an arrangement being found among the rodents, insectivores, smaller carnivores, marsupials, marmosets, and lemurs. This original type is capable of modification (even during the life of an individual animal), the modifications being produced either by morphological changes in the animal, or by the action of mechanical forces acting on the surface of the body. The regions where the direction of the hair is altered are called *Critical Areas*,

and are such as are particularly open to contact with the ground or other opposing surfaces, or lie over parts of the body where strong, very frequent, divergent or frequent convergent muscular action prevails.

That the writer's conclusions will strike a serious blow at Weismannism may be open to question; but that the facts he adduces are full of interest is certain, and that his method of explaining them is ingenious is undoubted.—O. C. B.

THE MIGRATION AND DISPERSAL OF INSECTS. By J. W. Tutt, F.E.S. (London: Elliot Stock, November 1903. Price 5s. net.)

This little volume (which is surely worthy of a cloth binding, although issued only in paper covers) gives a capital summary of all that is known through published records of the so-called migrations of insects. The subject, which is only yet in its infancy, is dealt with in nine long chapters, the first of which treats of general considerations, the second to the eighth of the various orders *seriatim*, while the last is devoted to a consideration of the real nature and causes of the various dispersal movements. In the case of the Orthoptera and Coleoptera the migration appears to be connected with the question of food-supply, but in Hymenoptera the author suggests that the necessity of finding a new home, the desirability of cross-fertilisation, and the need for new feeding-grounds all act as important factors. With regard to the Lepidoptera, the author confesses that the causes of dispersion are still obscure, but at the same time suggests that the migratory habit may be merely a matter of hereditary instinct.

This little book of 132 pages is very suggestive and well worth reading, and we can cordially recommend it as likely to interest not only the entomologist but the nature-lover in general.

A NATURALIST'S CALENDAR, KEPT AT SWAFFHAM BULBECK, CAMBRIDGESHIRE. By Leonard Blomefield (formerly Jenyns). Edited by Francis Darwin. (Cambridge: University Press, 1903.)

This is a very old friend in separate form, and amplified from data amassed by the author since it appeared as part of his well-known "Observations on Natural History," published in 1846. The late Charles Darwin said of the observations: "These are the facts which make one understand the working or economy of nature," and also that he thought it "very amusing to have a list before one's eyes of the order of appearance of plants and animals around one; it gives a fresh interest to each fine day." The editor informs us that it was to a great extent this latter sentiment of his father's that induced him to republish the Calendar; and we on our part welcome its appearance, and appreciate much the editor's admirable introduction on the usefulness of such calendars.

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No. 51]

1904

[JULY

WILLIAM TAIT, LL.D.

OBITUARY.

ON 17th May 1904, at the age of 70, died one who was a true lover of nature, and did much, by personal investigation and by assistance to others, to extend our knowledge of the natural history of Aberdeenshire, although in ways known to few save personal friends, who often experienced his readiness to help with information and labour. During several years he gave especial attention to the Lepidoptera around his home between Kintore and Inverurie, where he detected a number of interesting insects. He also took up the Coleoptera for a time, but found his eyes suffer from the minute examination of the smaller species. In recent years he turned to Botany, and was much interested in the investigation of the flora of Kintore, in which parish he lived. His time was much occupied with the management of a large business in making paper; but he took an active share in various sides of public work, and was during several years Chairman of the Education Committee of the Aberdeen County Council, assisting greatly in the development and extension of educational facilities in the county. In 1895 the University of Aberdeen conferred on him the degree of LL.D. in recognition of his public services. For some time before his death he had not felt able for severe physical

exertion, but had not been incapacitated for business or for moderate exercise. His death occurred with great suddenness while searching for plants for a marsh-garden which he was forming.

REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1903.

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

THE decrease, noted in last year's Report, in the number of schedules received from the Lighthouse Keepers, is again a feature in the returns for 1903. The falling off is mainly in the returns from East Coast Stations. With the exception of the schedules received from the Bell Rock, no reports have been received from lightkeepers on the East Coast, south of the Orkney Islands, during the past year. This is much to be regretted, as it is only when fairly complete records from the Coast Stations are available that any correct idea of the migratory movements can be obtained.

On the other hand, the returns from Inland correspondents have been fully maintained, and the number of notes sent in has been in excess of any previous record.

While thanking our correspondents for their valued assistance during the past year, we again express the hope that we may rely on their co-operation during the present season. Schedules for recording observations may be obtained from Mr. Eagle Clarke, Museum of Science and Art, Edinburgh, to whom, also, any notes should be sent.

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

NORTHERN ISLES.

SHETLAND.

<i>Locality.</i>	<i>Name of Observer.</i>
Lerwick	John S. Tulloch.
Dunrossness	Thomas Henderson, jun.

ORKNEY.

<i>Locality.</i>	<i>Name of Observer.</i>
Noup Head L.H.	T. J. Wallace, Lightkeeper.
Sule Skerry L.H.	The Lightkeepers.
Pentland Skerries L.H.	James Tomison.
North Ronaldshay L.H.	T. E. Arthur.

SUTHERLAND AND CAITHNESS.

Thurso	Lewis Dunbar.
	MORAY.
Strathconan, etc.	Lionel W. Hinxman, B.A.

DEE.

Peterhead	Rev. William Serle, M.A.
Aberdeen	L. G. Esson.
Inverurie	Thomas Tait.

TAY.

Fordoun	John Milne.
Kinloch-Rannoch	W. Renton.
Tayfield, Newport	W. Berry, B.A.
Bell Rock L.H.	Robert Clyne and mates.

FORTH.

Burntisland	D. J. Balfour Kirke.
Lothians and Fife	Bruce Campbell.
Do.	Robt. Godfrey, M.A.
Edinburgh District	William Evans, M.B.O.U.
Do.	Rev. William Serle, M.A.
Cramond	Charles Campbell.
Kirkliston	Sydney E. Brock.
Tranent	D. Ritchie, M.D.
North Berwick	W. M. Inglis.

TWEED.

St. Mary's	Alexander Sim.
Broughton	A. C. Gairns.
West Linton	D. G. Laidlaw.

OUTER HEBRIDES.

Flannan Isles L.H.	Messrs. Begg and M'Lachlan, Lightkeepers.
Monach Isles L.H.	A. M. Laidlaw, Lightkeeper.
Barra	Wm. L. MacGillivray.

ARGYLL AND INNER HEBRIDES.

<i>Locality.</i>	<i>Name of Observer.</i>
Scarnish, Tiree	Peter Anderson.
Tiree	H. W. Robinson.
Skerryvore L.H.	The Lightkeepers.
Loch Lochy	N. B. Kinnear, M.B.O.U.

CLYDE.

Carmichael	Rev. J. D. W. Gibson, B.A.
Various Localities	M. Barr, John Paterson, Chas. Bury, Dr. Fullarton, Dr. M'Rury, A. Shanks, T. W. Wilson, Robt. Wilson, and H. Boyd Watt, M.B.O.U.

SOLWAY.

Beattock	James Bartholomew.
Maxwelltown, Dumfries	Robert Service, M.B.O.U.
Corsewall L.H.	H. Jamieson, Assistant Lightkeeper.

GENERAL REMARKS.

The earlier part of the year 1903 was remarkable for the rough unsettled character of the weather, the persistent rains, and the absence of anything like genial warmth during the Spring and Summer. The inclement character of April and May, months when the bulk of the summer visitors reach our shores, had the effect of retarding the appearance of most species for a week or a fortnight beyond the usual period of their arrival; but no ultimate bad effect appears to have resulted, as in most districts the numbers arriving appear to have been normal.

The absence of returns from the East Coast prevents any general record of Spring movements being given. An interesting note, however, was received from the Light-keeper at Pentland Skerries, who writes:—"We experienced a long continuance of south-east and east winds, blowing with considerable force, in April and May. Whilst this lasted we had immense numbers of visitants on the island. From April 15 to 25 Wheatears were numerous. On April 26, about noon, all at once the whole island was simply alive with Robins. They were everywhere, and at night in every place where there was an open door or

window. Fieldfares were in vast numbers on May 1, and from May 5 to the 9th. At North Ronaldshay very few birds were observed during the Spring.

On the West Coast, in "Solway" area, Spring movements began early. On Feb. 12 Lapwings were passing up during the whole of daylight, and a big general movement of Curlews was noted on Feb. 15. A similar movement took place on March 18. On April 20, big general migration after nightfall, lasting till 11.25 P.M. Ducks, Geese, Knots, Dunlin, Redshanks, Golden Plover, Thrushes, and Gulls recognised. April 30, big migration of waders at 9 P.M. At Corsewall Lighthouse great numbers of Redwings, Thrushes, Blackbirds, Starlings, and Larks were at the lantern on March 21-22; and on May 3, Redstarts, Meadow Pipits, and Ring Ousels. At Skerryvore, Feb. 14-17, small birds were striking. March 22-31, Blackbirds, Thrushes, and Starlings. April 17-19, Wheatears and Pipits; and on May 1 a rush of small birds, Wagtails, Meadow and Rock Pipits, Wheatears, etc. The same species were passing on May 11 and 20. At Tiree an extraordinary number of Fieldfares and over a thousand Lapwings wintered. "Very unusual," no frost or snow. Flannans, movement of Larks, etc., on March 24; and great numbers of Redwings, April 7.

The first important movement in the autumn is reported from Sule Skerry on Sept. 4. Large numbers of birds on lantern, Meadow Pipits, Wheatears, Wagtails, and Petrels. A strong rush took place on Oct. 15-16, Redwings, Thrushes, Fieldfares, Goldcrests, Robins, and Woodcock. On Oct. 28-29, a great rush of Fieldfares, with Thrushes, Redwings, and Starlings. Hundreds in rays, about ninety Fieldfares killed.

The same species were noted at Noup Head on Oct. 25 and 28. A correspondent at Auskerry writes under date Oct. 24: "Great rush of birds, hundreds killed. Thrushes in thousands, a few Blackbirds and Starlings. Picked up the following day: Fieldfares and Redwings, 259; Ring Ousel, 1; Woodcock, 5; Snipe, 1; Snow Bunting, 2. Strong breeze from E.; haze and rain.

Similar movements are recorded from North Ronaldshay. Oct. 25, hundreds of Fieldfares and Thrushes, scores killed; also two Ring Ousels. Oct. 28, Fieldfares very numerous.

At the Bell Rock, from Sept. 10 to 26, Redstarts, Willow and Wood Wrens, Wheatears, Pipits, Whitethroats, Wagtails, etc., passing almost daily; most numerous on Sept. 20. At the end of September and during October, Blackbirds, Thrushes, Redwings, Larks, Starlings, Meadow Pipits, and Goldcrests passing; greatest numbers on Oct. 11-12. On Nov. 8, Fieldfares, with Thrushes and Blackbirds.

On the West Coast, the first rush at the Flannans is recorded on October 8, great numbers of Thrushes, Redwings, Fieldfares, Pipits, Wagtails, etc., many killed. Other extensive movements of Turdidæ principally noted on Oct. 11 and 29. On Nov. 7, Fieldfares, Redwings, etc., all over island. Nov. 11, great rush of Blackbirds, etc. The same species, in rushes, are recorded at Monach on Oct. 12, 25, and Nov. 10, many being killed at light.

Migratory Passerines were passing Skerryvore, Sept. 4-11, and Oct. 2. At the same station rushes of Turdidæ, Oct. 10, 18, and 28. Nov. 18, a few. The observer writes in regard to time of flight: "Only seen at night, and it is hardly possible to say from which direction they come."

In "Solway," Redstarts (young) on return journey, July 28. On Sept. 28, movement of Goldcrests; one caught at street lamp, others passing overhead, calls heard. Oct. 14, considerable movement amongst Thrushes and Blackbirds. Corsewall Lighthouse, Sept. 27, rush of Thrushes, Blackbirds, Larks, Wheatears, and Pipits, many at lantern.

An outstanding feature of the past autumn was the occurrence in unusual numbers in many parts of Scotland, but especially in the southern counties, of the Great Grey Shrike, Waxwing, and Rough-legged Buzzard. Particulars are noted in the "Annals" for Jan. 1904 (pp. 54 and 56), and under the species in this "Report."

The list of casual visitors includes the Black Redstart (*Ruticilla titys*) near Fochabers, Oct. 30; Little Bunting (*Emberiza pusilla*), Pentland Skerries, Oct. 15 (first record for Scotland); Snowy Owl (*Nyctea scandiaca*), Unst, March 5; Dunrossness, April 22; and Flannans, Oct. 12; Hen

Harrier (*Circus cyaneus*), Solway, Kirkbean, in October, and Tarff, in November; Greenland Falcon (*Falco candicans*), Orkney, mainland, March 23; Outer Hebrides, Mingulay, April 2; and Argyll and Isles, Tiree, Feb. 15; Wryneck (*Iynx torquilla*), Unst, Sept. 2; Roller (*Coracias garrulus*), Tay, Ballinluig, Oct. 13; Glossy Ibis (*Plegadis falcinellus*), Perth, Oct. 18; Spotted Crake (*Porzana maruetta*), Tay, Murthly, Nov. 2; Solway, Dumfries, Sept. 3; Crane (*Grus communis*), Pentland Skerries, May 2; Spotted Redshank (*Totanus fuscus*), Solway, Carsethorn, October; and Sabine's Gull (*Xema sabini*), Argyll and Isles, Easdale, Oct. 30. The nesting of the Hawfinch (*Coccothraustes vulgaris*) at Newport, Tay, is of interest, as a nest of the species had not hitherto been found in Scotland.

TURDUS MUSICUS (Song Thrush).

Orkney—Noup Head, April 28, at light; Oct. 25 and 28, rushes with Fieldfares. Sule Skerry, March 27, one; Oct. 15, in flocks with Redwings; Oct. 29, at lantern with Fieldfares, Redwings, and Starlings. North Ronaldshay, Oct. 25-26, very numerous with Fieldfares, scores killed. *Tay*—Bell Rock, Feb. 15, at lantern; May 1, several at light; Sept. 22-26, at light and on rock; Oct. 11, and 19, flying round light; Nov. 8, about thirty, with Blackbirds and Fieldfares. Auchinblae, Feb. 17, returned to woods. *Outer Hebrides*—Monach, Oct. 12, great numbers, with Blackbirds, striking, twenty killed; Oct. 25, striking, four killed. *Argyll and Isles*—Tiree, May 8, nest with four eggs at Vault. "First record of Thrush nesting here"; Oct. 10, numbers. Skerryvore, March 22, at lantern with Blackbirds; March 31, with Starlings; Oct. 18, at light with Thrushes, Redwings, Blackbirds, etc. Loch Lochy, Feb. 6, several, first. *Solway*—Corsewall, March 21-22, great numbers, with Redwings, Blackbirds, Starlings, and Larks; Sept. 27, Rush, Thrushes, Blackbirds, Larks, Wheatears, and Pipits.

TURDUS ILIACUS (Redwing).

Orkney—Sule Skerry, Oct. 15, on island for some days; Oct. 29, several at lantern, great numbers of Fieldfares, Thrushes, and Starlings. *Tay*—Bell Rock, March 25, one at lantern; Oct. 4, 11, and 26, several at light. *Forth*—Burntisland, Oct. 13, one picked up exhausted. *Tweed*—West Linton, Oct. 12. *Outer Hebrides*—Flannans, April 17, several; April 19, great numbers flying in rays; April 29, several with Fieldfares; Oct. 8, first rush, Thrushes,

Fieldfares, Pipits, Wagtails, and Wheatears, Oct. 11, great rush; Oct. 20 and 29, several; Nov. 7, Redwings, Fieldfares, Blackbirds all over island. *Argyll and Isles*—Tiree, April 6, several; Sept. 29, one; Oct. 9-12, and 28, numbers passing. Skerryvore, Oct. 6, several; Oct. 10, 18, and 28, numbers at lantern, with Blackbirds, Thrushes, and Fieldfares; Nov. 18, a few. *Clyde*—Beith, Oct. 17. *Solway*—Corsewall, March 21-22, Redwings, Blackbirds, Thrushes, Starlings, and Larks in great numbers during night; Oct. 10, several.

TURDUS PILARIS (Fieldfare).

Shetland—Unst, May 3, numbers largely increased, last seen 14th. *Orkney*—Noup Head, Oct. 25, on rush all night; Oct. 28, another rush. Sule Skerry, April 29, flock; Oct. 16, several; Oct. 28-29, rush at lantern, hundreds in rays, about ninety killed, Fieldfares, Thrushes, Redwings, and Starlings. Pentland Skerries, April 25, first seen; May 1, large rush of Fieldfares; May 5-9, immense numbers, a few Blackbirds and Ring Ousels, none seen after 10th. North Ronaldshay, April 28, at light; April 30, about two dozen; Oct. 25-26, hundreds, scores killed; Oct. 28, very numerous, dozens killed. *Moray*—Strathpeffer, April 29. *Dee*—Aberdeen, Oct. 4, two. *Tay*—Kinloch Rannoch, April 28, large flock flying N. Bell Rock, Oct. 29, thirteen; Nov. 8, at lantern, with Thrushes, and Blackbirds. *Forth*—Balerno, May 9. Rosebery, Oct. 14. *Tweed*—Halmyre, May 12, large flock. *Outer Hebrides*—Flannans, April 29, several, with Redwings flying round light; Nov. 7, Fieldfares, Redwings, and Blackbirds all over island. *Argyll and Isles*—Tiree, all winter in large numbers, very unusual; April 13, still in numbers; Oct. 30, "crowds." Skerryvore, Oct. 28, with Redwings and Blackbirds; Nov. 18, a few. *Clyde*—Bowling, Oct. 18.

TURDUS MERULA (Blackbird).

Orkney—Pentland Skerries, May 5-9, a few. Sule Skerry, Sept. 29, one; Oct. 4, six; Nov. 28, one; still on island, Dec. 29. North Ronaldshay, May 3-4, at lantern. *Tay*—Bell Rock, March 23, a ♀ at lantern; 25, ditto; Sept. 22, one; Oct. 19, four; Nov. 8, at lantern, with Thrushes, and Fieldfares. *Outer Hebrides*—Flannans, Jan. 28, several; Feb. 15, one; March 17, several; April 5, a ♀; Oct. 11-12, in rush of Redwings; Oct. 23 and 29, several; Nov. 7, Fieldfares, Redwings, and Blackbirds all over island; Nov. 11, great rush. Monach, Oct. 12, great numbers striking, with Thrushes, many killed; Nov. 10, striking, twelve killed. *Argyll and Isles*—Skerryvore, March 22, at lantern, with Thrushes; Oct. 8, a few in rush; Oct. 18 and 28, at lantern, with Redwings, Thrushes, etc.; Nov. 30, two. Tiree, Oct. 15, have come; Oct. 28, numerous. *Solway*—Corsewall, March 21-22,

great numbers of birds, Redwings, Thrushes, Starlings, etc.; Sept. 27, at lantern, Blackbirds, Thrushes, Larks, Pipits, and Wheatears.

TURDUS TORQUATUS (Ring Ousel).

Orkney—Sule Skerry, May 2, two; Sept. 17, one, at lantern; Oct. 3, one. Noup Head, Sept. 21, one; Oct. 29, one killed. Pentland Skerries, May 2, several; May 5-9, a few, none seen after 12. North Ronaldshay, April 30, two; Oct. 26, two, at light, hundreds of Fieldfares and Thrushes. *Tay*—Kinloch Rannoch, April 15. Bell Rock, Oct. 4, a ♀ at lantern. *Forth*—Yester, Sept. 12, one, Lammermuirs. *Tweed*—Cramilt, April 16, one. *Argyll and Isles*—Clunies Hill, April 27. *Clyde*—Barr, April 19. *Solway*—Corsewall, April 2, killed at lantern; May 3, two, one killed. Balmaclellan, Sept. 23, one.

Earliest, Solway, Corsewall, April 2.

SAXICOLA ŒNANTHE (Wheatear).

Shetland—Dunrossness, April 28, unusually late. *Orkney*—Noup Head, April, 25, three (first); Oct. 1, two. Sule Skerry, April 29, flock, stayed a few days; Aug. 24, several; Sept. 4, large numbers at lantern; Oct. 3, several. Pentland Skerries, April 15, first seen; April 23-25, large numbers. North Ronaldshay, April 19, two. *Tay*—Perth, April 4. Bell Rock, May 1, ♂ and ♀, at lantern; May 14, 23, and 29, several; Sept. 20, at lantern; Oct. 4, at lantern. *Forth*—Lothian Burn, March 24, a ♂; Kilspindie, Sept. 26. *Tweed*—Cramilt, March 25, two. *Outer Hebrides*—Flannans, April 23, one; 29, three; May 7, very plentiful; May 20, great numbers; Oct. 8, in rush of Pipits, Wagtails, etc. *Argyll and Isles*—Tiree, March 31, a few have arrived. Skerryvore, April 17, 19, and 27, at lantern; May 1-2, rush of small birds, Wheatears, Pipits, etc., several killed; May 9 and 22, at lantern; Aug. 19-20, two. *Clyde*—Lendalfoot, March 22. *Solway*—Corsewall, April 1, about a dozen; April 20, large numbers at Southernness, a pair of the large Arctic form recognised. Corsewall, Sept. 6, large numbers; Sept. 27, rush of birds, at lantern, Wheatears, Pipits, etc.

Earliest, Clyde, Lendalfoot, March 22.

PRATINCOLA RUBETRA (Whinchat).

Moray—Strathgarve, April 28. *Argyll and Isles*—Skerryvore, May 1-2, rush of small birds, Whinchats, Wheatears, etc. *Clyde*—Lamlash, April 29.

RUTICILLA PHŒNICURUS (Redstart).

Moray—Scotwell, May, 1. *Tay*—Bell Rock, May 1, two; May 28, on tower, resting; Sept. 17, a ♀ at lantern. *Forth*—Gorebridge,

May 1. Leven, Sept. 10, adult ♀. *Tweed*—Halmyre, May 6. *Outer Hebrides*—Flannans, Nov. 10, one, "firetail"; Nov. 28, one [? Black Redstart]. *Argyll and Isles*—Loch Lochy, April 29, a ♂; Skerryvore, Oct. 6, two sent in flesh. *Clyde*—Beith, May 5. *Solway*—Corsewall, May 3, a dozen. Maxwelltown, July 28, young on return journey.

Earliest, Argyll, Loch Lochy, April 29.

RUTICILLA TITYS (Black Redstart).

Moray—Oct. 30, a young ♂ shot on moor between Fochabers and Keith ("Annals," 1904, p. 55).

ERITHACUS RUBECULA (Redbreast).

Shetland—Unst, May 4, and following days, four seen. Dunrossness, May 2, one. *Orkney*—Noup Head, April 30, one; Oct. 1, one. Sule Skerry, May 3, one; Oct. 15, two. Pentland Skerries, April 26, a great rush; May 12, entirely gone. North Ronaldshay, April 30, one. *Tay*—Bell Rock, Oct. 12 and 22, at lantern. *Outer Hebrides*—Flannans, March 30, one; Oct. 19, 31, and Nov. 10, one, each date. *Argyll and Isles*—Tiree, Nov. 13, one. *Solway*—Corsewall, March 23, at lantern; Sept. 18, Robins, Wagtails, Goldcrests, etc., at light.

SYLVIA CINEREA (Whitethroat).

Tay—Scone, May, 6; Bell Rock, Sept. 24, one at lantern. *Forth*—N. Queensferry, May 5. Leven, Sept. 10. *Tweed*, Halmyre. May 8. *Clyde*—Beith, May 5. *Solway*—Dumfries, May 17, many this morning.

SYLVIA ATRICAPILLA (Blackcap).

Orkney—Pentland Skerries, Oct. 15, ♂, sent in flesh. *Tay*—Scone, May 6. *Forth*—Broomhall, Fife, April 30.

SYLVIA HORTENSIS (Garden Warbler).

Orkney—Pentland Skerries, Oct. 15, sent in flesh.

REGULUS CRISTATUS (Goldcrest).

Orkney—Noup Head, Oct. 9, one caught. Sule Skerry, Sept. 29, captured at lantern; Oct. 15, fifteen remained until 30th. *Tay*—Bell Rock, Sept. 30, at lantern; Oct. 31st, two. *Forth*—Burntisland, Oct. 7, numerous, evidently great arrival. *Solway*—Corsewall, Sept. 18, at light with Wagtails, Robins, etc.; Sept. 23, three dozen. Maxwelltown, Oct. 25, many about to-day.

PHYLLOSCOPUS RUFUS (Chiffchaff).

Tay—Inverhaddon, May 3. *Clyde*—Dalry, April 2.

PHYLLOSCOPUS TROCHILUS (Willow Wren).

Orkney—Pentland Skerries, April 30, one picked up; May 2, one captured. *Tay*—Perth, April 26. Bell Rock, July 28, one killed; Sept. 19, one at light. *Forth*—Kirkliston and Cramond, April 26. Kirkliston, Sept. 14. *Tweed*—Broughton, April 30. *Outer Hebrides*—Barra, May 1. *Argyll and Isles*—Loch Lochy, April 29. *Clyde*—Lendalfoot, April 10. *Solway*—Maxwelltown, April 23, here; April 25, large numbers.

Earliest, *Clyde*, April 10.

PHYLLOSCOPUS SIBILATRIX (Wood Wren).

Tay—Perth, May 5. *Clyde*—Lamlash, May 3, numerous.

ACROCEPHALUS PHRAGMITIS (Sedge Warbler).

Tay—Auchinblae, May 10, first. *Forth*—Broomhall, May 5. *Tweed*—Halmyre, May 3. *Clyde*—Cardonald, May 1. *Solway*—Maxwelltown, May 18, large arrival.

LOCUSTELLA NÆVIA (Grasshopper Warbler).

Tay—Inverhaddon, May 4. *Forth*—Tranent, May 11. *Argyll and Isles*—May 5, one near Loch Lochy. *Clyde*—Dalry, May 10.

CINCLUS AQUATICUS (Dipper).

Orkney—Noup Head, May 1, one, first seen here.

MOTACILLA ALBA (White Wagtail).

Dee—Peterhead, Aug. 27, a few. *Argyll and Isles*—Tiree, May 6, two; May 8, one; Aug. 31 and Sept. 8, passing south. *Clyde*—Beith, April 26; Lendalfoot, April 28; Dalbeth, May 3, fourteen; Kilbirnie, Sept. 20, ♂ and ♀. *Solway*—April 5, a ♂ seen at four-mile house; Maxwelltown, Oct. 9, one.

MOTACILLA LUGUBRIS (Pied Wagtail).

Shetland—Dunrossness, April 21, only one seen or heard of this spring. *Orkney*—Sule Skerry, May 4, one; Aug. 24, three on Island for ten days. Pentland Skerries, May 18, one. *Dee*—April

18, flocks, Kintore Parish. *Tay*—Auchinblae, March 9, returned. Bell Rock, April 10, two on rock; Oct. 25, one on tower. *Forth*—Duddingston, Aug. 10, first migratory Wagtails noted. By Sept. 14, congregating from all parts to roost in reeds. *Tweed*—Broughton, March 14. *Argyll and Isles*—Loch Lochy, Feb. 2, single bird, did not stay; March 2, one; a few arrived during next week. *Clyde*—Carmichael, March 16. *Solway*—Corsewall, March 22, one; Sept. 18, rush of small birds, Wagtails, Robins, Goldcrests, etc.

MOTACILLA MELANOPE (Gray Wagtail).

Tay—Auchinblae, March 22, first. Bell Rock, Sept. 22, one. *Tweed*—Broughton, March 12. *Outer Hebrides*—Flannans, April 20, one; May 12, two; Aug. 17, several; Sept. 23, four; Oct. 8, rush of birds—Thrushes, Wagtails, Pipits, etc. *Argyll and Isles*—Loch Lochy, April 2, one. *Solway*—Corsewall, April 5, one.

MOTACILLA RAI (Yellow Wagtail).

Clyde—Beith, April 26, Ford and Cambuslang, May 4. Govan, Oct. 13, six.

ANTHUS PRATENSIS (Meadow Pipit).

Orkney—Sule Skerry, Aug. 24, several; Sept. 4, large numbers at lantern; Oct. 10, several. *Tay*—Bell Rock. *Outer Hebrides*—Flannans, Oct. 8, rush of Pipits, Wagtails, etc. *Argyll and Isles*—Loch Lochy, Feb. 26, a few. Skerryvore, May 7-8, Pipits and Wheatears on the rock; Oct. 2, a few. *Clyde*—Carmichael, March 24, returned. *Solway*—Corsewall, Sept. 27, at lantern.

ANTHUS TRIVIALIS (Tree Pipit).

Moray—Contin, May 1. *Tay*—Scone, May 6. *Forth*—Kirkliston, May 1. *Tweed*—Halmyre, May 3. *Argyll and Isles*—Loch Lochy, April 30. *Clyde*—Arran, April 28.

LANIUS EXCUBITOR (Great Grey Shrike).

Shetland—Halligarth, Oct. 15, one. *Sutherland and Caithness*—♂ at Kerso during Autumn. *Moray*—Strichen, Feb. 9. Gordon Castle, Nov. 7, two. Dreffus, one in Nov. Craig Ellachie, one in autumn. *West Ross*—Poolewe, Nov. 12, one. *Dee*—Inverurie, Feb. 21, one. *Tay*—Drumtochty, March 8.

AMPELIS GARRULUS (Waxwing).

Shetland—Westside, young ♂, in December. *Orkney*—One. *Sutherland*—Thurso, Oct. 22, young ♀. *Dee*—Aberdeen, Oct. 9, one shot; common in Aberdeenshire during autumn. *Tay*—

Arbroath, Oct. 30, three. Comrie, four. Dec. 18, one, Loanhead Craigs. *Forth*—Haddington, Nov. 12, seven or eight. North Berwick, Oct. 27, one; Nov. 13, two. Musselburgh, Nov. 13, two. Cramond, Nov. 30, one. Tranent, Nov. 30, one. Levenhall, Dec. 4, one. Innerwick, Dec. 16, a ♂. Burntisland, Nov. 12, two. *Tweed*—Galashiels, Dec. 17, a ♀ shot. *Ross*—Ardgery, Dec. 25, three shot.

MUSCICAPA GRISOLA (Spotted Flycatcher).

Tay—Perth, May 17. *Tweed*—Halmyre, May 8. *Argyll and Isles*—Achnacarry, May 25, one. *Clyde*—Cadder, May 17. Glasgow, Queen's Park, Sept. 12. *Solway*—Maxwelltown, May 18, numbers.

HIRUNDO RUSTICA (Swallow).

Orkney—Sule Skerry, March 26, two; May 27, two. *Dee*—Inverurie, April 28; Peterhead, Aug. 26, small straggling parties flying south. *Tay*—Perth, April 26. *Forth*—Cramond, April 14; Aberlady, Nov. 9, one. *Tweed*—Halmyre, April 25. *Outer Hebrides*—Barra, May 18; Flannans, May 20, one; 26th, fifteen. *Argyll and Isles*—Skerryvore, May 27, six. *Clyde*—Dalry and Lendalfoot, April 21; Beith, Oct. 11. *Solway*—Kempleton, Twynholm, March 23, one; Castle Loch, Lochmaben, March 30, three; Maxwelltown, April 10, many; Sept. 21, left this evening; Nov. 4, a couple reported from New Galloway.

Earliest, Solway, March 23.

CHELIDON URBICA (House Martin).

Shetland—Baltasound, May 25, eight. *Tay*—Auchinblae, May 1. *Forth*—Burntisland, April 23, two; Aberlady, Oct. 24, pair. *Tweed*—Halmyre, May 6. *Clyde*—Lamlash and Millport, May 5; Beith, Oct. 3.

Earliest, Forth, April 23.

COTILE RIPARIA (Sand Martin).

Moray—Strathconon, April 25. *Dee*—Inverurie, April 24, a few. *Tay*—Cupar Fife, April 14, one. *Forth*—East Linton, April 13, several on Tyne. *Clyde*—Cambuslang, April 12. *Solway*—Maxwelltown, April 10, three.

Earliest, Solway, April 10.

COCCOTHAUSTES VULGARIS (Hawfinch).

Tay—Newport, nest with addled egg found in the beginning of August ("Annals," 1904, pp. 11-14). *Solway*—Adult ♂ picked up near Kinnel Head, April 6 ("Annals," 1903, p. 184).

PASSER MONTANUS (Tree Sparrow).

Shetland—Most, June 13, nest with five eggs found at Halligarth (“Annals,” 1903, p. 211).

FRINGILLA CÆLEBS (Chaffinch).

Shetland—Most, Aug. 7, a pair seen feeding four young (“Annals,” 1903, p. 212). *Orkney*—Pentland Skerries, April 26, a flock of Bramblings and Chaffinches.

(*To be continued.*)

NOTES ON SOME BIRDS OBSERVED IN THE
LOCH ARKAIG DISTRICT, WESTERN INVER-
NESS-SHIRE.

By NORMAN BOYD KINNEAR, M.B.O.U.

THE following notes were made between November 1902 and August 1903, and refer to the northern part of the “Argyll” area to the west of Loch Lochy. The boundaries of the district are roughly as follows:—On the east, Loch Lochy and the Lochy river; on the south, Glen Loy and Streap Hill; on west, Glen Chaoruinn and the lower part of Glen Dessary; and on the north the range of hills which form the division between “Argyll” and “Moray.” The greater part of the district consists of hills—the highest of which is Gulvain, 3224 feet—intersected by numerous glens and burns. Stretching eastwards from Glen Dessary is Loch Arkaig, a large loch some fourteen or fifteen miles long by about half a mile wide; and flowing out of it at the eastern end is the river Arkaig, which, after a course of a mile, enters Loch Lochy. Situated on the right bank of the river, half way between the two lochs, is Achnacarry Castle, the seat of Cameron of Lochiel. Besides a number of burns, two small rivers, the Dessary and Mallie, run into Loch Arkaig, the latter at the western end, and the former at a bay on the south side a few miles from the eastern end,

A large Scotch fir wood extends up the side of Loch Arkaig and Glen Mallie for eight or nine miles. This wood is like the old fir forests on Speyside, and is just the place where one would expect to find the Crested Tit ; but I never saw any, or obtained satisfactory information of its having been seen. The other woods of the district are chiefly birch and oak. There are some young plantations of Scotch fir and larch along the side of Loch Lochy and above Gairlochy, where the Caledonian Canal joins the loch. The only cultivated ground of any extent is at Achnacarry and along the side of the Lochy river, and in consequence birds like the Starling and Yellow Bunting are not numerous. A few of the larger birds of prey still breed in the district, but they are decreasing. Ptarmigan are fairly common on the higher tops, and there are a good many Black Grouse in Glen Loy ; but Red Grouse are not numerous, and seem to be decreasing. Very few ducks remain to breed except the Merganser, which has increased of late, I am told. Waders are scarce, and the only Gull nesting in the district is *L. canus*.

In the Vertebrate "Fauna of Argyll and the Inner Hebrides" the number of birds, given as occurring in the area up to the date of May 1892 is 208 ; of these I have seen 94 in this district. In the following list, however, only those species about which there is something fresh to add, either in the way of distribution or migration, are mentioned.

PRATINCOLA RUBETRA (*Linnaeus*), WHINCHAT.—Very local and never plentiful. Occurs near Gairlochy, Glen Dessary, and one or two other places.

P. RUBICOLA (*Linnaeus*), STONECHAT.—In distribution and numbers much the same as the preceding species. Have also seen it in Glen Dessary.

SYLVIA ATRICAPILLA (*Linnaeus*), BLACKCAP.—During June I saw three male blackcaps among some rhododendrons near Achnacarry. Although I looked for, I never saw any females or found their nests.

LOCUSTELLA NÆVIA (*Boddaert*), GRASSHOPPER WARBLER.—Occurs among the heather above the road which runs along the side of Loch Lochy, between Gairlochy and Achnacarry. As the heather is very rank the birds are difficult to detect, but heard several singing at different places, so there must be a few pairs about.

- MOTACILLA LUGUBRIS, *Temminck*, PIED WAGTAIL.—Very local, and absent during the winter. In the beginning of February a single bird was seen by Loch Lochy, but it did not stay, and no more appeared till March 2nd, when another bird turned up, and during the next week was joined by several more.
- M. MELANOPE, *Pallas*, GRAY WAGTAIL. — Commoner than *M. lugubris* over most of the district. Arrived on April 2nd.
- ANTHUS PRATENSIS (*Linnaeus*), MEADOW PIPIT.—Very common during spring and summer all over the area. In November most of the birds depart, but a few stay about Loch Lochy till the middle of December. I saw a small flock near the loch on December 11th, and a single bird, on the 23rd, was the last I saw till several returned on February 26th.
- [LIGURINUS CHLORIS (*Linnaeus*), GREENFINCH.—This species is mentioned in the “Argyll” as occurring at Torcastle on the River Lochy, just outside this district, but I have never seen it, although the country around Achnacarry seems quite suitable for it.]
- CHRYSOMITRIS SPINUS (*Linnaeus*), SISKIN.—Large flocks are to be seen feeding on the alder trees throughout the district in autumn, winter, and early spring. I never came across any breeding, but saw a pair of old birds in the middle of July.
- FRINGILLA MONTIFRINGILLA, *Linnaeus*, BRAMBLING.—A single bird on November 1st, and another on February 19th, were the only examples I came across of this species.
- LINOTA RUFESCENS, *Vieillot*, LESSER REDPOLL.—Common all the year round near Loch Lochy, where it nests in considerable numbers among the birch and young Scotch fir trees. A nest which I found close to a cottage was built in some tall heather, at the foot of a young birch tree, about 2 feet from the ground, and was lined with black feathers and cotton wool. The feathers came from some black fowls kept at the cottage, and the cotton wool was some which I had thrown away about a week before.
- STURNUS VULGARIS, *Linnaeus*, STARLING.—Common at Achnacarry and Gairloch during spring and summer, but absent in winter. Three birds returned to Achnacarry on January 21st, and by February 3rd there were a good many about.
- ALAUDA ARVENSIS, *Linnaeus*, SKYLARK.—Very local, only occurs in Glen Mallie and along the side of the River Lochy. Absent during the winter. On March 10th about 9.30 a.m. I saw eleven skylarks, high up, flying almost due west. Some of these I think must have been the birds I saw in Glen Mallie in May.

- ACCIPITER NISUS (*Linnaeus*), SPARROWHAWK.—Seems to be absent during the winter, returning in the beginning of April, and is common in the wooded districts during the breeding season.
- MARECA PENELOPE (*Linnaeus*), WIGEON.—I saw a pair of Wigeon on Loch Arkaig, and another pair on a small loch in the west of the district in the end of May, but do not know if they nested or not.
- FULIGULA FERINA (*Linnaeus*), POCHARD.—On December 8th a small flock arrived in Bunarkaig Bay, and remained there for a couple of months.
- CLANGULA GLAUCION (*Linnaeus*), GOLDENEYE.—Common during the winter. I saw five old males of Loch Arkaig on May 28th.
- MERGUS MERGANSER, *Linnaeus*, GOOSANDER.—Several pairs about during spring and summer. I saw a female and four young on July 2nd.
- FULICA ATRA, *Linnaeus*, COOT.—Once seen on Loch Lochy during a sharp frost on December 11th.
- ÆGIALITIS HIATICOLA (*Linnaeus*), RINGED PLOVER.—A pair frequented Clunes Bay on Loch Lochy for some time during April.
- CHARADRIUS PLUVIALIS, *Linnaeus*, GOLDEN PLOVER.—Very scarce. Have only seen two pairs in the district.
- VANELLUS VULGARIS, *Bechstein*, LAPWING.—Absent during the winter. On the morning of January 28th a Lapwing came into Bunarkaig Bay from the N.E. and went in a westerly direction. As it was flying low I thought it would alight in the fields of Achnacarry, but it must have gone on, as I did not see it again. In March two returned on the 2nd, and were joined by twenty-four others on the 10th. A good many breed in Glen Mallie by the side of Loch Arkaig, near Clunes on Loch Lochy, and down the Lochy river.
- TOTANUS CALIDRIS (*Linnaeus*), REDSHANK.—Occurs occasionally by Loch Lochy. On April 3rd I saw a single bird, and a pair remained about the loch for several days after June 22nd.
- T. CANESCENS (*J. F. Gmelin*), GREENSHANK.—Arrived on Loch Lochy on April 20th. Two or three pairs breed in district.
- NUMENIUS ARQUATA (*Linnaeus*), CURLEW.—Scarce and local as a breeding species. A single bird in Glen Loy, and three flying down Loch Lochy in a S.W. direction, were the only birds I saw during the winter. On March 7th two returned and were soon joined by a few more. A flock of twenty non-breeding birds frequented Loch Lochy and the fields in front of Achnacarry from March till the beginning of June.

- N. PHÆOPUS (*Linnaeus*), WHIMBREL.—One seen by the side of Loch Lochy, resting on migration, on May 9th.
- LARUS RIDIBUNDUS, *Linnaeus*, BLACK-HEADED GULL.—Now and again seen on Loch Lochy. The nearest breeding-place is a loch in Glen Garry in the “Moray” area.
- COLYMBUS GLACIALIS, *Linnaeus*, GREAT NORTHERN DIVER.—Seen on Loch Lochy on November 23rd.
- C. ARCTICUS, *Linnaeus*, BLACK-THROATED DIVER.—I am not sure whether a pair bred on a small loch near the boundary of “Argyll” and “Moray,” but I was told that they had done so for a good many years. On May 7th I was at the loch, and saw the birds. In June I was again at the loch, but there was no sign of the birds.

ON THE OCCURRENCE OF THE HAWFINCH AND OTHER BIRDS IN UNST, SHETLAND.

By Dr. T. EDMONDSTON SAXBY.

THE weather during the autumn, winter, and spring of 1903-1904 has been no exception to that which generally obtains in Shetland during these seasons, viz. very wet, stormy, and subject to sudden and violent changes (generally for the worse).

The average person then feels much more inclined to spend the day indoors before a comfortable fire, but such cannot be with me, a parish “sawbones” in a scattered country district.

Even when professional work does not call him forth, to the man who, like myself, loves watching bird life, winter in Shetland has a peculiar charm.

What does it matter though the wind howl and the rain and snow do their best to discourage prowling out of doors? The true bird-lover knows that on the very worst days his “prowls” are most likely to be rewarded by finding some storm-driven bird taking shelter in some “likely spot”; and he has the satisfaction of having added another “record” to his list.

Then again, on a bright frosty day what can be more exhilarating and enjoyable than to take a small skiff and pull or sail quietly round the secluded bays and islets?

The weird cry of the "Calloo" (*i.e.* Long-tailed Duck), with his oft-repeated "ca-ca-ca-caoo ca-ca-oo," and the crisp sound of the boat ploughing through the thin ice, furnish the musical accompaniment; the cry of birds being almost the only other sound which breaks the death-like silence of a Shetland winter day.

As the boat passes along the shore, Redshanks, Sandpipers, the ever-present "Sandy-loo" (Ringed Plover), and other shore birds will be seen, too busy to take any notice of the intruder.

Now and again a Curlew will rise and make off as though he suddenly remembered some forgotten engagement on which his life depended!

Then round this point perhaps a Great Northern Diver or two will be seen, and the Eider Duck in his handsome dress.

Black Guillemots in gray and black plumage, Shags, and Common Guillemots abound everywhere, and now and again a flock of Red-breasted Mergansers or perhaps some Shearwaters pass by in a great hurry.

Of course the gun is kept ready for a Duck or some other edible bird, for in winter salt fish and tinned foods become monotonous; and one naturally wonders how the older generation kept so healthy on such an unvaried diet as they must have existed on—it must have been a case of the "survival of the fittest."

The following notes will show how my wanderings during the past winter and spring have been rewarded.

Of course it is impossible to see every bird which deigns to visit our rocky home, but if one keeps his eyes open and notes *at the time* all that one sees and hears, and if one does not mind being frequently drenched with rain and sometimes even driven off his course by the wind, a winter may be very comfortably (?) put in in Shetland by a keen bird-lover.

SHORT-EARED OWL, *Asio accipitrinus*.—A good many seen from 24th October 1903, and on through the winter.

WHOOPEE SWAN, *Cygnus musicus*.—A few passed south, 11 A.M., 25th October 1903. At 8 P.M. on 28th November 1903, five flying in a northerly direction. At 6 P.M. on 24th March

- 1904, heard overhead. At 11.30 P.M. on 29th April 1904, flying north-west.
- SCAUP-DUCK, *Fuligula marila*.—One shot at Burrafirth, 28th October 1903. A few seen at Loch of Cliff, 9th November 1903.
- RED-BREASTED MERGANSER, *Mergus serrator*.—Very plentiful during winter; a pair seen on Loch of Cliff, 10th May 1904.
- SMEW, *Mergus albellus*.—Two at Baltasound, 30th October 1903; these are the only ones I have ever seen in Shetland.
- ROOK, *Corvus frugilegus*.—A few at Haroldswick, 31st October 1903. A flock of eighteen passed in an easterly direction on 14th November 1903. A small flock at Baltasound, 14th February 1904. Numbers greatly increased on 23rd March 1904. Enormous numbers over whole island, 20th April 1904; last seen, 10th May.
- GOLD-CRESTED WREN, *Regulus cristatus*.—Plentiful, 4th November 1903 and following days. A few about from 15th April to 23rd April 1904.
- ROSE-COLOURED STARLING, *Pastor roseus*.—One—the only one I have ever seen alive—in the garden at Halligarth on 6th November 1903. It was sitting on a branch of a mountain ash, and I had a good look at it.
- WAXWING, *Ampelis garrulus*.—My little girl found the remains of one hanging in the honeysuckle in front of the house; judging by its appearance, it had hung for about a fortnight—12th November 1903.
- SNOWY OWL, *Nyctea scandiaca*.—One, immature, at Ungista, 13th November 1903. One, quite white, reported from Haroldswick, 17th November 1903.
- CHAFFINCH, *Fringilla œlebs*.—Plentiful during autumn and winter; numbers increased on 17th March 1904.
- LONG-EARED OWL, *Asio otus*.—Found remains of one among some shrubs at Halligarth, evidently torn by a cat.
- WOODCOCK, *Scolopax rusticula*.—One at Burrafirth, 12th February 1904. Many reported to me from near Lerwick about same date.
- JACKDAW, *Corvus monedula*.—One along with some Rooks, 14th February 1904. One at Haroldswick, 9th March 1904.
- SONG THRUSH, *Turdus musicus*.—One in garden at Halligarth, 5th March 1904; one, probably the same, at same place, 8th March 1904.
- CHIFFCHAFF, *Phylloscopus rufus*.—A good number from 15th to 26th April 1904.

- BRAMBLING, *Fringilla montifringilla*.—A great many, 16th April to 27th May 1904 (to-day).
- WILLOW WREN, *Phylloscopus trochilus*.—Many about, 19th April; a few still in garden, 27th May 1904.
- SISKIN, *Carduelis spinus*.—One or two at least, 19th April 1904.
- WHEATEAR, *Saxicola oenanthe*.—Arrived 20th April.
- WHITE WAGTAIL, *Motacilla alba*.—One shot at Haroldswick, 25th April 1904.
- HAWFINCH, *Coccothraustes vulgaris*.—A female brought to me alive on 3rd May 1904. So far as I am aware this is the only record for Shetland.¹
- LITTLE GULL, *Larus minutus*.—One at Uyasound, 3rd May 1904.
- BLACKBIRD, *Turdus merula*.—Not so plentiful as usual; four birds hatched, 10th May.
- RED-NECKED PHALAROPE, *Phalaropus hyperboreus*.—Two seen, 18th May (for obvious reasons I give no particulars as to exact locality).
- CUCKOO, *Cuculus canorus*.—Heard at Baltasound, 20th May 1904.
- MARTIN, *Chelidon urbica*.—Two along shore below Bunes, Baltasound, 25th May 1904.
- SWIFT, *Cypselus apus*.—One at Baltasound, 26th May 1904.
- REDSTART, *Ruticilla phoenicurus*.—A few, 19th April 1904; not so many as usual.

HALLIGARTH, UNST, SHETLAND,
27th May 1904.

THE PERSECUTION OF THE GREAT SKUA IN SHETLAND.

We learn, with much regret, that there is a recrudescence of the persecution of this interesting bird in its breeding haunts in Shetland. For some few years past the wholesale taking of the eggs was put down; but during the past year or two there has unfortunately been a reversion to the old order of things, due to the fact that the protection afforded has, in certain haunts at least, been allowed to fall into abeyance, a circumstance which is greatly to be deplored.

¹ For occurrence of the Hawfinch at Skerryvore Lighthouse, see p. 179.—Eds.

It has come to our knowledge that a person in Orkney received no less than sixty Great Skua's eggs from one of the Shetland stations. We trust that the County authorities in Shetland will do all in their power to enforce the observation of the Act under which this bird and its eggs are protected in the area under their jurisdiction.

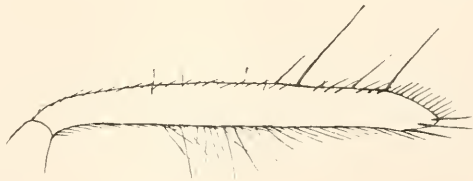
ON A NEW BRITISH FLY (*HYDROTÆA PILIPES*,
STEIN) FROM THE FORTH DISTRICT.

By PERCY H. GRIMSHAW, F.E.S.

IN my recent list of Diptera from the Forth district (Ann. Scot. Nat. Hist., October 1903, p. 223) I recorded a male *Hydrotæa* taken at Aberfoyle by Mr. A. E. J. Carter in July 1903 as *rondanii*, Meade. Since this list was published, however, I have been occupied in studying the genus with the aid of the valuable monograph of the European species, by Herr P. Stein, in the "Verhandlungen der k. k. zool.-bot. Gesellschaft in Wien," published in February of that year. In that paper *H. rondanii* is given as a doubtful synonym of *H. palæstrica*, Mg., with which I saw at once Mr. Carter's specimen did not agree. Working with the key given by Stein I came to the conclusion that it must be the species described as new under the name *pilipes*, and the detailed description given in the body of the paper strengthened this opinion. I at once sent off the fly to Herr Stein, who confirmed my identification. *H. pilipes* was described from a single male specimen in Bonsdorf's collection, from "Akkas" (Palestine?). Mr. Carter took four males in all, and in a letter to me says, "I find from my notes that 1 ♂ was taken 2/7/03, and 3 ♂♂ 4/7/03, on the hills north of Aberfoyle, near the waterfall and stream where I took *Oxycera dives*. The ground is well covered with bracken, and trees (I think chiefly birch, alder, and larch) grow all down the sides of the stream. It is likely, I think, that I took the species on the bracken. It was a very sunny spot."

At first sight this interesting species appears to be very like *H. militaris*, Mg. (= *impexa*, Lw.), but it is easily distinguished by the colour of the abdomen, as well as by many other important characters. Stein's diagnosis is as follows:—"Atra, oculis fere arcte cohærentibus; thorace immaculato subnitido; abdomine oblongo, apice paullo attenuato, nigro, cinereo-pollinoso, vitta media et segmentorum marginibus posterioribus obscuris; femoribus anticis subtus bidentatis, tibiis posticis intus nonnullis pilis vestitis, extus in latere a corpore averso setis 5-6 a medio usque ad apicem pertinentibus instructis; alis subflavidis, venis long. 3 et 4 vix convergentibus, squamis flavis, halteribus nigris.—Long. 7 mm." From his long and careful description (in German) I extract the following additional details, which will aid any one in recognising the species:—Arista of the antenna slightly pubescent, somewhat thickened at the base; thorax deep black, with a slight bluish tinge, and somewhat shining, presutural acrostichal bristles distinct; abdomen as long as thorax and scutellum together, when seen from behind the first segment, a triangular dorsal spot on the second and third segments, and a narrow dorsal line on the fourth segment black, while the other portions are dusted with whitish. The spots on the second and third segments broaden out behind to form broadish, ill-defined hind-marginal bands of blackish-gray.

The hind legs are provided with the following arrangement of bristles and hairs: femora below on the side next the body with shortish, fine hairs along the entire length, on the outer side with a row of longer hairs which are fine from the base to the middle, and from thence to the apex bristly; tibiæ (see figure, which gives a view of the side next the body) on the posterior side ("aussen") one-third from the apex with a long bristle, on the externo-posterior side ("aussen abgewandt") with a row of fine bristles, among which one longer one is prominent somewhat after the middle,



on the externo-anterior side ("innen abgewandt") with 5-6 bristles from the middle to the apex, and on the anterior side ("innen") in the middle third with a considerable number of fine somewhat erect hairs.

The wings are yellowish, especially near the base; the squamæ are yellowish, and the halteres black.

SOME SCOTTISH ROTIFERS (*BDELLOIDA*).

By JAMES MURRAY.

THE majority of the rotifers comprised in the order Bdelloida are moss-dwellers. A few species are parasitic on other animals. None are truly pelagic or are found other than casually in open water, but a few species habitually make short swimming excursions among the weeds. Besides moss, they also shelter among other water plants, such as filamentous algæ, Myriophyllum, etc. Mosses, however, afford them by far the commonest shelter in a great variety of situations—in the fresh water of streams and the margins of lakes, the stagnant water of peat bogs, and on trees, rocks, walls, and the ground, where the supply of moisture is intermittent. Many species, especially of the genus *Rotifer*, are to be found among the floccose material at the bottom of ponds. Only a few are marine, and those are usually parasitic. Gosse describes a free-living species of *Philodina*, *P. microps*, which was found in rock-pools in the Firth of Tay, and I have seen two large species of the same genus among washings of seaweed, but could not identify the species.

The classification of the Bdelloids presents great difficulty owing to the remarkable uniformity of structure which is found throughout the group. The two families, Adinetadæ and Philodinadæ, are sufficiently distinguished by the different type of corona, but within the family Philodinadæ distinctions of generic value are not easily found. As at present defined, the principal genera are distinguished by the presence or absence of eyes, and by the position of the eyes when present. *Rotifer* has two eyes, placed within the

rostrum; *Philodina* has two eyes, placed in the neck; *Callidina* has no eyes. Though convenient in use, there can be no doubt that this classification is artificial, and associates species having only distant affinities, while separating others which are closely related. Many observers, from Dujardin onwards, have pointed out the unreliability of the eye spot as a generic distinction, but no more satisfactory arrangement has yet been proposed. Milne proposed to amend the definition of *Philodina* so as to include all the four-toed *Philodinadæ*, and I think this is a step in the right direction. The two genera, *Rotifer* and *Philodina*, are on the whole natural groups. There are but a few species having the eyes placed as in those genera which would have to be excluded from them in a natural classification. The genus *Callidina*, on the other hand, comprises a most heterogeneous body of species, many of which have very little affinity one with another. Though there is a pressing need for a rearrangement of the genera, and the time is almost ripe for the attempt, it is not my intention to do more than indicate some groups of species which seem to me to be so closely related that in a natural classification they would be associated. If the four-toed species at present included in the genus *Callidina* were joined to *Philodina*, and those species which resemble the genus *Rotifer* in the long foot and conspicuous toes were placed in that genus, the genus *Callidina* would be much more compact, but would still include several groups of species having only distant affinities. The best marked group is that in which the food is moulded into pellets. All the species having this habit resemble one another in many other points. Another group showing characters of possibly generic value is that in which the toes are modified to form a powerful adhesive disc, the so-called symbiotic rotifers. Other groups will doubtless suggest themselves as our knowledge of minute details of structure increases. Among the four-toed *Bdelloids* it is probable that a genus will have to be formed to include *Philodina macrostyla*, *P. aculeata*, and *Callidina spinosa*, three closely related species which differ from the typical group of *Philodina* in the long spurs, three-barred ramus, long tactile setæ on the rostrum, absence of

central setæ on the discs, tendency to spines or tubercles on trunk, and above all in being viviparous. Another group of four-toed Bdelloids of possibly generic value would include *Callidina alpium*, *C. Brycei*, and one or two others, which have distinct transverse folds on the ventral surface of the trunk, those folds being more numerous than the divisions of the segments. These species also have the four toes arranged in a different manner from the other four-toed Bdelloids, the dorsal being the larger pair. Further notes on the affinities of the species will be given in the list which follows.

This list includes only species which I have myself identified, or which Mr. Bryce has named from my drawings or found in material sent to him. There was neither time nor opportunity to compile a list of published records. If the species recorded by Hood, Milne, Bryce, and others were added, as well as a number of new species recently found in the course of the work of the Lake Survey and yet undescribed, the list would be nearly doubled.

ORDER BDELLOIDA.

Family ADINETADÆ.

- Adineta vaga*, Davis.—Both the varieties *major* and *minor*, recognised by Mr. Bryce, are common among Sphagnum. Blantyre Moor.
- A. barbata*, Janson.—A large species, with prominent rostral styles, resembling the antennæ of insects. The large symmetrical egg is covered with rounded bosses. Frequent, Blantyre Moor, Inverness-shire.
- A. gracilis*, Janson.—Small and slender, and excessively active, even for this genus. Frequent, Loudoun Hill, Rannoch Moor, Inverness-shire.

Family PHILODINADÆ.

- Philodina macrostyla*, Ehr.—Very common, and extremely variable in size. The tubercled variety (*P. tuberculata*, Gosse) is probably only a state in which the secretion of mucus is excessive. The secretion takes the form of plates crowning the longitudinal dorsal folds of the trunk and interrupted at the junctions of the segments. In extreme cases the projection of those plates will about equal the diameter of the extended trunk. This and the next species are the only viviparous Philodinæ with which I am acquainted.

- P. aculeata*, Ehr.—Extremely variable. The spines are typically twelve in number, arranged in pairs on the back, the pair most laterally placed pointing forward. The spines may be reduced to mere tubercles, and they may be less than twelve in number. The texture of the skin also varies greatly. It is sometimes smooth, sometimes papillose, and rarely beautifully and regularly rugose. Frequent, Mallaig, Lochinver, Fort Augustus.
- P. roseola*, Ehr.—In my experience this typical species of the genus is rare. Blantyre Moor, Fort Augustus.
- P. citrina*, Ehr.—Not common, Blantyre Moor, Inverness-shire.
- P. erythrophthalma*, Ehr.—Mr. Bryce identifies as this species a lanky active animal frequent in the sediment of bog pools. It is a most voracious feeder, and will swallow diatoms so large that one wonders how they get through the gullet. When feeding it is restless, bending from side to side. It often swims. Blantyre Moor.
- P. obesa*, Murray.—Distinguished by its stout form, dental formula 3—3, and tubercle between the spurs. Rare—only one example yet seen, Blantyre Moor.
- P. brevipes*, Murray.—This is distinguished from the other large species of the genus by its short foot, which has only three joints. It is like *P. erythrophthalma* in its restless habits when feeding. The dental formula consists typically of two large teeth on each ramus, with a thinner one bounding the groove which receives the opposite tooth. This is a common formula in Bdelloids, the thinner tooth being anterior on the one ramus and posterior on the other. In this species the third tooth is frequently enlarged so that there seems to be three equal teeth on each ramus. The animal appears to be liable to attack by various parasites. The commonest consist of large round nucleated cells, of what nature has not been ascertained, which float in the body fluid. In one district all the specimens had a coating of hair-like fibres on the oral segments.
- P. nemoralis*, Bryce.—Frequent, Loudoun Hill, Fort Augustus.
- P. acuticornis*, Murray.—Both the spurs and corona show a considerable amount of variation. The spurs are usually small, straight, divergent, and acute, but they are sometimes very slender, almost setiferous. The skin is usually very minutely stippled, rarely even papillose. The sulcus of the corona varies in width. The folds of skin continuing the collar terminated in rounded expansions a little way below the summit of the upper lip. In creeping, it is seen to be a heavy bodied animal with very slender foot. Common, Blantyre Moor, Fort Augustus.

- P. decurvicornis*, Murray. — This has some resemblance to *P. nemoralis*, but the upper lip is of different form, the sulcus between the discs being deeper, and the spurs are strongly decurved. Rare, Blantyre Moor.
- P. rugosa*, Bryce.—A species varying to a degree unusual in the genus. The skin is rugose, or nearly smooth. The eyes, usually pale red, may be dark red or entirely absent. The teeth, normally three on each ramus, may be only two. Some of the varieties have a rounded dorsal boss on the first foot-joint. This is the only instance I know of such a boss outside of the genus *Callidina*. It also varies in colour, being often hyaline, but sometimes blood-red. Generally distributed, but not often abundant. Blantyre Moor, Rannoch Moor, Inverness, Sutherland.
- P. megalotrocha*, Ehr.—The small spurs have a little movable joint at the apex. I have never been able to see central setæ on the discs. These are general throughout the genus except in viviparous section. Not common, Fort Augustus.
- P. hexodonta*, Bergendal.—There can be no doubt that the animal which I identify as this species has the closest affinity with the pellet-forming *Callidinæ*. It occurred abundantly in a bog pool recently, and I was enabled to make a more thorough study of it. The foot is three-jointed and has three toes. The corona is small, in width distinctly less than the collar, with a narrow sulcus in the middle of which is a large conical process. Dental formula 5-4. Rare, top of Nutberry Hill, Ben Oich. Mr. Bryce has suggested that this is identical with *P. collaris*, Ehr., and as that species is described as moulding its food into pellets, the identification is probably correct.
- Rotifer tardus*, Ehr.—Frequent, Blantyre Moor, Fort Augustus.
- R. triseclatus*, Weber.—Resembling *R. tardus*, but with longer spurs, smaller eyes, and tubercled skin. A few examples in the sediment of ponds, Fort Augustus.
- R. citrinus*, Ehr.—Frequent in ponds, Inverness.
- R. macroceros*, Gosse.—Usually in colonies, in rough tubes of floccose matter, Inverness.
- R. macrurus*, Schrank.—Common, Blantyre Moor, Fort Augustus.
- R. neptunius*, Milne.—Rare, not yet recorded outside of Scotland, Blantyre Moor, Inverness.
- R. vulgaris*, Schrank.—Common, Blantyre Moor, Fort Augustus.
- R. spicatus*, Murray.—Easily known by the backward pointing spikes on the ventral surface of the trunk. Rare, only once seen, Blantyre Moor.

- R. quadrioculatus*, Murray.—Unlike most species of the genus, the greatest thickness is found in the central segments. The foot is short, but of the usual five segments. The eyes are in two pairs, the lower further apart. Sometimes there are a few red granules scattered between the two eyes of the same side. Not common, Blantyre Moor, Fort Augustus.
- Callidina spinosa*, Bryce.—A four-toed species having the closest affinity with *Philodina aculeata*. Rare, Fort Augustus.
- C. alpium*, Ehr.—This has four toes and a series of transverse ventral folds on the trunk. Frequent, Killin, Mallaig, Inverness.
- C. Brycei*, Weber.—Very near the last, distinguished chiefly by a row of transverse dorsal spines. Common, Blantyre Moor, Ben Nevis, Mallaig.
- C. plena*, Bryce.—Found by Mr. Bryce in material sent from Mallaig. Like the preceding species, it has four toes.
- C. plicata*, Bryce.—Very common both in bogs and in washings of dry moss, Nutberry Hill, Lochinver, Inverness.
- C. quadricornifera*, Milne.—Common, Blantyre Moor, Inverness.
- C. papillosa*, Thompson.—Frequent, East Kilbride, Inverness.
- C. multispinosa*, Thompson.—Rare. Found by Mr. Bryce in sediment from a pond on the summit of Nutberry Hill.
- C. ornata*, Murray.—Rare, Blantyre Moor.
- C. aspera*, Bryce.—Rare, Fort Augustus.
- C. asellicola*, Bryce, MS.—Parasitic on *Asellus*. Inverness-shire.
- C. magnicalcarata*, Parsons. Parasitic on *Asellus*. This species and *C. asellicola* resemble the genus *Rotifer* in the long many-jointed foot and conspicuous toes. Inverness-shire.
- C. symbiotica*, Zelinka.—Frequent in moss washings, Inverness.
- C. russeola*, Zelinka.—Frequent, Mallaig, Fort Augustus.
- C. scarlatina*, Ehr.—In pitchers of *Frullania*, not common, Killin, East Kilbride, Fort Augustus.
- C. leitgebii*, Zelinka.—Rare, Fort Augustus.
- C. tetraodon*, Ehr.—I find this the commonest of the symbiotic species, and like the others it is not confined to the pitchers of *Frullania*, but is found in many other situations. Inverness-shire.
- C. elegans*, Ehr.—The type of that numerous group of species which mould the food into pellets. Frequent, Inverness-shire.
- C. lata*, Bryce.—Very common, and generally distributed in different situations, but most common in bogs, Blantyre Moor, Fort Augustus.

C. pusilla, Bryce.—I have only seen this tube-forming species on one occasion, Fort Augustus. My example was typical, but Mr. Bryce has also seen *var. tatrix* in material sent him.

NOTES ON THE ANTHOPHILOUS INSECTS OF THE CLOVA MOUNTAINS.

By J. C. WILLIS, M.A., and I. H. BURKILL, M.A.

NOTE II.—ON THE CHOICE OF FLOWERS BY SYRPHIDS.

CHILOSIA FRATERNA, Mg., is a not uncommon insect at Clova in June and July, but we always took it upon flowers of a bright yellow. It frequented the following:—of Class B, *Taraxacum officinale* and *Hypochaeris radicata*; of Class AB, *Caltha palustris*, *Ranunculus Flammula*, *Ranunculus acris*, and *Potentilla Tormentilla*; and of Class A, *Saxifraga aizoides*. We have, however, one very doubtful visit recorded to *Pimpinella Saxifraga*. The other species of *Chilosia* seen at Clova also were largely on yellow flowers. They are: *C. sparsa* to *Trollius europæus*, and female flowers of *Salix aurita*; *C. antiqua* to *Hypochaeris radicata*, *C. bergenstammi* to male flowers of *Salix aurita*, and *C. scutellata* to *Pimpinella Saxifraga*. *C. sparsa* and *bergenstammi* were taken in May, the others in June and July. All of them belong to the strath, and on one day only was *C. fraterna* taken on the hill-sides at 1300 and 1800 feet above sea-level.

A glance at the lists, given by Knuth,¹ of flowers visited by *Chilosias* in various parts of Europe shows that there are other species of the genus so far only recorded as visitors to yellow flowers, e.g. *C. antiqua*, Mg., *C. albitarsis*, Mg., *C. canicularis*, Pz., *C. chrysocoma*, Mg., *C. pubera*, Ztt., *C. vernalis*, Fall., and *C. vidua*, Mg. A number of others visit, besides pure yellow flowers, the greenish-yellow male flowers of *Salix* and yellowish-green female flowers, and the creamy-white or white flowers of *Spiræa* and *Umbellifers*. There are, however, several *Chilosias* which have been seen to visit flowers of other colours. Verrall² says of the genus that “in life the species sit on large leaves, with the wings lying flatly parallel over each other, or partly spread out in the sunshine.” Whether their affection for the sunshine leads them to the brightest flowers or not, we cannot say; but the observation that they do seem to choose them leads us to examine particularly

¹ “Handbuch der Blütenbiologie,” vol. ii.

² “British Diptera—Syrphidæ,” London, 1901, p. 207. ♀

into the colour choice of the Syrphids which we have seen on flowers in Glen Clova.

The following table summarises our observations:—

	Lilac-blue.	Rose-purple.	White.	Yellow.	Green.	Total.	No. of kinds of flowers visited.
LARGER SYRPHIDS—							
<i>Rhingia campestris</i> , Mg. . .	11	10	...	...	...	21	11
<i>Volucella bombylans</i> , L. . .	...	7	...	4	...	11	6
<i>Sericomyia borealis</i> , Flin. . .	15	1	...	4	...	20	5
" <i>lappona</i> , L. . .	1	4	2	1	...	8	4
<i>Eristalis rupium</i> , F. . .	...	15	4	2	...	21	6
" <i>arbustorum</i> , L. . .	1	30	25	11	...	67	21
" <i>pertinax</i> , Scop., and <i>tenax</i> , L. . .	40	8	7	30	...	85	14
<i>Helophilus pendulus</i> , L. . .	1	3	2	1	...	7	5
<i>Chilosia fraterna</i> , Mg. . .	...	...	? 1	28	...	29	9
" <i>sparsa</i> , Lw. and 3 other spp. . .	...	...	...	3	3	6	4
<i>Leucozona lucorum</i> , L. . .	...	1	...	...	...	1	1
<i>Chrysogaster hirtella</i> , Lw. . .	1	...	1	5	1	8	7
LESSER SYRPHIDS—							
<i>Syrphus ribesii</i> , L. . .	...	1	3	7	...	11	7
" <i>vitripennis</i> , Mg. . .	3	1	57	1	...	62	13
" <i>punctulatus</i> , Verr. . .	...	...	6	2	...	8	4
" spp. . .	5	4	9	41	1	60	18
<i>Syritta pipiens</i> , L. . .	...	3	16	11	...	30	19
<i>Platychirus discimanus</i> , Lw. . .	...	1	4	51	3	59	9
" <i>albimanus</i> , F. . .	2	...	20	10	...	32	12
" <i>manicatus</i> , Mg. . .	27	32	23	35	1	113	40
" <i>peltatus</i> , Mg. . .	...	3	...	2	...	5	3
" <i>clypeatus</i> , Mg. . .	1	...	...	3	...	4	3
" sp. . .	1	4	3	4	1	13	10
<i>Melanostoma quadrimaculatum</i> , Verr. . .	...	1	1	2	...	5	4
<i>Melanostoma mellinum</i> , L. . .	3	2	...	7	...	12	10
" <i>dubium</i> , Zett. . .	1	...	1	...	...	2	2
<i>Ascia podagrica</i> , F. . .	2	...	2	4	1	9	7
<i>Sphaerophoria</i> , 4 spp. . .	...	...	...	6	...	6	5

It is seen from the table that *Rhingia campestris*, which visited 11 flowers, chose those with more or less of blue colour in them. No other insect showed quite such a favouritism for that end of the spectrum. *Sericomyia borealis* visited *Scabiosa succisa* freely, but no other lilac-blue flower; it therefore cannot be said to have a distinct preference. *Eristalis rupium* and *E. arbustorum* seemed rather to marked the extreme of blue. *Chilosia*, as already said, has a very marked preference for yellow, which, perhaps, is shared by *Chrysogaster*. Among the small Syrphids there seemed to be a tendency to prefer white and yellow in many species, but *Platychirus manicatus* was found to be in no way particular in its choice of colours.

It has been pointed out by many entomologists that this or that species has a preference for a particular flower, but we now want evidence upon the finer point as to whether this or that species has a preference for a particular colour of flower.

PLANTS OF CAITHNESS.

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

IN the August of 1902 I spent a few days near Thurso with the Rev. H. J. Riddelsdell, and had a very enjoyable time in some interesting botanical excursions along the fine cliffs of that neighbourhood. Mr. Sinclair was extremely kind to us, and showed us some of the special rarities of the district.

Our most interesting discovery was that of *Deyeuxia neglecta*, Kunth., near Castleton, for so Professor Hackel confidently names my specimens which I found near to, but not in, the exact locality whence *D. strigosa* is said to have been gathered. Professor Hackel is inclined to doubt if *D. strigosa* has been found in Scotland. When I gathered the plant, which grew over a very restricted area, I felt I could not separate it from *D. neglecta*, although not precisely similar to the Cheshire plant.

Thalictrum dunense, Dum.—Sands at Reay. Very dwarf when in full exposure (2 to 3 inches), but growing to 18 inches when sheltered by sand-cliff.

**Ranunculus Lingua*, L.—Mr. Lindsay tells me he has gathered this between Thurso and Reay.

†*Berberis vulgaris*, L.—Appeared to be always a planted shrub, as in hedges between Castleton and John o' Groat's.

Cochlearia officinalis, L.—A pretty form. Grew on one or two places on the sea-cliffs, but *C. groenlandica* is the common plant.

Cardamine flexuosa, With.—Thurso, by the river.

Raphanus raphanistrum, L., var. *flavum* (Gray).—Downreay.

Viola tricolor, L.—Scrabster, John o' Groat's, near Castleton; usually *F. versicolor*, With.

Silene maritima, Sm.—A common plant of the sea-cliffs, as at Holborn Head, perfectly typical; also often much condensed in size where subject to full wind exposure.

- Lychnis dioica*, *L.*—Abundant on sea-cliffs at Duncansbay, and also seen near Holborn Head.
- Cerastium tetrandrum*, *Curt.*—A large form near the White Sands, and very condensed floriferous forms at Downreay, where exposed to full wind and sun. A lax form grew on the Reay sand-hills where sheltered.
- C. semidecandrum*, *L.*—Downreay, Holborn Head.
- C. vulgatum*, *L.*—Occurred as a glabrous and very stunted form on the sea-cliffs of Holborn Head, growing in short turf, and also as a very hairy form at Reay.
- Arenaria peplodes*, var. *diffusa* (Hornem).—Lax plants a foot long grew out of the crevices of the sea-cliffs near Downreay, near Murkle Bay. The type also occurred.
- Spergula sativa*, *Boenn.*—Castleton.
- **Buda rubra*, *Dum.*—On the railway at Georgemas.
- Sagina nodosa*, *Fenzl.*—On the Holborn cliffs in short turf, and at Reay.
- S. maritima*, *Don.*—Rather plentiful on the cliffs 250 feet above sea-level, growing under the partial shelter of rocks, but there subject to the sea spray. Also on low cliffs near Murkle Bay. Some luxuriant specimens also seen near Downreay.
- Montia fontana*, *L.* var. *major*, *All.*—Near Rattar Moss.
- Trifolium pratense*, *L.*—This was also conspicuous from its large and bright-coloured flowers, reminding one of *T. medium*, which I did not see.
- Anthyllis vulneraria*, *L.*, var. *Dillenii* (Schultz).—Reay cliffs. But the corolla is not wholly pink with red tips, but cream-coloured. That is, it is the var. *Dillenii* of the third, not of the second, edition of Hooker's *Student's Flora*. The flowers of plants of *Dillenii* from Anglesey are pink and crimson, and are typical.
- Vicia cracca*, *L.*—The beautifully blue flowers, which are conspicuously larger than those of our Midland plant, were a great ornament to the hedges near Castleton.
- V. sylvatica*, *L.*—By the Thurso river.
- Lathyrus pratensis*, *L.*—The flowers of this also were distinctly larger than those of our southern plant.
- Rubus Rogersii*, *Linton.*—Near John o' Groat's.
- R. corylifolius*, *Sm.*—About Thurso in several places.
- Alchemilla vulgaris*, *L.*, var. *alpestris* (Schmidt).—Between Castleton and John o' Groat's. The type grew by the Thurso river.

- Rosa eglanteria*, *L.* (*R. rubiginosa*, *L.*).—In several places in the hedges between Castleton and John o' Groat's, but probably planted.
- R. spinosissima*, *L.*—Thurso riverside, on the glacial clay cliffs.
- † *Pyrus aria*, *Ehrh.*—Planted about Castleton, and I also saw it in a hedgerow.
- Parnassia palustris*, *L.*—Very dwarf on the exposed turf of Holborn Head.
- † *Ribes alpinum*, *L.*—In a hedge at Thurso.
- † *R. grossularia*, *L.*—In a hedge near Castleton.
- Sedum roseum*, *Scop.*—On sea-cliffs, to within twenty feet of the sea-level near Clairdon Head, and very plentiful on Holborn Head, etc.
- Hippuris vulgaris*, *L.*—In a pond near Berriedale.
- Callitriche stagnalis*, *Scop.*—Near Berriedale.
- Ligusticum scoticum*, *L.*—Rather frequent in sheltered crannies in the sea-cliffs.
- Angelica sylvestris*, *L.*—Very dwarfed on the sea-cliffs near Murkle Bay.
- Galium verum*, *L.*, var. *litorale*, *Breb.*—Murkle Bay, Dunnet Links, Loch Durran.
- † *Nardosmia fragrans*, *Presl.*—Thurso; of course an escape.
- Tanacetum vulgare*, *L.*—On sea-cliffs near Clairdon Head; perhaps native.
- Arctium intermedium*, *Lange.*—Near Scrabster.
- Matricaria inodora*, *L.*, var. *phæocephala*, *Rupr.*—Scrabster.
- Artemisia vulgaris*, *L.*—Scrabster.
- Hieracium iricum*, *Fr.*—Scrabster cliffs.
- H. subanfractum*, *Marshall.*—Thurso, *Rev. H. J. Riddelsdell.*
- H. gravestellum*, *Dahlst.* (*rhomboides*, *Stenstr.*).—Thurso.
- H. cerinthiforme*, *Backh.*—Thurso, *Rev. H. J. Riddelsdell.*
- H. Leyi*, *F.I.H.*—Thurso, *Rev. H. J. Riddelsdell.*
- H. murorum*, *L.*, *H. silvaticum*, *Gouan*, var. *phacotricum* (*Dahlst.*).—Thurso, *Rev. H. J. Riddelsdell.*
- H. gothicum*, *Fr.*—Thurso.
- Senecio aquaticus*, *Huds.*—Very large flowered plants grew in the Thurso meadows.
- Saussurea alpina*, *DC.*—Grew on sea-cliffs near Clairdon Haven, only 20 feet above sea-level. The plants were from 12 to 20

inches high. The heaths *Calluna* and *Erica Tetralix* grew on Holborn Head in a very prostrate form, the latter often white-flowered.

**Myosotis palustris*, var. *nemorosa*, Besser.—On the Reay sands, by a small rivulet. A nearly glabrous form, differing chiefly from *strigulosa* in the leaves being nearly destitute of hairs, and in having somewhat larger flowers. It is intermediate between var. *strigulosa* and var. *caespiticia*, DC., and is a very beautiful plant.

Myosotis caespitosa, *Schult.*—Near Olig.

Pneumaria maritima, *Hill.*—Very beautiful and plentiful near Downreay on shingle, also at John o' Groat's growing in shell sand.

†*Symphytum asperrimum*, *Bieb.*—Thurso.

Statice linearifolia, *Laterr.*—This appeared to be the only species on the Caithness cliffs, where it varies extremely in size. At Holburn Head it was very dwarfed with very narrow leaves, and sometimes from the pressure resulting from the contiguity of the plants, the rosettes had a geometric appearance like the markings on a tortoise. On the cliffs near Clairdon Hill Mr. Lindsay told me he had seen a bracteate form.

Primula scotica, *Hook.*—Was in nice flower. The odour recalls that of our common Primrose, but is more delicate. The plant appeared to prefer the barer portions of a dampish peaty turf, and nearly full exposure. On the Dunnet Links it grew in humus on the sand. It does not appear to grow far from the coast.

Mimulus langsdorffii, *Don.*—Occurred at Reay as the form with spotted corolla, var. *guttatus* (DC).

Bartsia odontites, *Huds.*, var. **litoralis* (Reichb.). By the sea at Downreay, and less typical in a pasture near Towerhill, about two miles from Thurso.

Euphrasia latifolia, *Pursh.*—Very abundant on the cliffs at Downreay, local at John o' Groat's.

E. brevipila, *Burn.* and *Gremli*, var. *subglandulosa*, *Towns.*—In shell sand near Clairdon. The type is common.

E. borealis, *Towns.*—Scrabster.

E. foulænsis, *Towns.*—Scrabster.

E. curta, *Fries.*, var. *glabrescens*, *Wetts.*—Thurso. The abundance and beauty of the form of *Euphrasia* on the cliffs, especially about Reay, must be seen to be realised.

Rhinanthus minor, *Ehrh.*—Common.

**R. stenophyllus*, *Schur.*—Thurso, and near John o' Groat's, etc.,
Lamium intermedium, *Fries.* — Garden ground, Scrabster and
 Thurso.

L. purpureum, *L.*—John o' Groat's.

Stachys ambigua, *Sm.* (*S. silvaticus palustris*).—Thurso.

Galeopsis Tetrahit, *L.*, var. *bifida* (Boenn.).—Scrabster, John o'
 Groat's, etc.

*var. *nova*.—In potato fields. A form occurred with more
 glabrous foliage and differently outlined leaves and
 flowers, which as yet I have been unable to match.

Prunella vulgaris, *L.*—The flowers of this were conspicuously larger
 than those of our Midland plant.

**Stachys arvensis*, *L.*—Castleton, in cornfields.

Ajuga pyramidalis, *L.*—We saw only the root-leaves of the young
 plant, which were pointed out to us by Mr. Lindsay, whose
 great kindness it is impossible to do justice to. The plant
 likes the shelter afforded by gorse bushes, although just growing
 out of their shade on a steep earthy cliff of glacial clay with
 shallow loamy subsoil, and not 100 feet above sea-level.

Plantago coronopus, *L.*, var. *pygmæa*, Lange.—Common on the
 Holburn sea-cliffs at Downreay, etc.

var. *maritima*, Gren. and Godr.—Near Clairdon.

P. maritima, *L.*, var. *latifolia*, Syme.—With very broad leaves
 (nearly an inch), on a precipitous rock near Downreay.
Forma vivipara occurred near Downreay, also with broad
 slightly dentate leaves. The var. *dentata*, Wirtgen (*teste* E. G.
 Baker), a monstrous form with foliaceous bracts, also occurred
 on the cliffs.

var. *minor*, Hook. and Arnott.—Scrabster, Downreay.

P. lanceolata, *L.*, var. *capitellata*, Koch (? *capitata*, Presl.).—Holburn
 cliffs. Also a form near *P. glareosa*, A. Kerner (*teste* E. G.
 Baker), at Downreay.

Rumex crispus, *L.*, var. *trigranulatus*.—Thurso. The form with
 a tubercle on only one perianth segment was seen at John o'
 Groat's.

†*Fagus sylvatica*, *L.*—Planted about Castleton.

†*Quercus sessiliflora*, *Salisb.*—Planted near Castleton.

Salix repens, *L.*—On the Holborn sea-cliffs.

Empetrum nigrum, *L.*—On the Holborn cliffs in full exposure.

Juniperus communis, *L.*—By the Thurso river.

- Orchis maculata*, *Linn.*, var. *ericetorum* (Linton).—On the Holborn Head sea-cliffs, and near Castleton and John o' Groat's. The type occurs near Berriedale.
- Habenaria viridis*, *Br.*—A very stunted form with oval leaves grew on the Holburn cliffs, which I think comes under the var. *bracteata*.
- Orchis incarnata*, *L.*—Near Berriedale.
- Potamogeton natans*, *L.*—Near Berriedale.
- Schoenus nigricans*, *L.*—As a stunted form on the Scrabster cliffs.
- Carex aquatilis*, *Wahl.*—By the Thurso river.
- C. Goodenowii*, *Gay*, var. *recta* (*teste* Kükenthal), by the Thurso river.
- C. Hornschuchiana*, *Hoppe*, and *C. flava*, *L.* On the Scrabster cliffs.
- **Catabrosa aquatica*, *Beauv.*, nov. var. *grandiflora*, *Hack.*, *in lit.*—Flowers twice the size of the type, with two florets. In a moist sandy spot well above high-water mark near Downreay. A conspicuous-looking plant growing in a very tufted form.
- Poa subcœrulea*, *Sm.*—Rather common at Downreay and John o' Groat's, less marked near Murkle Bay.
- P. annua*, *L.*—As a subperennial and upright tall plant, with larger and more coloured spikelets and larger and more open panicle, occurred in shell-sand at Murkle Bay.
- Agropyron junceum*, *Beauv.*—Murkle Bay, John o' Groat's, Reay, etc.
- A. repens*, *Beauv.*, var. *Vaillantianum*, *Schrank.*—Thurso.
- Agrostis alba*, *L.*, var. *coarctata* (*Hoffm.*).—Scrabster, etc. Also as a very dwarfed plant mimicking *A. pumila*, only of more tufted growth, on the Holborn cliffs.
- A. pumila*, *L.*—Dunnet Links.
- Deschampsia cœspitosa*, *Beauv.*, var. *brevifolia* (*Parn.*).—Thurso.
- Festuca rubra*, *L.*—Common.
var. *barbata*, *Hack.*—John o' Groat's.
var. *juncea*, *Hack.*—In shell-sand at Murkle Bay.
- F. ovina*, *L.*, var. *paludosa*, *Gaud.*—Reay.
- Equisetum limosum*, *L.*—Downreay.
- E. palustre*, *L.*, var. *nudum*, *Duby.*—In the Reay sands.
- **Chara hispida*, *L.*—Downreay.

ALIEN PLANTS NEAR EDINBURGH.

By WILLIAM EVANS, F.R.S.E., and W. EDGAR EVANS.

IN the previous number of this magazine, Mr. James Fraser gives a valuable list of "alien" or "introduced" plants gathered by himself and others during last year in the neighbourhood of Edinburgh. It so happens that we have also recently given considerable attention to the "Alien Flora" of the district; and in February last we submitted to the Botanical Society of Edinburgh a list of about 300 species which we had collected. Some were gathered in 1902, but the great majority were obtained between July and October 1903. We hope before long to have the list published in full, and in the present communication we therefore mention only species not in Mr. Fraser's list. A number of others, such as *Eranthis hyemalis*, *Reseda lutea*, *Vicia angustifolia*, *Valeriana pyrenaica*, *Dipsacus sylvestris*, *Campanula rapunculoides*, *Lamium intermedium*, etc., included in Dunn's "Preliminary List of the Alien Flora of Britain" (1903), and not uncommon here, are purposely excluded to avoid undue extension of the list.

The naming of the large number of foreign "casuals" which have sprung up from grain-siftings, etc., at Leith Docks and other "dumping" grounds has been no easy task; and in this connection we are especially indebted to Professor Bayley Balfour not only for facilitating our reference to specimens and books in the Herbarium and Library at the Royal Botanic Garden, but for himself personally identifying some of our plants. To Mr. Jeffrey, assistant in the Herbarium, we are also greatly indebted for much help kindly rendered in a variety of ways. Professor Trail of Aberdeen has likewise given us valuable assistance in the identification of a number of critical species.

Ranunculus falcatus, L.—Leith Docks, a single plant, September 1903.

R. sardous, Crantz.—Leith Docks, two or three.

Helleborus foetidus, L.—Near Oxenford, plentiful.

Delphinium Ajacis, L.—Rubbish heap near Slateford, August 1903, scarce. Seems to be this form, but spur shorter than normal

and colour somewhat violet, thus approaching *D. orientale*, F. Gay.

D. nudicaule, Torr. and Gray.—Craigmillar Quarry.

Aconitum Napellus, L.—Arniston and Dalmeny woods.

Papaver somniferum, L.—Craigmillar Quarry; Leith Docks; near Hopetoun.

Meconopsis cambrica, Vig.—Hopetoun; Kirkliston.

Corydalis lutea, DC.—Near Eskbank (an old locality).

Fumaria Boravi, Jord.—Comiston; Craigmillar; Leith Docks.

F. parviflora, Lam.—Near Slateford, scarce; Leith Docks.

Arabis albidia, Stev.—On old wall near Eskbank.

Draba muralis, L.—Nursery garden, Comely Bank, very abundant; Craigmillar; Inveresk.

A Armoracia rusticana, Gaertn.—Longniddry Links; Inverkeithing.

Hesperis matronalis, L.—Craigmillar Quarry; Leith; near Elie.

Sisymbrium fugax, Lag.—Leith Docks, one plant.

Camelina grandiflora, Boiss.—Leith Docks, one plant. Seems to be this form rather than *C. sylvestris*, Walls.

Bunias orientalis, L.—Railway siding, Kinross, one large plant, June 1903; Leith Docks, one, August.

Brassica elongata, Ehrh.—Leith Docks, two large plants; Granton, one; Craigmillar Quarry, one.

B. nigra, Koch.—Kingsknowe and Slateford, common; Granton; Craigmillar.

B. dissecta, Boiss.—Leith Docks, scarce.

B. Cheiranthos, Vill. ?—Slateford, one.

Lunaria annua, L.—Shore east of North Berwick, several plants.

Lepidium incisum, Roth.—Leith Docks, not scarce. Agrees exactly with recent Continental specimens of this form in herbarium at Royal Botanic Garden.

L. perfoliatum, L.—Leith Docks, half-a-dozen.

Iberis amara, L.—Charlestown, a few plants on waste ground; near Kirkcaldy.

Raphanus Landra, Mor.—Refuse heap, Gorgie, frequent.

Viola cornuta, L.—Railway bank, Tynehead.

Dianthus barbatus, L.—Wood near North Berwick.

Silene Behen, L.—Leith Docks, several.

S. Armeria, L.—Leith Docks, one, small.

S. Muscipula, L.—Slateford, one small plant.

- S. dichotoma*, Ehrh.—Leith Docks, one ; Inveresk, two.
- Cerastium dichotomum*, L.—Leith Docks, one specimen.
- Gypsophila paniculata*, L.—Near Musselburgh, two or three.
- Claytonia sibirica*, L.—Craigmillar Quarry, one plant.
- Althæa hirsuta*, L.—Inveresk, one, June 1904.
- Malva parviflora*, L.—Slateford, several plants.
- Geranium phæum*, L.—Craigmillar Quarry, one.
- Euonymus latifolius*, L.—Plentiful in Hopetoun woods—introduced.
- Lupinus* sp. ?—Refuse heap, Slateford, a single smallish downy plant ;
flower pale-bluish white.
- Trigonella polycerata*, Led.—Slateford, one plant.
- T. hamosa*, L.—Leith Docks, two or three.
- Medicago falcata*, L.—Inveresk, a few plants.
- M. orbicularis*, All.—Inveresk, one, June 1904.
- M. striata*, Bast. ?—St. David's, 1902. Pods unarmed.
- Melilotus sulcata*, Desf.—Leith Docks, one plant.
- M. messanensis*, All.—Leith Docks, one.
- Astragalus bœticus*, L.—Refuse heap, Gorgie, October 1903, one
plant, with fruit.
- Coronilla varia*, L.—Roadside, near Kirkliston.
- Scorpiurus sulcatus*, L.—Waste ground, Gorgie, not scarce. Seems
to be this rather than *S. subvillosus*.
- Pisum sativum*, L.—Leith Docks ; Craigmillar ; Slateford, etc.
The form *arvense* also frequent.
- Vicia gracilis*, Loisel.—Slateford, two or three plants.
- V. dasycarpa*, Ten. (= *varia*, Host.).—Inveresk, several specimens
from this locality submitted to Professor Trail are referred by
him to this form rather than to the following. Slateford.
- V. pseudo-cracca*, Bertol.—Leith Docks, one.
- V. tenuifolia*, Roth.—Inveresk, not scarce.
- V. pannonica*, Crantz.—Slateford and Inveresk, several.
- V. melanops*, Sibth.—Slateford, one.
- V. peregrina*, L.—Leith Docks ; Slateford ; frequent.
- V. calcarata*, Desf.—Slateford, a few plants.
- V. narbonensis*, L.—Slateford, not scarce ; Leith Docks.
- V. bithynica*, L.—Roadside near Kinghorn, one plant ; Inveresk
several.
- Lathyrus Ochrus*, DC.—Slateford, one plant ; Gorgie, several.

- L. grandiflorus*, Sibth. and Sm.—Roadside near Aberdour. Garden escape.
- L. hirsutus*, L.—Slateford, several.
- L. sativus*, L.—Granton ; Slateford ; Leith Docks ; not scarce.
- L. sphaericus*, Retz. ?—Leith Docks, scarce ; Inveresk. Seems this rather than the closely allied *L. inconspicuus*, L.
- L. clymenum*, L.—Leith Docks, a single plant.
- Poterium Sanguisorba*, L.—Inveresk, a few plants.
- Saxifraga Geum*, L.—Near Kirknewton, Kirkliston.
- Tellima grandiflora*, R. Br.—Banks of Esk, Dalkeith Park.
- Sedum album*, L.—Blackford Hill, plentiful.
- S. reflexum*, L.—On bank, Burntisland.
- Ænothera biennis*, L.—Craigmillar Quarry, two plants.
- Astrantia major*, L.—Near Dalmeny, several.
- Ammi majus*, L.—Slateford, one plant.
- Falcaria vulgaris*, Bernh.—Craigmillar Quarry, a single plant, July 1902.
- Archangelica officinalis*, Hoffm.—Longniddry Links, several.
- Peucedanum Ostruthium*, Koch.—Roadside, Leadburn.
- Sambucus racemosus*, Willd.—Arniston Woods, etc., introduced.
- Asperula taurina*, L.—Near Kirknewton ; Hopetoun.
- Valerianella dentata*, Poll.—Field at Gullane, a few : an old locality.
- V. coronata*, DC.—Leith Docks, several.
- Aster paniculatus*, Lam.—Charlestown, one.
- Anaphalis margaritacea*, B. and H.f.—Craigmillar Quarry.
- Xanthium spinosum*, L.—Refuse heap, Granton, and Leith Docks ; several young plants.
- Achillea nobilis*, L.—Burntisland, one ; Inveresk, one.
- Chrysanthemum macrophyllum*, Waldst. and Kit.—Near Dalmeny.
- Petasites albus*, Gaertn.—Near Roslin, and near Dalmeny, plentiful.
- Cnicus eriophorus*, L.—Near Bannockburn, several.
- Onopordon Acanthium*, L.—Burntisland, one ; near South Queensferry, one.
- Silybum Marianum*, Gaertn.—Craigmillar, several ; Leith Docks, two.
- Centaurea montana*, L.—Craigmillar, one ; Bridge of Allan.
- C. calcitrapoides*, L.—Slateford, one.
- Crepis biennis*, L.—Ballast heap, St. David's, plentiful in 1902.

- Hieracium aurantiacum*, L.—Railway bank, Morningside, a large patch.
- H. præaltum*, Vill.—Leith Docks, one or two patches.
- H. umbellatum*, L.—Waste ground, Leith Docks, abundant.
- Specularia hybrida*, A.DC.—Fields at Gullane (an old locality).
- S. pentagonia*, A.DC.—Leith Docks, a single plant.
- Lysimachia punctata*, L.—Near Uphall, September 1896, one plant.
- L. vulgaris*, L.—Craigmillar Quarry, two.
- Polemonium cœruleum*, L.—Dalmeny ; Colinton ; Craigmillar.
- Borago officinalis*, L.—Morningside.
- Anchusa italica*, Retz.—Inveresk, one ; Leith Docks, one.
- A. officinalis*, L.—Inveresk, several.
- Pulmonaria officinalis*, L.—Arniston (an old locality) ; near Kirkliston.
- Lithospermum purpurco-cœruleum*, L.—Wood in Linlithgowshire—an old introduction.
- Omphalodes verna*, Moench.—Wood at Craigmillar, plentiful.
- Lycopersicum esculentum*, Mill.—Granton, one small plant.
- Linaria purpurea*, Mill.—Craigmillar Quarry, two or three ; railway bank, Newington, one.
- Antirrhinum majus*, L.—Aberdour (an old locality) ; Craigmillar.
- Mimulus Langsdorfi*, Donn.—Braid Burn, several places ; Arniston Glen ; Dollar, etc.
- Mentha piperita*, L.—Arniston (an old station).
- M. viridis*, L.—Near Newbattle ; Tynhead (an old station).
- Calamintha arvensis*, Lam.—In field, Comiston ; Leith Docks ; scarce.
- Salvia virgata*, Lam. ?—Inveresk, one plant.
- Nepeta nepetella*, L.—Railway siding, Kingsknowe, one plant.
- Lallemantia peltata*, F. & M.—Leith Docks, one, small.
- Stachys annua*, L.—Leith Docks, one.
- S. arvensis*, L.—Field near Kinghorn, several.
- Galeopsis Ladanum*, L.—Burntisland, one ; Leith Docks, several.
- Lamium maculatum*, L.—Near Winchburgh, and Kirkliston.
- L. Galeobdolon*, Crantz.—Near Burntisland, and Dalmeny.
- Chenopodium Vulvaria*, L.—Refuse heap, Slateford, not scarce.
- C. urbicum*, L.—Craigmillar ; Gullane, plentiful.
- C. rubrum*, L.—Leith Docks, abundant.
- C. murale*, L.—Leith Docks, scarce.

- Atriplex rosea*, L.—Leith Docks, several plants.
Spinachia oleracea, L.—Craigmillar Quarry, one.
Polygonum lapathifolium, L.—Leith Docks; Craigmillar, etc.
P. cuspidatum, S. and Z.—Inveresk; Cramond; Hopetoun.
Rumex bucephalophorus, L.—Leith Docks, one. Compared by Professor Trail with specimens found by him at Aberdeen.
Cannabis sativa, L.—Leith Docks, two or three.
Maianthemum Convallaria, Web. (= *Smilacina bifolia*, Desf.).—In a wood in Linlithgowshire, 1903. This locality, we have been informed, is the same as that mentioned in Balfour and Sadler's "Flora of Edinburgh," though a long way from Binny Craig.
Allium paradoxum, Don.—Banks of Braid Burn at Dreghorn and Comiston, common; Colinton; Arniston.
Ornithogalum umbellatum, L.—Dalmeny.
Cornucopie cucullatum, L.—Leith Docks, one plant.

ON THE STATION FOR *CAREX SALINA*, WAHL.,
 VAR. *KATTEGATENSIS*, FR., IN CAITHNESS.

By J. GRANT.

THE lower reaches of the Wick river are very shallow, and are fringed on the north side by sandbanks. *Carex salina* first occurs on the north bank of the river, in front of one of the fields of Westerseat Farm, and almost opposite the farm steading of Milton. This is about three-quarters of a mile above the river-mouth. The banks of the river here are quite flat, only about a foot above the ordinary level of the water; and when the river is at all flooded, the banks are generally completely covered with water. On the occasion of high tides, tangle and other sea-weeds are brought up and cast on the banks. This shallow part of the river is also a favourite resort of sea-gulls in stormy weather. The river-edge is covered at this point with the *minor* form of *Carex flava*, *Ranunculus Flammula*, *Senecio aquaticus*, *Triglochin maritimum*, *Carex vulgaris*, *Scirpus uniglumis*, *Juncus acutiflorus*, *Glaux maritima*, *Blysmus rufus*, *Armeria maritima*, *Cochlearia officinalis*, and *Triglochin palustre*. In the first bed the *Carex* grows partly on the bank, but chiefly in from one to two inches of water. The bed is

about twenty yards in length, and perhaps five to seven yards broad, and consists of nothing but *Carex salina*. A little farther up the river there is a small island about nine yards in circumference, covered with *salina*, in the middle of a sandbank, and several feet from the bank. A third bed grows higher up, in which *Carex aquatilis*, var. *Watsoni*, is mixed in about equal quantities with *salina*. The Carices here are not so compact as in the bed farther down.

On the river-bank, directly opposite Milton Farm, *salina* occurs about twenty yards in from the river-bank, in a marshy piece of ground where the water appears quite fresh and with no touch of brackishness. The plants of the *Carex* are here much dwarfed compared with those farther down; and the general appearance of the female spikes is darker, the glumes being almost black, whilst those of the plants half-a-mile down are of a medium brown tint. The bed extends for nearly forty yards, with a breadth of probably six. The *Carex* is here only thinly scattered, and the character of the surrounding flora is less maritime, sea-shore plants being almost entirely absent, and *Galium uliginosum*, *Caltha*, *Eriophorum*, *Mentha*, *Myosotis*, and *Juncus effusus* taking their place.

Straight opposite the point where the Milton Burn joins the Wick river, *salina* grows, but farther inland than any of the places already mentioned. The sedges here grow amongst grasses, *Comarum*, *Lychnis Flos-cuculi*, and *Myosotis strigulosa*, and occur only here and there.

The next bed where *salina* may be got is directly opposite the Fairies' Hillock, and at the end of one of the fields which stretch down from Kettleburn to the Upper Glebe. This point is about a quarter of a mile farther up the river from the last bed, and is forty yards from the water's edge. The plants are but scattered and grow almost singly, differing in this respect from the plants lower down, which occur in dense masses. The flora of the ground on which *salina* grows is represented by *Poa*, *Iris*, *Scirpus palustris*, *Equisetum limosum*, *Carex Watsoni*, *C. ampullacea*, *Aira flexuosa*. *Salina* may be met with along the river's brim, where the banks are four or five feet high. It grows with *Phalaris*, *Glyceria*, and *Scirpus lacustris*, and

fringes the river-edge most of the way up to a point directly in front of the farm of Gillock, where it occurs in denser patches. Gillock is about two miles above the river-mouth, and for the last one and a half miles the *Carex* is to be met with only sparsely, in little patches of half-a-dozen plants or so. Between Gillock and the railway girder bridge over the river at Sibster, three miles up, *salina* may be found at wide intervals, and appears to reach no farther up than this. All these places are on the north side of the river.

On the south or Pulteneytown side of the river *salina* hardly occurs. There are two small patches near Milton Burn, and occasional plants of it a little farther up. The fact of its being found almost entirely on the north bank of the river is a remarkable one.

HEPATICÆ OF THE BREADALBANE RANGE.

SECOND CONTRIBUTION.

By P. EWING, F.L.S.

SINCE writing my first article, which appeared in "The Annals" for 1903, pp. 235-243, I have spent two days at Tyndrum with Mr. Macvicar and about six weeks on the Range, most of my time being devoted to the distribution of the Hepaticæ.

I have again to admit my indebtedness to Mr. Macvicar for his valuable hints in the field, which were of great service to me in my further researches after the smaller species, and for showing me the habitat of some of the rarer species mentioned below, and confirming or correcting the more critical of those I collected myself.

It is interesting to note that these two lists contain three-fourths of the plants mentioned in the Census of Scottish Hepaticæ, a fact which of itself is ample proof that the Range is quite as rich in this form of vegetable life as the higher forms.

During the last year I have been on sixteen of the mountains forming the larger part of the Range, and what

I have seen has led me to be a little more guarded with the terms of distribution, as it seems to me that all these plants would probably be found to be common on the Range if one had the time and patience to investigate. For reasons stated at the end of this list I have not thought it advisable either to follow the arrangement or the nomenclature as given by Mr. Macvicar in the Census, and I think that those who follow Spruce will agree with me in this. A new arrangement for every list published is not a good way to encourage the novice in topographical botany.

LEJEUNEA ULICINA, *Tayl.*—Not a common plant, but found in small patches on the bark of trees in shady places, Tyndrum.
 † *L. calcarea*, Lib.—Tyndrum. † *L. microscopica*, *Tayl.*—Growing on decaying mosses, Tyndrum.

* RADULA LINDBERGHII, *Gottsche.*—Meall-Ghaordie, Meall-na-Saone Am Binnein.

* MASTIGOPHORA WOODSII, *Hook.*—On shady banks with *Bazzania* and *Hypna*, Beinn Chuirn.

TRICHOCOLEA TOMENTELLA, *Ehrh.*—Auchlyne Burn, Glen Dochart.

†† LEPIDOZIA TRICHOCLADOS, *G. Mull.*—Auchmore Woods, Creag na Caillich, Wood near Tyndrum. See notes by Macvicar in "Journal of Botany," 1902, p. 157.

BAZZANIA TRICRENATA, *Wahlenb.*—Summit of Cam Chreag, Meall na Saone, Beinn Chuirn.

* CEPHALOZIA LUNULÆFOLIA, *Dum.*—Ben Lawers, Creag na Caillich, Wood near Tyndrum. *C. connivens*, Dicks.—Meall na Saone. *C. Francisii*, *Hook.*—On peaty soil near Tyndrum.
 †† *C. fluitans*, *Nees.*—Beinn Chuirn; no doubt much overlooked. *C. Sphagni*, Dicks.—Ben Lawers, Meall na Saone. *C. denudata*, var. *alpina.*—It seems that this plant, given in my former list from Beinn Heasgarnich, has been misnamed and must now stand as an addition to the British Flora under the name of *C. tessellata*, *Berggr.* See note in "Journal of Botany," 1904, p. 88. *C. divaricata*, *Sm.*—Wood near Tyndrum. † *C. leucantha*, *Spruce.*—Creag na Caillich, Meall Ghaordie, Meall na Saone, Finlarig Wood, Am Binnein.

PLEUROCLADA ALBESCENS, *Hook.*—Creag na Caillich, Meall Ghaordie, Beinn Heasgarnich, Meall na Saone, Am Binnein.

EREMONOTUS MYRIOCARPUS, *Carr.*—Am Binnein. I do not think that this is a rare plant, but it requires time and patience for the novice to detect it in the field, as it is like so many dark hepatics when it is growing.

- SCAPANIA ORNITHOPODIOIDES, *With.*—Beinn Laoigh, Beinn Chuirn. Although this does not appear in my former list, it occurred in my list of Beinn Laoigh plants given in the "Transactions of the Glasgow Natural History," vol. v., p. 287, but as I had no specimen left I did not include it. I do so now as I again saw it growing abundantly on the above-mentioned hills this year.
- ** *S. uliginosa*, Swartz.—Meall Ghaordie, Beinn Heasgarnich, Meall na Saone, Am Binnein. *S. nemorosa*, L.—Meall Ghaordie, Wood near Tyndrum.
- DIPLOPHYLLUM TAXIFOLIUM, *Wahlenb.*—Summit of Beinn Laoigh. *D. Dicksoni*, Hook.—Cam Chreag, Am Binnein, wood near Tyndrum.
- CHILOSCYPHUS POLYANTHOS, L.—Boreland, Glen Lochay. In a stream by the roadside.
- † MYLIA CUNEIFOLIA, *Hook.*—Near Tyndrum. This very rare or overlooked species is a very satisfactory plant when seen growing, it looks so different from anything else among the tree-growing hepatics.
- * HARPANTHUS FLOTOWII, *Nees.*—Beinn Heasgarnich, Meall na Saone, Am Binnein. Only as a few stems mixed up with other hepatica in, or on the margin of, the streams.
- PLAGIOCHILA ASPLENIOIDES, L.—At 3000 ft. on Beinn Heasgarnich. *P. punctata*, Tayl.—Beinn Heasgarnich, Am Binnein, Wood near Tyndrum.
- JAMESONIELLA CARRINGTONII, *Balf.*—Ben Lawers, Am Binnein, Beinn Chuirn.
- JUNGERMANNIA BANTRIENSIS, *Hook.*—Ben Lawers, Cam Chreag, Ben Heasgarnich, Tyndrum. *J. sphaerocarpa*, Hook.—Beinn Heasgarnich, Beinn Laoigh. *J. autumnalis*, DC.—Finlarig Woods, Macvicar. * *J. porphyroleuca*, Nees.—Tyndrum. A very difficult plant to determine with certainty. †† *J. longidens*, Lindb.—Am Binnein. The bright red gemmæ on this plant make it very conspicuous. It must be very rare else it would not have been so long overlooked. *J. Kunzeana*, Hüb.—Meall Ghaordie. I believe overlooked on account of its resemblance to *J. alpestris* or mistaken for that plant. * *J. gracilis*, Schleich.—Auchmore Woods. * *J. gelida*, Tayl.—Beinn Laoigh. †† *J. polita*, Nees.—Beinn Heasgarnich, Meall na Saone, Beinn Laoigh (Young), Beinn Oss (Macvicar). *J. minuta*, Crantz.—Creag na Caillich, Meall Ghaordie, Meall na Saone, Am Binnein, Tyndrum.
- NARDIA HYALINA, *Lyell.*—Beinn Chuirn. Not a common plant on the Range. *N. compressa*, Hook.—Am Binnein. This plant

must be rare on the Range. I spent a good deal of time looking for it this year, but was only able to add this other station. *N. Funckii*, Web. and Mohr.—On the road-side near Auchlyne, Glen Dochart.

MARSUPELLA SPHACELATA, *Gies.*—Beinn Heasgarnich, Beinn Chuirn. †† *M. Jörgensenii*, Schffn.—Meall Ghaordie.

ACOLEA OBTUSA, *Lindl.*—Meall Ghaordie, Am Binnein. * *A. adusta*, Nees.—Macvicar.

FOSSOMBRONIA CRISTATA, *Lindb.*—Macvicar.

PALLAVICINIA BLYTTII, *Moerck.*—This is one of the commonest of our alpine species, and in consequence of some remarks which have been made to me regarding my statements in connection with the distribution of the species in my former paper, I have paid particular attention to it on the hills this year and found it in great plenty and in many cases fruiting freely. I note that H. W. Lett in his "Hepatics of the British Islands" states that its "Hab. Amongst Sphagnum on mountains." The Perthshire plant, however, is altogether different. Its habitat being on the exposed mountain tops, sometimes you find it extending to the shade of a rock and there it is more luxuriant but not so typical.

* ANURA LATIFRONS, *Lindb.*—Macvicar. *A. multifida*, L.—Wood near Tyndrum.

LUNULARIA CRUCIATA, *L.*—Auchmore, Killin.

* RICCIA SOROCARPA, *Bisch.*—Further study has proved that it is this plant which is the common plant and not *R. glauca*, as given in my former paper.

The publication by Mr. Macvicar in the "Annals" for January 1904 of a "Census of British Hepaticæ" has in a manner detracted from the value of the marks affixed to several of the above records, but to keep this supplement in line with my former contribution I have put a * to those plants not formerly recorded for the district in the "Eighth Edition of the London Catalogue," a † to those not there recorded for Scotland, and †† to those which form new additions to the British Flora.

I think that the above additions justify me in concluding as I did before, by saying that there is still plenty of work to do in this branch of ecological work.

ZOOLOGICAL NOTES.

An old Inverness-shire "Vermin" List.—Of the many lists of vermin killed on Scottish estates, I think the following has not appeared before. There was much destruction of vermin about the years covered. Such lists (subject to editorship) are valuable to Naturalists interested in the historical side of the distribution of species. It is reproduced from the pages of *The Scottish Field* (Dec. 1903, p. 309) in an unsigned article upon Glen Quoich Deer-Forest, and I take the opportunity of adding a few remarks.

A LIST OF VERMIN KILLED ON THE GLEN GARRY ESTATES BETWEEN 1837 AND 1840.

Foxes 11	Marsh Harriers 5	Fern Owls 71
Wild Cats 198	Goshawks 63	Maggies 8
Marten Cats 246	R. L. Buzzards 371	Honey Buzzards 3
Pole Cats 106	Kites (or Salmon	Kestrels 462
Stoats and Weasels 301	tailed Gleds) 275	Merlins 79
Badgers 67	Ash-coloured Harriers 9	Hen Harriers 63
Otters 48	Hooded Crows 1431	White-tailed Eagles 27
House Cats (going	Ravens 475	Jer Falcons 6
wild) 78	Horned Owls 35	Golden Eagles 15

REMARKS.—The area over which these operations were conducted is "situated in the Parishes of Kilmonivaig, Kilmalie, and Glenelg, and embracing Glen Kingie (leased from Lochiel, and about 16,000 acres)." The boundaries are then given, and the area described as "about 20 miles, and the average width about 6."

Allowances must be made as regards accuracy in naming the several species. Thus—whilst true Wild Cats are definitely separated from House Cats (going wild), Stoats and Weasels are "lumped." Again, "Marsh Harriers" items *may* be correct, but we cannot place reliance on them. "Ash-coloured Harriers" are the males of the Hen Harriers separately entered. "Rough-legged Buzzards" must be read as Common Buzzards. "Kites" are doubtless quite correct, as it is well known how abundant they were about and previous to that time. "Goshawks (63)" must be read, I think, *Peregrines*. The Owls are doubtless right, *i.e.* "Horned Owl" for Long-eared Owl; "Fern Owl" for Short-eared Owl; "Golden Owl" probably for Barn Owl [but how about Tawny Owls?].

I could place alongside the above list a modern list of vermin killed on a large estate closely situated to the above, where modern game-preserving is being carried on, in which 478 "Owls" figure in ten years, and in a few of these years some thousands of *Rats*. At this place many hundreds of tame Wild Duck are reared, and a huge stock of Pheasants, and no doubt tons of Indian corn and "feed" laid down. Also it is worthy of remark that whereas Rooks were not included in the older Vermin Lists of 1837-40, they now

occupy a very prominent position in modern ones. The Balances of Nature are being utterly upset, between, for one instance, Owls and Rats and *wasted feeding*.—J. A. HARVIE-BROWN.

Long-eared Bat in Moray.—A Long-eared Bat (*Plecotus auritus*) was found on the 24th of April hanging head downwards and dead on the outside “harled” wall of the Parish Church at Drumnadrochit. The ivy was cut down a few days before; and if it were hibernating beneath, this may have been the cause of death. I send you the specimen, as I find that it is stated in the “Fauna of Moray” that this species has not been reported from the neighbourhood of Inverness. I never handled this species before, but am certain that I have seen it on the wing.—ANGUS GRANT, Drumnadrochit.

Common Shrew in the Isle of Mull.—Several specimens of the Common Shrew (*Sorex araneus*) have been captured at Tobermory. These were brought in by the house cat, and I believe that they were secured about the hedges around the garden. I sent a specimen to Mr. Oldfield Thomas of the British Museum, who informed me that he was interested to find that it belonged to this species, for hitherto the Common Shrew had not been known, with any degree of certainty, to occur in the Hebrides.—D. MACDONALD, Tobermory.

Supposed Wild Cat seen on the Tow-path of the Caledonian Canal (“Argyll”).—After passing the lock of the Canal at Lochy on the 31st May 1904, I was informed that two of our crew who were on duty in the early morning, saw what they described as a Wild Cat of large size amongst the whin and broom which clothe the canal banks a little to the west of the Lochy loch of the Canal. They were positive that it was a very large animal. One of them is a native of Loch Broom, and he denied it could be a tame cat run wild. Now, I do not give this as a *record*, but I mention the observation at this time, because such a locality is still within the acknowledged distributional area of the true wild species, and on that account seems at least worthy of notice. I wished I could have been called up on deck, but as the yacht—“Hotspur”—was being towed at full speed at the time, no doubt it was in vain to have done so. The men saw it at quite close quarters, and a long way from any (visible) human habitation. I give the note for what it may be worth.—J. A. HARVIE-BROWN.

Sowerby’s Whale on the Aberdeenshire Coast.—On 23rd March last I saw a report in the newspapers that a Bottle-nosed Whale about 18 feet long was stranded at Fraserburgh. I went to see it on the 26th, but found it had been cut up and buried in the sand. I had the head dug up, and, as soon as I saw the teeth, identified it as a male *Mesoplodon bidens*. I secured the damaged skull and cleaned it. The animal, I found, measured 14 feet in

length. As this species is new to the coast of Aberdeenshire, and as the late Sir John Struthers never procured a Sowerby's Whale, I thought the occurrence was worth recording in the "Annals."

I think it worth mentioning that the colour of *Mesoplodon bidens* varies greatly. In all the four Moray Firth ones that I have examined, two males and two females, no two were alike.

First male was black all over, with a few faint lines. Second male was black and slate colour, beautifully cross-hatched with white all along the sides, like Flower's figure of *Grampus griseus*.

First female was black all over with no pale markings at all. Second female (half-grown) was dark slate colour with white patches on sides, and nearly white on median ventral line. Sowerby's type of this whale was dark above and white beneath, and was a full-grown male.

There is not the least doubt that all the specimens belong to the same species as all the skulls are preserved, nor can they be "varieties," as my two females were mother and daughter.—WILLIAM TAYLOR, Lhanbryde.

Occurrence of the Raven near Cramond.—On Thursday, 21st March a Raven (*Corvus corax*) was picked up in one of the fields in East Craigie Farm. It was not quite dead when found, but had evidently been shot. I have no previous record of the Raven occurring in this neighbourhood.—CHAS. CAMPBELL, Cramond Bridge.

Jays in Argyllshire.—Mr. Heatley Noble is mistaken in regarding the occurrences of *G. glandarius* in Argyllshire, mentioned by him in a note in "Annals" of April last, as constituting "the first undoubted records of Jays in Argyllshire." Had he consulted the authorities, say Gray's "Birds of the West of Scotland," or Harvie-Brown and Buckley's "Fauna of Argyll," he would have found that this bird is well-known and widely distributed in that county.

It is a regular inhabitant of the Inveraray Woods, where it may be seen and heard any day. Colonel F. C. Lister Kay of Cladich, Loch Awe, tells me that there have always been some about the woods there ever since he can remember, but were more numerous than ever last year, and had evidently bred there. They are also regularly seen at the Pass of Brander on the opposite shore of the loch; and recently one was seen at Taynult, at the foot of the River Awe by my son. Colonel Kay observed last autumn that a brood of Jays, which had evidently been bred there, were constantly to be seen perched on the stooks in a corner of an oat field; I do not know if this habit of feeding on grain has been noticed before.

The Jay is evidently one of the increasing species in this locality; and is perhaps as common in Argyll as in any county of Scotland.—CHAS. H. ALSTON, Letterawe, Loch Awe.

Occurrence of the Hawfinch at Skerryvore Lighthouse.—I enclose a Hawfinch got on the lantern on 28th of April. It is

somewhat a *rara avis* in Scotland, and I don't think it has been recorded as a visitor to the Western Isles. The night it was caught was stormy, with heavy rain, wind south. At the same time there were several Snow-buntings about.—JAMES TOMISON, Skerryvore Lighthouse.

[In the January number of the "Annals" the important, though not unexpected, announcement was made that the breeding of this species in Scotland had been established. In our present number the records of the bird's occurrence in the Hebrides and in Shetland in the spring of this year would seem to indicate that it may possibly occur on our coasts as a migratory species.—EDS.]

Great Titmouse in Caithness.—About the second week of November a pair of Great Titmice (*Parus major*) appeared in my garden at Wick. Messrs. Harvie-Brown and Buckley do not include this species in their "Fauna of Sutherland" for Caithness, and only mention having seen the bird on one occasion in the county of Sutherland, namely near Lochinver.—JAMES SUTHERLAND, Wick, in the "Northern Ensign."

Long-tailed Titmouse in the Outer Hebrides.—Last year I saw a company of these birds at Mhorsgaie Lodge, Lewis. Mr. Harvie-Brown tells me that the Long-tailed Titmouse (*Acredula rosea*) has not hitherto been detected in the Outer Islands.—DUNCAN MACKENZIE, Stornoway.

Late Stay of Waxwings in Inverness-shire.—I was in the Nethy Bridge district late in May, and saw some Waxwings (*Ampelis garrulus*) which had been shot there in January. There was a flock of forty to fifty to begin with, but they gradually disappeared, though four were still seen during the first week of May, which is surely a very late date.—ARCH. M'L. MARSHALL, Blairgowrie.

Pied Flycatcher in Dumfriesshire.—It may be of interest to you to note in the "Annals of Scottish Natural History" that I saw a male Pied Flycatcher (*Muscicapa atricapilla*) near here yesterday, 12th May. I watched it for about ten minutes through my glasses. It was engaged in catching insects, which it "spotted" from a convenient perch, whence it pounced down upon them on the ground. This is the first of these birds I have recognised here, though I believe they have been known to nest in this locality before now. I am in hopes of being able to find and photograph the nest.—HUGH S. GLADSTONE, Capenacle, Thornhill.

[This species was observed in fair numbers on the east coast on passage to N.W. Europe during the first fortnight of May. It is interesting to know that the very small colony in Dumfriesshire is still in existence.—EDS.]

Great Spotted Woodpecker in the Outer Hebrides.—Last autumn a bird, undoubtedly of this species, was seen climbing

the telegraph posts which cross the Island of Lewis in the direction of Loch Roag.—DUNCAN MACKENZIE, Stornoway.

[This is the first indication we have received relating to the occurrence of the Great Spotted Woodpecker (*Dendrocopus major*) in the Outer Hebrides.—EDS.]

Capercaillie in Argyll.—Last year there was a brood of Capercaillies hatched out here in an old spruce and larch wood. So far as I can ascertain, there are more of these birds elsewhere in Argyll, and it is hard to imagine where the old birds can have come from. They must have travelled a long way over perfectly woodless hills. I did not find the nest or see the old birds, but when first I saw the brood, mistook them for an extraordinary early lot of Black Grouse. This would be early in August. In first week in October I shot three, a cock and two hens, all young birds. I fancy the other male birds have left,—I only now see one or two hens. It will be interesting to see if these will cross with Black Grouse. I may mention that my keeper tells me he saw a hen some six or seven years ago, but at the time did not realise what it was.—F. C. LISTER KAY, Lieutenant-Colonel, Cladich, Dalmally.

Gadwall in Moray Firth.—On 12th Nov. 1903, at Novar-Ross, a Gadwall (*Anas strepera*) drake was found dead on the shore by the keeper, now in my possession, and on 22nd March 1904 at Novar. None of the keepers here or the bird-stuffer at Dingwall knew the Gadwall, and I see from the "Fauna of the Moray Basin" that it is a rare bird in this area. The only other specimen I have seen is one shot on Loch Spynie and now in the collection of Capt. Dunbar Brander of Pitgavany. I have as yet (27th March), seen no summer migrants, only large flocks of Thrushes which I take to be migrating birds. They appear to me both smaller and darker than the resident bird, but this may only be fancy.—ARCH. M'L. MARSHALL.

Eiders in the North-West Highlands.—The Eiders are still upon their march southward on the Sutherland West Coast. For the first time, to the knowledge of Mr. Duncan MacIver, did Eiders appear in force in Scourie Bay in the spring of 1904. He had never witnessed such a gathering before. There is no doubt that this is an advance from the north and north-west and north-east, and not from the west or south. Also at the outer island of Loch Inver—Eilan Soay—I saw three male and two female Eiders on the 11th May 1904. This is the first recorded occurrence of these birds in Loch Inver. I shall be quite pleased to learn of even a solitary occurrence at an earlier date.

On Bulgie Island none existed in 1882, and a visit paid to it on the 12th May revealed not one bird, yet on Garbh Eilean there were none in 1882, and they were unknown to the fisher-folk at Durness, Rispond, at any place farther west than Hoan Island at the entrance of Loch Eriboll; and in 1882 my boatman assured me

they had only appeared there one year before. He said they were quite rare. Eastwards now they are quite common.—J. A. HARVIE-BROWN.

Nesting of the Woodcock in Dalmeny Park.—Although the presence of the Woodcock in the nesting season has previously been noted, up till this year there has been no actual record of its breeding. On the 2nd of April one of the foresters in Dalmeny Park found a nest with four eggs, which were duly hatched. In the course of the next two weeks four other nests were discovered; of these one clutch was destroyed by crows, but in the other three the young birds got safely away. The Woodcock has also been noted nesting in Hopetoun Estate this season.—CHARLES CAMPBELL, Cramond Bridge.

Woodcock and Snipe nesting in Central Scotland.—In May 1902—a season, it may be remembered, of exceptional lateness and severity, almost approaching arctic conditions—we had a phenomenal number of Woodcock and Snipe breeding on this estate of Dunipace. I mention the details more fully elsewhere.¹ It is sufficient to say that on the night of the 2nd-3rd May seventeen degrees of frost were registered here, and the weather, mild and sunny during the latter ten days of April, suddenly became arctic in character, and continued so for many weeks, with N.E. blizzards, scarcely shifting a single point of the compass, and this throughout the north of Scotland. This to all appearance, resulted in a crushing down upon our warmer coverts in Stirlingshire of a larger number of Woodcocks than we ever saw before, at least twelve nests in a covert where some three nests are the usual complement. It also resulted in a very phenomenal invasion of Snipe to certain marshy fields on this same estate. Further, while the Woodcocks successfully hatched off and reared their young in the shelter of the coppice facing the south, a large number, and probably all, of the newly hatched Snipe were found dead within a few feet of the broken egg-shells. Most of these were upon a dry knoll and on an aspect facing the north-east. The Woodcocks on their eggs were so tame as to permit of the gamekeeper and my butler stroking their backs, and if they left the eggs they again came and covered them while the men were present. I accounted for this by believing that *first layings* had been destroyed at localities further north on the night of the 2nd-3rd May 1902. And, as regards the Snipe, that they were overtaken at their breeding time, driven south, and again overtaken here at the hatching off of their *first* eggs. So much for the “early summer” of 1902.

In 1903 we had only our normal number of Snipe and Woodcock nesting in our meadows and coverts.

¹ In a forthcoming volume now passing through the press, on “The Fauna of the N.W. Highlands of Skye.”

In the winter season of 1903-4, woodcock were abundant in central Scotland, but Snipe were phenomenally scarce from almost all localities whence I received intelligence. On a neighbour's ground—famous for Woodcock at both seasons of the main flights—a record bag was made in the season 1903-4.

And now I come to May 1904, and I find a repetition of the phenomena of May 1902 which is at least startlingly suggestive. From 5th May onward for weeks the weather conditions in Scotland were again arctic, as is abundantly proved, not only by our own wretched experiences in the yacht "Hotspur," but also by Mr. Ormond's scientific records sent to me of the meteorological causes and effects during the *exactly* same period, and the returns from the Weather Bureau in Washington, along with other evidence, which may yet appear in greater detail. To serve the purpose here, however, I merely record the certain facts, that once more we experienced an "inundation" of woodcocks and snipe, just as in 1902, on this same estate, and in surrounding coverts in central Scotland. Once more the Woodcocks succeeded in hatching off their young ones, and, as I write, 6th June, many birds may be seen at nights "roding" over and through the trees. And once more I have to record the decimation of newly hatched snipes in the same exposed meadows, clearly due to the awful inclemency of this "early summer." Thus, the actual phenomena of 1902 were repeated under similar meteorological conditions in 1904, the only difference being in the latter that we did not, so far as my information goes, have such an intense frost in 1904, as occurred on the 2nd-3rd May 1902. We had to all appearances a *crushing down* of Woodcock and Snipe in both years, which resulted in a *death-rate* quite phenomenal among the Snipe, and an abnormal hatch-off of Woodcock in the more sheltered coverts. The large bags of Woodcock in 1903-4 may or may not indicate a greater "return" of birds bred upon this line of flight. However that may be; surely there may be lessons to be learned from our Meteorological dry statistics if these be combined with these facts, and many other natural phenomena.

I would desire *once more* to try to concentrate the attention of our professional Meteorologists and their large staff of local help-mates, upon these parallel phenomena—details, which, as a Naturalist and not a professed Meteorologist, I cannot help feeling assured has been a sadly neglected source of information in all our Meteorological work hitherto. Then, as my friend Mr. Ormond says when furnishing me with meteorological data between the 5th May 1904 and the end of that same month, "actual certainties might be arrived at, and weather-prophets might prophecy from what they may learn in the sweet by and bye, instead of Meteorology being as it is at present, a *dumb science* and a mere collection

of dry bones." These are not Mr. Omond's actual words, but I read into them this distinct meaning. The interest too in Meteorology would be vastly heightened, and would appeal with advantage to the scientific world. At least such is my most humble opinion.—J. A. HARVIE-BROWN.

Pomatorhine Skua in Ayrshire.—On February 17, 1904, I picked up a dead Pomatorhine Skua (*Stercorarius pomatorhinus*) at Hunterston on the Ayrshire coast. It had lain some time, and was too far gone for preservation, but I kept the skull and one of the feet.—ROBERT GODFREY, Edinburgh.

Land Shells in Ayrshire.—In connection with Mr. Thomas Scott's Clyde List of Land and Fresh-water Mollusca in "The British Association Handbook, 1901," I may note the following species obtained during the past winter in the neighbourhood of West Kilbride :—

Arion subfuscus.—One under bark at Ardneil, November 11.

Hyalinia nitida.—Common in the shore marsh near Hunterston : twenty-nine specimens were obtained on an old bag lying in the marsh on March 14. A single specimen was also found in swampy ground at Portincross on March 31.

Hyalinia excavata.—Twelve under stones at Seamill, Nov. 16 ; and one at Portincross, February 5.

Helix pulchella.—Generally distributed along the shore, Chapelton, Ardneil Bay, Portincross, Fence Bay.

Pupa muscorum.—Abundant under stones on the sandy edge of the links between Seamill and Chapelton.

Vertigo substriata.—A single specimen taken in the neighbourhood of Portincross.

Aicula lineata.—Two specimens at Portincross Rocks.

Limnæa palustris.—At Knockewart Marsh, March 15.—ROBERT GODFREY, Edinburgh.

Vertigo antivertigo in Midlothian.—This small shell, which does not appear to have been previously recorded from Midlothian, occurs at the Marl Pit near Davidson's Mains, where I found a small colony on May 4, 1904. A single specimen of another interesting member of the same genus, *Vertigo substriata*, was obtained by me at Kirknewton, near Mid-Calder, on March 29, 1902 ; this species has been taken by Mr. Evans at Dreghorn, as recorded in the "Annals" 1897, p. 126.—ROBERT GODFREY, Edinburgh.

Helix virgata, Da Costa, in Fife.—In the "Annals" for 1901 (p. 183) I referred to the occurrence of this shell on a ballast heap near Kincardine-on-Forth. I have now to record it from Charles-town on the Fife coast, where I found a colony on 3rd October last upon waste ground where ballast used to be deposited. Doubtless originally introduced with ballast, the species seems well established

there now. I must have seen from three to four dozen shells, most of them having a living mollusc within. Some were clinging to the stems of plants, while others were half concealed about the roots.—
WILLIAM EVANS, Edinburgh.

Land-Shells from Tiree, Inner Hebrides.—In April 1899, my friend Mr. James Baxter brought me a box of shells from the island of Tiree, containing the following ten species, all of which, with the exception of *Helix pulchella*, have been submitted to Mr. Taylor, Leeds.—*Helix itala*, abundant; *H. acuta*, common; *H. pulchella*, one; *Hyalinia cellaria*, several; *Cochlicopa lubrica*, *Succinea elegans*, *Linnæa peregra*, *Valvata piscinalis*, abundant; *Sphaerium corneum*, *Pisidium fontinale*.—ROBERT GODFREY.

Insects from the Neighbourhood of Aberdeen.—The Rev. E. N. Bloomfield of Guestling has sent us the following supplementary list of insects he has received from Mr. J. Mearns from the neighbourhood of Aberdeen. Mr. Mearns's list was published in the 1901 volume of this magazine:—

DIPTERA.—*Beris vallata*, Forst.; *Dioctria reinhardi*, W.; *Melanostoma scalare*, F.; *Platychirus angustatus*, Ztt.; *Syrphus annulatus*, Ztt.; *Gonia ornata*, Mg.; *Anthracomyia nana*, Mg.; *Hyetodesia lucorum*, Fln.; *Hydrotca dentipes*, F.; *Coniosternum obscurum*, Fln.; *Cælopa pilipes*, Hal.—Bay of Nigg; *Fucomyia parvula*, Hal.—Bay of Nigg; *Centor myopinus*, Lw.; *Borborus equinus*, Fln.—White Stripes, near Aberdeen.

TENTHREDINIDÆ.—*Tenthredopsis tilia*, Pz.; *Dolerus niger*, L.; *Dolerus æneus*, Htg.; *Blennocampa subcana*, Zadd.; *Athalia spinarum*, F.; *Nematus ribesii*, Scop.

Polietes hirtierura, Mde., in the Forth District.—On June 2nd, I took a ♂ of this very distinct species at Balerno, in company with *P. albolineata*, Fln., which occurred commonly. Since Meade made his description from a Yorkshire specimen ["Ent. Mo. Mag. Jan." 1887, p. 179], the only additional captures seem to be one by Mr. Verrall from Kilmarnock, ("Entomologist," 1890, p. 152), confirming the species and a second ♂ in the Edinburgh Museum, taken by Col. Yerbury at the Mound, Sutherlandshire, in August 1900.—
JAMES WATERSTON, Edinburgh.

Some Pulicidæ (Fleas) from the Edinburgh District.—Since sending to the "Annals" the above (pp. 128-9) records of Diptera taken by me in this district, I have looked out some *Pulicidæ* in my collection and submitted them to the Hon. N. C. Rothschild, who has most kindly examined them for me, verifying and correcting the names I had attached to them. They are as follows:—

Pulex irritans, L.—In house, Edinburgh, September 1903.

P. erinacei, Bouché.—From Hedgehog (*Erinaceus europæus*), Morton-hall Woods, near Edinburgh, April 1898; Dreghorn, May 1904.

- P. goniocephalus*, Taschb. (= *P. cuniculi*, Dale).—From Rabbit (*Lepus cuniculus*), near Edinburgh, March 1903; also many from inner surface of ears of Rabbit, Torduff, Pentlands, February 1904.
- Ceratophyllus* (= *Trichopsylla*) *sciurorum*, Bouché.—From Squirrel (*Sciurus vulgaris*), Clubby Dean, Pentlands, March 1896; Gosford, East Lothian, and Brankston Grange, near Dunfermline, March 1904.
- C. fasciatus*, Bosc.—From Ferret, Dregghorn, June 1904.
- C. gallinæ*, Schrk.—From nest of domestic fowl, Hunter's Tryst, near Edinburgh, December 1903.
- C. garei*, Rothsch.—From nest of Pintail Duck (*Dafila acuta*), Loch Leven, June 1898; also from nest of Song-thrush (*Turdus musicus*), Braid Hills, May 1898.
- C. hirundinis*, Curt.—From nest of House Martin (*Chelidon urbica*), Liberton, August 1899.
- C. styx*, Rothsch.—From nest of Sand Martin (*Cotile riparia*), Largo Links, June 1897. Curtis named the flea of the Sand Martin *P. bifasciatus*, but this, being a *nomen nudum*, is rejected by Mr. Rothschild.
- Typhlopsylla gracilis*, Taschb. (= *T. sorecis*, Dale).—From Moles (*Talpa europæa*), Crosswood, Pentlands, January 1889; and Torduff, March 1904.
- Hystrichopsylla talpæ*, Curt.—From Moles' nests, head of Logan Burn, and Clubby Dean, Pentlands, March 1904.

The Hon. N. C. Rothschild has taken *Typhlopsylla agyrtes*, Heller, from the Bank Vole (*Hypudæus glareolus*) at North Berwick ("Novitates Zoologicae," v. (1898), p. 539).

I hope to secure a few more *Pulicidæ* in the course of this year.—WILLIAM EVANS, Edinburgh.

Myopa testacea, L., in "Forth."—As the only record cited for this fly in Mr. Grimshaw's list of Diptera of the Forth district ("Annals," 1903, p. 218) is an old one, I write to say that on 24th May this year I took a specimen off a dandelion flower near Gifford, East Lothian.—WILLIAM EVANS, Edinburgh.

Trichoptera and Neuroptera from Arran.—Mr. Kenneth J. Morton, F.E.S., has kindly furnished the following list of some insects of the above orders, taken at Whiting Bay during the third week of September 1903:—TRICHOPTERA.—*Asynarchus cænosus*, Curt.; *Halesus radiatus*, Curt.; *H. digitatus*, Schrk.; *Plectrocnema conspersa*, Curt.; *Rhyacophila dorsalis*, Curt. NEUROPTERA.—*Hemerobius Orotypus*, Wall. PERLIDÆ.—*Nemoura inconspicua*, Pict.; *Leuctra Klapaleki*, Kempny. PSOCIDÆ.—*Elipsocus Westwoodii*, M'L.; *E. Abietis*, K.—JAMES WATERSTON, Edinburgh.

Chernetidea in Ayrshire.—Three species of false-scorpions—two of which are new to the “Clyde” list—rewarded a very careful search about West Kilbride during the past winter. *Chthonius tetrachelatus*, Preyss. Both old and young of this species, hitherto noted in Scotland in “Forth” only, were obtained hibernating in nests under stones at Portincross Rocks. None were seen moving free.

Obisium muscorum, Leach.—Abundant at Portincross. During winter the adults were living a free life, and one very immature individual was found hibernating inside a nest. The females began laying on March 10, and in the course of a single ramble later in March nineteen nests with the contained female were observed.

Roncus Cambridgii, L. Koch.—This species, which in Scotland has been recorded for Argyllshire only, was met with commonly in the shore-woods. I have entered in my note-book over eighty specimens, all of which, immature as well as adult, were leading a free life. No trace of a nest in this species was discovered during the winter months.—ROBERT GODFREY, Edinburgh.

Trichopticus aculeipes, Zett., in the Tweed District.—In the “Entomologists’ Monthly Magazine” for November 1900, I recorded this peculiar species of Anthomyid as new to Britain. The specimen there referred to was obtained in the Clyde District, and only a single male was procured. I have now much pleasure in recording the capture of a specimen (male) at Heriot, Midlothian, in June 1898, by Mr. William Evans. The species may be readily recognised by the curious appendage on the hind tibia (see Fig. in “Ent. Mo. Mag.”). So far as I am aware these two specimens are the only examples hitherto obtained in Britain. From these records it is evident that the species, though rare, is widely distributed.—PERCY H. GRIMSHAW, Edinburgh.

BOTANICAL NOTES AND NEWS.

Juncus trifidus, L., in the Outer Hebrides.—Mr. W. S. Duncan has found this rush on two mountains in North Harris—on Ullaval at 1500 feet, and on the top of Ceartaval at 1807 feet, where it was growing plentifully with *Luzula spicata*, DC. On this same mountain, between 1000 and 1400 feet, grow *Salix herbacea*, L., *Polygonum viviparum*, L., *Vaccinium Vitis-Idea*, L., and *Carex rigida*, Good. Above this occurred *Silene acaulis*, L., and *Alchemilla alpina*, L., with occasional tufts of *Armeria maritima*, Wild. Curiously enough neither the *Juncus* nor *Luzula* occur on the summit of Tirga More (2227 feet) which is close by. The species

that do occur on the summit are *Silene acaulis*, *Alchemilla alpina*, *Sedum Rhodiola*, L., *Saxifraga stellaris*, L., *Vaccinium Vitis-Idæa*, *Polygonum viviparum*, *Salix herbacea*, and *Carex rigida*. *Luzula spicata* was gathered on Mullach an Langa (2012 feet) in North Harris by Messrs. Balfour and Babington,¹ but they did not observe it on Clisham (2622 feet).

The distribution of *J. trifidus*, and *J. triglumis*, L., is very similar in Scotland, but the latter extends south to England 1500 to 2700 feet, and Wales (3500 feet?).

In Scotland *J. trifidus* occurs at 1650 feet (Sutherland), in Shetland on Roeness Voe Hill (Beeby *spec.*), 1470 feet, and up to 4230 feet (Watson); while *J. triglumis* occurs at "Hill of Colvadale, Unst, at the low elevation of 200-300 feet" (Beeby). In Sweden these Junci are very rare; while in Finland and Russian Lapland they extend north to 69° 40' N. Lat. (Hjelt). In the "Journal of Botany," 1871, p. 112, Mr. J. G. Baker says there is a specimen in Gay's herbarium sent by Dr. Greville from Braerich, which is referred by Gay to the *Juncus Hostii* of Tausch. Along with it Gay writes "Ab simillima *J. trifido* differt culmis 1-2-foliatis non aphyllis." I find these on specimens from "Corrie of Loch Ceander, Glen Callater, S. Aberdeen; July 1883," W. F. Miller, *spec.*—ARTHUR BENNETT.

Rhinanthus.—In the *Botaniska Notiser*, 1904, Mr. C. O. Ostenfeld has begun a series of papers entitled "Studier over nogle Former af Slaegten *Alectorolophus*," the first of the series (pages 83-85, 97-116) being devoted to "*Alectorolophus* (sive *Rhinanthus*) *apterus* (Fries, pro var.)." As there is much of interest in the notice, and as it is not very accessible to British botanists, a brief abstract here may prove acceptable.

This includes *Rhinanthus major*, Ehrh., vars. *stenoptera*, Fr., and *aptera*, Fr., of the "London Catalogue," Ed. 9, the author giving reasons for the belief that *stenoptera* was founded on rather young individuals of *aptera*, the seeds of which were not fully ripe. The synonymy of the forms of *R. major* is fully discussed; and the conclusion arrived at is that *R. apterus*, is a true species, distinguished from *R. major* by its unwinged seeds and by its being a weed of cultivated ground. It is shown to be distributed in N.W. Europe on light agricultural soils around the North Sea and along the eastern shore of the Baltic. Its centre probably lay in West Sweden and West Jutland, from which it spread west and east. It was probably brought with seed to England and Scotland, perhaps even in the time of the Norsemen. Its southern limit is not clearly known, but it can scarcely pass beyond North Germany, where it seems to be rare.

¹ "Trans. Bot. Soc. Edinburgh," i. 151, 1844.

The author enumerates under countries the localities from which he has seen examples. Among these lands are Finland, Sweden (many localities, as far north as Lapland), Norway (scarce), Denmark numerous localities, including Bornholm), Northern Germany, England, and Scotland.

From Great Britain he has seen examples, chiefly from East Scotland (Fife, S. Aberdeen, Elgin, Nairn, East Inverness, West Sutherland, Shetland), and from Northern England in a district around Yorkshire. True *R. major* he has seen from only one British locality, in Sussex near Hastings, which agrees with its occurrence at Calais in N. W. France. He suggests that perhaps the only native species of *Rhinanthus* in Britain is *R. minor*.

NOTE.—With reference to the above I have seen this form of the large Yellow Rattle in the counties of Kincardine (where it has occurred plentifully among corn and in artificial pasture, but seems to be very local) and Forfar, as well as in Fife, Aberdeen, Banff, and Elgin, and always as a weed of cultivated soil. It certainly appears to be a recent introduction into the counties around Aberdeen, *R. major* not being recorded under any form from the North-east of Scotland even in Professor Dickie's "Botanist's Guide to the counties of Aberdeen, Banff, and Kincardine." It probably owes its presence to mixture with seed of cereals or of other field crops.—JAMES W. H. TRAIL.

Saxifraga tridactylites, L., in Islay.—On the 15th of May I received from Dr. T. F. Gilmour, Port Ellen, Islay, specimens of the three-fingered Saxifrage, *Saxifraga tridactylites*, L., gathered by him on the Machrie Links Golf Course near Port Ellen. The plants were found in abundance "on rather bare, sloping, dry, sandy banks facing the south." Fresh specimens were shown at the meeting of the Natural History Society of Glasgow on 31st May. In view of the abundance of the plant where found, it is a little remarkable that this should be but the second record of its occurrence in the West of Scotland. The previous reference, as pointed out to me by Prof. Trail, is in the "Annals" for 1898, at page 84, where Mr. S. M. Macvicar, in his paper "On the Flora" of Tiree, mentions having observed a single specimen. Mr. Arthur Bennett, F.L.S., who confirmed the identification of Dr. Gilmour's specimens, remarks: "I rather expect it is its early flowering that causes it not to be recorded." *S. tridactylites* is frequent on the East Coast of Scotland, and is abundant on Dunnet Links, Caithness.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—April-June 1904.

[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.

A CURIOUSLY COLOURED HARE. J. Cuthbert Spencer. *The Field*, 11th June 1904, p. 1000.—Note, probably referring to a Scotch hare changing its winter coat. The specimen alluded to is from St. Boswells.

SUMMER BIRDS IN SCOTLAND. *The Field*, 23rd April 1904, p. 694.—Note on the arrival of summer birds north of the Tweed, furnished by the Duchess of Bedford.

ORNITHOLOGICAL NOTES FROM ABERDEEN—February and March. William Wilson. *Zoologist*, April 1904, p. 146. Eleven species mentioned.

ABERDEEN: MIGRATION NOTES FOR APRIL. W. Wilson. *Zoologist*, June 1904, p. 231. Notes on Wheatears, Ring Ouzels, and Dunlins.

ORNITHOLOGICAL NOTES FROM SHETLAND. By T. Edmondston Saxby, Halligarth, Unst. *Zoologist* (15th June 1904).—Amongst other less important records, such as Snowy Owl, Short-eared Owl, Smew, Rose-coloured Pastor, Waxwing, *three* records are prominent—Chiffchaffs—A good number, from April 15 to 26, 1904; Hawfinch—One ♀ brought to Mr. E. alive, May 3, 1904; and Little Gull—Myrasound, May 3, 1904.

ON NYSSIA LAPPONARIA. By E. A. Cockayne. *Entomologist*, June 1904, pp. 149-150, pl. vi. An interesting account of the life-history and habits of this Scottish species.

DIPTERA FROM THE SHETLANDS AND ORKNEYS. E. A. Bloomfield. *Ent. Mo. Mag.* April 1904, p. 88. Records 6 species of Syrphidæ collected by the Rev. F. D. Morice in the autumn of 1894.

FURTHER NOTES ON HYDROPTILIDÆ BELONGING TO THE EUROPEAN FAUNA, WITH DESCRIPTIONS OF NEW SPECIES. By Kenneth J. Morton, F.E.S. *Trans. Ent. Soc. Lond.* 1904, Part II. (June), pp. 323-328, pl. xxi. *Oxyethira mirabilis* described as new, from Loch Eigheach, Rannoch, and *Allotrichia pallicornis*, *Hydroptila sylvestris*, *Orthotrichia tetensii*, *Oxyethira frici*, *O. tristella*, and *O. simplex*, mentioned as Scottish species.

BOTANY.

NOTES ON THE DRAWINGS FOR ENGLISH BOTANY. By F. N. Garry, M.A. (as a supplement to *Journ. Bot.*, 1904, pp. 137, 184), extends from *Mentha sativa* to *Salix phylicifolia*, var. *Borreriana*, Syme.

NORTH-EAST HIGHLAND PLANTS, 1903. By the Rev. W. Moyle Rogers (*Journ. Bot.*, 1904, pp. 12-21). Notes on plants in Banff (94), Elgin (95), and Easternness (96). Several new records from Speyside.

EPILOBIUM COLLINUM, *Gmel.* By C. E. SALMON (*Journ. Bot.*, 1904, pp. 110-111), calls attention to existence in Holmesdale N.H. Club's Museum at Reigate of two sheets of this species labelled "*Epilobium roseum?* . . . Scotland, Dr. Power," probably collected about sixty years ago, and quotes Haussknecht's descriptions of it, and of *E. montanum* and *E. lanceolatum*.

NEW BRITISH HEPATICÆ. By Symers M. Macvicar (*Journ. Bot.*, 1904, p. 88). *Lophozia guttulata* (Lindb. and Arnell), Evans, discovered by Mr. George Stabler on wood in Ballochbuie, S. Aberdeen, July 1894; *Odontoschisma Macounii* (Aust.), Underw., discovered by Mr. P. Ewing on bare soil on Ben Heasgarnich, Perth, in July 1900.

FURTHER RESEARCHES ON THE SPECIALISATION OF PARASITISM IN THE ERYSIPTACEÆ (*Journ. Bot.*, 1904, p. 94-95). Notice of a report read to Linnean Society by C. E. Salmon, on 4th February, on many experiments upon the infective power of the fungi on different host-plants, proving existence of "biologic forms" of *Erysiphe graminis* (on species of *Bromus*), of *E. Cichoracearum*, and of *Sphaerotheca*.

BOOK NOTICES.

A NATURAL HISTORY OF THE BRITISH LEPIDOPTERA. By J. W. Tutt, F.E.S. Vol. iv. (London: Swan, Sonenschein and Co., April 1904).

Within two years of the publication of the third volume of this exhaustive and masterly work a fourth is now issued, and it is difficult to speak of it without appearing to be guilty of exaggerated language. We can only say that the sterling quality of the previous volumes is again kept up, and some idea of the thoroughness with which the work is done may be gathered from the fact that in over 500 closely printed pages only a dozen species are dealt with. Everything that is known about these species appears to have been given in this volume, so that the working entomologist, possessed of Mr.

Tutt's work, need wish for nothing more. The information too, though full of the minutest detail, is given in a way which renders almost every page eminently readable. Take for example, the account of the habits of *Manduca atropos*, the Death's-Head Moth. Although the author states that scarcely anything is known of many of the imaginal habits yet he manages to fill no less than 21 pages with interesting information under this head. The whole account of this well-known insect occupies 84 pages! The present volume completes the account of the Sphingidæ, while at the end is given an Appendix giving additional details concerning four species treated of in the third, followed by supplementary remarks on others in the fourth. Then comes a Catalogue of the Palæarctic Sphingides, a good Index, a Synopsis of Contents of vols. i.-iv., and finally a somewhat curiously arranged general Index to the whole work so far as published. As a frontispiece we notice with pleasure an excellent portrait of the author, executed in an admirable manner.

In turning over the pages of the work we notice many changes in nomenclature, and every species dealt with is assigned to a separate genus. This may surprise the collector who occupies himself entirely with British self-caught specimens, but such a change is in reality quite scientific, being founded upon a study of the Sphingidæ of the whole world, and, as the author states in his preface, being due to the fact that the British Hawk-Moths "are really scattered representatives of widely different groups having their central areas often in districts quite outside the limits of the palæarctic area." The details of localities, distribution, habits, etc. are given on the same plan as in previous volumes, which appears to be a good one. The headings of the pages might, however, be made a little more useful, if instead of repeating "British Lepidoptera" on the left-hand pages 250 times the name of the species were to be transferred to this side, and the right-hand heading devoted to "variation," "larva," "localities," as the case required. But this after all is only a matter of convenience—from a scientific point of view the work is, as we have said before, the *best account*, without exception, of the British Lepidoptera *ever published*.

P. H. G.

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[OCTOBER

ROBERT M'LACHLAN.

OBITUARY.

ALTHOUGH appreciative notices of the life and work of this distinguished entomologist have already been published elsewhere, it seems fitting that a short tribute to his memory should appear in the pages of the "Annals."

Robert M'Lachlan died at Lewisham on the 23rd of May last in his 67th year. Born at Ongar in Essex, and essentially a London man, he was, as his name indicates, of Scottish descent, his father having been a native of Greenock. His love of natural history dated from his childhood, and during the earlier part of his career he must have been a diligent student of the general subject, for although he afterwards became the leading specialist in his favourite order, his knowledge of natural history as a whole was extensive. Botany seems to have claimed his attention at first, and was gone into with that thoroughness which subsequently marked all his work, but it soon gave place to entomology. In Lepidoptera he became one of Stainton's best pupils, his studies extending to the micros, his collection of which the writer saw a few years ago, still in excellent preservation. He also attended to other orders, but his labours were gradually restricted to the Neuroptera in the broad sense

(including the Trichoptera), in which he soon became a recognised authority. To the great advantage of his own studies and of entomology generally, he soon threw aside insular limitations, and entered into active correspondence with Hagen, de Selys, Brauer, and others, and up to within the last few years of his life there were few prominent students of Neuroptera on either side of the Atlantic with whom he was not or had not been in touch. Hagen's correspondence was invaluable; this excellent worker (like Fritz Müller) had the habit of illuminating his subject by means of sketches introduced into his letters, and when M'Lachlan and the writer were working together on the *Hemerobiidæ* a few years ago, more than one knotty point in synonymy was cleared up by a reference to Hagen's old letters.

M'Lachlan wrote much, but his work was always solid. His connection with magazine work was almost unique, as he was for forty years one of the editors of the "Entomologist's Monthly Magazine," and the principal after Stainton's death in 1893. Many of his papers appeared in its pages, but he also contributed widely to the "Transactions" of the different learned Societies in this country and of the foreign Societies with which he was honourably connected. His great work, however, was his "Monographic Revision and Synopsis of the Trichoptera of the European Fauna." If he had written nothing else this would of itself have commended him to the respect of all entomologists. It is a first-rate piece of original research, and a model of what a systematic work should be.

When eighteen years of age, M'Lachlan made a voyage, extending over thirteen months, to Australia and China. At that time his bent was Botany, and he made a large collection of plants. Later he made almost annual excursions to the Continent (frequently *en route* paying a visit to his great friend de Selys), exploring the Alps of Dauphiné and Savoy, the Pyrenees and other parts, where he accumulated vast materials which were of use to him in writing his Monograph. He was a most energetic collector, and he worked as hard in the field as in the study. Twice he visited Scotland. On the first occasion, in 1865, he went to Rannoch when the accommodation there was still

of the most primitive type. An account of this visit appears in the "Entomologist's Monthly Magazine," vol. ii., from the pen of his colleague Rye, and in a note by himself he records the capture of our two boreal dragon-flies, *Somatochlora arctica*, and *Æschna carulea*. On the second occasion, in 1885, he went to the meeting of the British Association at Aberdeen, and on his return south, the writer had the privilege of conducting him to some of the Lanarkshire localities, and the pleasure of seeing his enthusiasm over the capture of the rare *Drepanopteryx phalænoides*, although he himself had not the good fortune to take it then.

Under a certain reserve of manner Mr. M'Lachlan had a most generous and kindly nature. He had the priceless faculty of taking trouble, and he did this not only in connection with his own work, but also on behalf of others, to an almost incredible extent. The hundreds of letters which passed between him and the writer during a period extending from 1878 to April last amply testify to the above excellent qualities. They are also full of interest, instruction, and encouragement. An American correspondent, now a biologist of mark, has said that at the beginning of his own work on the Neuroptera, M'Lachlan sent him his papers and wrote him a letter which was so kindly that it was an inspiration. This serves to show the character of the man whom his more intimate colleagues, students of his favourite orders, respectfully called their master.

K. J. M.

THE STOATS, *PUTORIUS ERMINEUS* (LINNÆUS), OF JURA AND ISLAY.

By G. E. H. BARRETT-HAMILTON, F.Z.S., etc.

SCOTTISH naturalists are, of course, well aware of the occurrence of the Stoat in Jura and Islay. Several specimens from these islands have recently found their way through my hands, and I find them of some interest, inas-

much as they seem to suggest the existence therein of a local race, characterised by smaller size, longer tail and ears, and certain cranial differences. The series is, however, hardly long enough to be thoroughly convincing, hence I think it best to publish the details in the "Annals of Scottish Natural History," in the hope that some other zoologist may find an opportunity of investigating the matter.

As far as the series which I have examined goes, the Jura Stoats are more distinct from ordinary British Stoats than are those of Islay: their short broad rostral region and short small auditory bullæ are noticeable. The Islay specimens agree in the later particular, but are larger.

At the end of this note follow the details of the dimensions of the whole series. I give also for comparison a set of dimensions for Stoats taken on the mainland of Britain. A comparison of the two will at once show that whereas the examples from the Islands have a mean head-and-body length not reaching the minimum for those of the mainland, yet they exceed the mean in length of tail and about equal it in length of ear, and this applies to both sexes. The occurrence of a somewhat stunted race of Stoats with rather large ears would seem to be a not unexpected feature of an island if food were scarce, and good hearing an important adjunct to the capture of a scanty prey, but whether or no this is true for these Islands I must leave Scottish naturalists to instruct me. The extra length of tail is an item not easily explained.

I must conclude with my thanks to the editors of this journal for their courtesy in publishing this note, and to the authorities of the British Museum of Natural History and the Zoological Museum at Cambridge, to whom I am indebted for the opportunity of examining the specimens. The Jura stoats were all presented to the latter museum by the late Mr. Henry Evans, so recently removed by death from the ranks of Scottish naturalists.

ISLAY STOATS.

	SKINS.				SKULLS.			
	Head and Body.	Tail without Terminal Hairs.	Hind Foot without Claws.	Ear.	Greatest Length.	Basal Length.	Greatest Breadth at Zygoma.	Palatal Length.
Male, 28/1/96, Hugh Morrison, in Coll. Brit. Mus. Nat. Hist.	mm. 273	mm. 111	mm. 47	mm. 22	mm. 49	mm. 45	mm. 30	mm. 21
Male, 6/2/96, Hugh Morrison, in Coll. Brit. Mus. Nat. Hist.	254	105	43	22	48	45	30	20
Male, 19/12/95, P. Mackenzie, in Coll. Brit. Mus. Nat. Hist.	270	114	46	21	48.5	45	28.5	21
Male, in Coll. Zool. Mus. Camb.	230	140	45	24	...	...	...	...
Average of Males approx.	257	117	45	22	48.5	45	29	21
Female, 25/12/95, H. Morrison, in Coll. Brit. Mus. Nat. Hist.	234	105	38	19	45	41	25.5	18.5
Female, in Coll. " Zool. Mus. Camb.	231 210	95 110	39 40	18 20	46 ...	42 ...	26 ...	19 ...
Average of Females approx.	225	103	39	19	...	...	...	...

JURA STOATS.

	SKINS.				SKULLS.			
	Head and Body.	Tail without Terminal Hairs.	Hind Foot without Claws.	Ear.	Greatest Length.	Basal Length.	Greatest Breadth at Zygoma.	Palatal Length.
Male, H. Evans, in Coll. Zool. Mus. Camb.	mm. 220	mm. 120	mm. 45	mm. 22	mm. 47	mm. 44	mm. 28.5	mm. 20
" " "	225	125	45	22	48.5	45	28	21
" " "	230	115	43	20	...	...	...	...
" " "	227	130	45	22	...	...	...	...
Average of Males approx.	225	122	44.5	21.5	...	...	...	...
Female, Henry Evans, in Coll. Zool. Mus. Camb.	220	95	40	20	...	...	...	...
" " "	210	110	40	20	...	...	...	...
" " "	200	80	35	20	...	...	...	...
Average of Females approx.	210	95	38	20	...	...	...	...

BRITISH (MAINLAND) STOATS.

	SKINS.				SKULLS.			
	Head and Body.	Tail without Terminal Hairs.	Hind Foot without Claws.	Ear.	Greatest Length.	Basal Length.	Greatest Breadth at Zygoma.	Palatal Length.
No. of Items— <i>Males</i> .	17	17	16	15	11	11	10	10
Maximum	mm. 298	mm. 122	mm. 53	mm. 26	mm. 54	mm. 50.5	mm. 31	mm. 24
Mean	270	112	48	22.5	51.5	48	30	22.5
Minimum	243	102	43	20	49.5	46	28.5	21
Combined Average of 4 Jura and 4 Islay Males	241	119.5	45	22	...	...	...	...
No. of Items— <i>Females</i> .	17	17	17	13	16	16	17	17
Maximum	mm. 262	mm. 109	mm. 47	mm. 23	mm. 48.5	mm. 44	mm. 27.5	mm. 21
Mean	246	96	44	20	46	42	24.5	19.5
Minimum	231	83	38	16	43.5	40	21	19
Combined Average of 3 Jura and 3 Islay Females approx.	217	99	38.5	19.5	...	...	...	...

ON THE OCCURRENCE OF THE SHORT-TOED LARK AND THE LAPLAND BUNTING IN THE OUTER HEBRIDES.

By WM. EAGLE CLARKE.

DURING a recent visit, along with Mr. T. G. Laidlaw, to the Flannan Isles—a remote group of uninhabited islets lying in the open Atlantic, twenty miles west of the Island of Lewis, and forty miles north-east of St. Kilda—among the birds which came under our notice were a Short-toed Lark (*Calandrella brachydactyla*) and a number of Lapland Buntings (*Calcarius lapponicus*).

The Short-toed Lark was captured on the morning of the 20th of September and proved to be a female.

That this southern European species should have occurred in such an out-of-the-way place is inexplicable, but is interesting since the Flannans now form the most northerly record of the bird's appearance in Europe or elsewhere, and

also because it has not hitherto been known to occur in Scotland. Even in England it is only to be regarded as a rare wanderer to the southern counties, where it has occurred on nine or ten occasions; while in Ireland one has been obtained in County Mayo.

The specimen has been presented to the Collection of British Birds in the Royal Scottish Museum, Edinburgh.

On our arrival at the Flannans on the 6th of September, the Lapland Bunting was almost the first bird that came under notice, and a party of from thirty to forty individuals, composed of old and young, were found to be present, some of which were seen daily down to the date of our departure, September 21st. On the following day, the 22nd, I saw several examples on Sule Skerry, a far western outlier of the Orkneys.

This species is of irregular occurrence in the British Isles, and has only hitherto been detected in one or two instances in Scotland, namely in Caithness and the Orkneys and Shetlands. The date of appearance of these birds in the Hebrides is also of special interest, since it is believed to be the earliest on record for our Islands.

I take this opportunity of expressing on behalf of Mr. Laidlaw and myself our indebtedness to the Commissioners of Northern Lighthouses for having granted us permission to reside in the lighthouse during our sojourn on the Flannans, and for other facilities afforded us in connection with our visit—privileges and assistance which we desire to gratefully acknowledge.

REPORT ON THE MOVEMENTS AND OCCURRENCE OF BIRDS IN SCOTLAND DURING 1902.

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

(Continued from p. 150).

FRINGILLA MONTIFRINGILLA (Brambling).

Orkney—Sule Skerry, April 29, caught at lantern. Pentland Skerries, April 26, a flock of Bramblings and Chaffinches: May 13,

disappeared; Oct. 15, juv., sent in flesh. *Argyll and Isles*—Loch Lochy, Feb. 19, returned, absent since November.

LINOTA LINARIA (Mealy Redpoll).

Orkney—Sule Skerry, Sept. 15, sent in flesh; Sept. 29, captured at lantern, sent; Oct. 24, one at lantern. *Pentland Skerries*, Oct. 15, one sent.

LOXIA CURVIROSTRA (Crossbill).

Shetland—Unst, July 19, four. *Outer Hebrides*—Barra, July 9, adult ♂ and ♀ in garden, Eoligary.

EMBERIZA PUSILLA (Little Bunting).

Orkney—*Pentland Skerries*, Oct. 15, remains of a bird captured by cat sent for identification. First record for Scotland ("Annals," 1904, pp. 14-16).

PLECTROPHENAX NIVALIS (Snow Bunting).

Orkney—Sule Skerry, March 13, flock; Oct. 2, at lantern; 3rd, flock on Island. *Pentland Skerries*, March 20, a few; April 3-30, several small parties during month. *Dee*—Aberdeen, Oct. 9, small flock. *Tay*—Bell Rock, April 20, on rock; May 6, two pairs on Schiehallion. *Forth*—North Berwick, Oct. 17, flock. *Outer Hebrides*—Flannans, March 15, very large flock; Sept. 18, first; Oct. 3, flock; Oct. 20, very numerous. *Argyll and Isles*—Skerryvore, Oct. 2, a few. *Solway*—Corsewall, Sept. 24, two. Beattock, Oct. 15.

STURNUS VULGARIS (Starling).

Orkney—Sule Skerry, March 25, two; 26th, flock; Oct. 29, in rush, Thrushes, Redwings, Fieldfares, etc. *Pentland Skerries*, March 20, a few. *Tay*—Bell Rock, May 1, several; Oct. 11-19, 27 and 28, at lantern. *Outer Hebrides*—Flannans, Feb. 12 and March 30, a few; Oct. 11, nine; Dec. 5, two. *Argyll and Isles*—Skerryvore, Feb. 25, resting in windows; March 31, at lantern, with Thrushes. *Solway*—Corsewall, March 21-22, in rush, Starlings, Thrushes, Redwings, etc.

CORVUS CORNIX (Hooded Crow).

Orkney—Sule Skerry, Feb. 25, one; April 24, two; Nov. 21, one, still on Island, Dec. 29. North Ronaldshay, May 11, sixteen. *Outer Hebrides*—Flannans, Oct. 3, two. *Argyll and Isles*—Skerryvore, May 14, on rock.

CORVUS FRUGELEGUS (Rook).

Orkney—Sule Skerry, April 10, one. North Ronaldshay, April 30, small flock. *Outer Hebrides*—Flannans, Jan. 1, one. *Argyll and Isles*—Tiree, April 3, three.

GARRULUS GLANDARIUS (Jay).

Argyll and Isles—Stonefield, Jan. 5, one shot. Escart, Jan. 6, one. *Solway*—Maxwelltown, March 25, five arrived Terregles Park, remained the season, and at least one pair bred.

ALAUDA ARVENSIS (Skylark).

Orkney—Noup Head, Sept. 19 and Oct. 1, at lantern. Sule Skerry, March 26, flock. North Ronaldshay, Feb. 15 and 28, at light. *Tay*—Bell Rock, Sept. 26, at light; Oct. 12, 22, and 26, at lantern. *Outer Hebrides*—Flannans, Jan. 20, five; Feb. 12, several; March 12, great numbers, midnight; April 9 and 12, a few. *Argyll and Isles*—Skerryvore, March 16, killed at lantern; May 11, five; July 7, twelve rested on the rock for two hours. *Clyde*—Carmichael, Feb. 9, returned. *Solway*—Corsewall, March 21-22, Thrushes, Starlings, and Larks in great numbers; Sept. 27, Thrushes, Larks, Wheatears, Pipits, etc.

CYPSELUS APUS (Swift).

Shetland—Baltasound, Unst, May 25. *Orkney*—Noup Head, June 24, one caught; June 27, one killed 10 P.M., bird sent; July 27, one. *Moray*—June 26, hawking over summit of Ben Wyvis. *Dee*—Aberdeen, May 19, two. Lochnagar, July 7, six haunting the highest summit of Carn Beag (3786 feet). *Tay*—Perth, May 4, one; Sept. 4, two. *Forth*—Hailes, May 4, one. Kirkliston, Sept. 16, one, very late. *Clyde*—Pollokshaws, May 8, a pair. Fairlie, Sept. 2. *Solway*—Maxwelltown, May 17, several; Aug. 8, many going off at nightfall.

Earliest, Tay and Forth, May 4.

CAPRIMULGUS EUROPÆUS (Nightjar).

Forth—Cramond, Sept. 1, one. Leven, Sept. 14. *Clyde*—Lamlash, May 2. *Solway*—Dumfries, Sept. 11, one "wired"; another, also "wired," near Killywhan Station, same date.

DENDROCOPUS MAJOR (Great Spotted Woodpecker).

Shetland—Sumburgh Head, Sept. 8, immat. bird at lantern (sent in flesh). *Sutherland*—Sandside, Oct. 16, young ♂. Helmsdale, Oct. 30, ♀. Braemore, Sept. 24, young ♂. *Moray*—Rothiemay,

shot early in February. *Dee*—Haddo, a pair nesting. Aberdeen, Oct. 5, one shot. *Tay*—Auchinblae, Dec. 20, two in Glen Woods. *Forth*—East Lothian, June 4, nested again this spring; old birds seen feeding young. *Tweed*—Roxburgh, Aug. 22, young bird.

IVNX TORQUILLA (Wryneck).

Shetland—Unst, Sept. 2, a ♂ captured alive, Haroldswick.

CORACIAS GARRULA (Roller).

Tay—Ballinluig, Oct. 13, one shot.

CUCULUS CANORUS (Cuckoo).

Shetland—Unst, May 28, one. *Moray*—Garve, May 16. *Dee*—Aberdeen, May 7, one. *Tay*—Perth, May 3, Craigend. *Forth*—Rosebery, April 24. *Tweed*—Broughton and Cramilt, May 3. *Argyll and Isles*—Earraid, May 3, heard. *Clyde*—Beith, April 26. *Solway*—Vale of Tarff, April 20, observer says “second latest date in nineteen years.”

Earliest, Solway, April 20.

STRIX FLAMMEA (Barn Owl).

Solway—March 14, a ♂, dark phase, found under telegraph at Lochanhead Station.

ASIO ACCIPITRINUS (Short-eared Owl).

Tay—Bell Rock, Sept. 6, one at light; Oct. 10, one on rock; Oct. 10, numerous, near Tentsmuir. *Forth*—Burntisland, Oct. 13, one. Isle of May, one, end of September.

NYCTEA SCANDIACA (Snowy Owl).

Shetland—Unst, March 5, first seen; haunted district for some time. Dunrossness, April 23, one seen. *Outer Hebrides*—Flannans, Oct. 12, one, “first I have seen on Island.”

CIRCUS CYANEUS (Hen Harrier).

Solway—Kirkbean, old ♂ shot last week of October. Tarff, one shot early in November.

ARCHIBUTEO LAGOPUS (Rough-legged Buzzard).

Sutherland, etc.—Caithness, Oct. 6, one; 23, old ♀ trapped; 30, adult ♂. *Tay*—Forfarshire, Oct. 9. *Forth*—Gorebridge, Oct. 26; Lammermuirs, Oct. 31; Pentlands, many after middle of

October; Fife, Nov. 28 ("Annals," 1904, p. 56). *Tweed*—West Linton, two or three during November. *Outer Hebrides*—N. Uist, one trapped in the past autumn, two previous records noted. *Solway*—Tarff, one shot early in November; Auchencheyne, one.

FALCO CANDICANS (Greenland Falcon).

Orkney—March 23, adult ♀ trapped, Hebrides ("Annals," 1903, p. 185). *Outer Hebrides*—Mingulay, April 2, shot, and forwarded in flesh to J. A. H. - B. (*op. cit.* p. 186). *Argyll and Isles*—Tiree, Feb. 15, one, struck down Lapwing.

FALCO ÆSALON (Merlin).

Outer Hebrides—Flannans, April 20, ♂ and ♀; Oct. 11, one. *Argyll and Isles*—Skerryvore, April 30, one; Aug. 24 and Sept. 4, one each date; Tiree, Sept. 25, numerous on migration.

PANDION HALIAETUS (Osprey).

Tweed—Border counties, Oct. 29, young ♀.

SULA BASSANA (Gannet).

Forth—Feb. 2, returned to Bass. *Outer Hebrides*—Flannans, Feb. 3, three; March 19, pairs passing all day S.W. to St. Kilda.

ARDEA CINEREA (Heron).

Outer Hebrides—North Uist, seen sitting on nest (R. Kearton). First good record of nesting in Outer Hebrides ("Annals," 1904, p. 57).

PLEGADIS FALCINELLUS (Glossy Ibis).

Orkney—Stromness, Sept. 19, one shot. *Tay*—Perth, near, Oct. 18, shot on Earn.

ANSER CINEREUS (Grey Lag Goose).

Argyll and Isles—Tiree, Oct. 19, fifteen; Oct. 26, eight. *Solway*—Maxwelltown, April 21 and 22, large numbers passed up to N.N.W. each morning; Oct. 5, thirty going S. at daybreak; Oct. 20, six flying S.

ANSER SEGETUM (Bean Goose).

Outer Hebrides—S. Uist, March 21, three, one obtained.

ANSER BRACHYRHYNCHUS (Pink-footed Goose).

Tay—Tayfield, April 30, large flock; Oct. 7, first. *Forth*—Burntisland, Oct. 1, forty or fifty arrived. *Tweed*—Macbiehill, Oct. 5, flying E.

ANSER ALBIFRONS (White-fronted Goose).

Argyll and Isles—Tiree, Oct. 14, several flocks.

BERNICLA LEUCOPSIS (Barnacle Goose).

Forth—N. Berwick, Oct. 17, one shot. *Outer Hebrides*—Flannans, March 15, large flock gathering for departure; April 23, eighteen; Oct. 25, flock of thirty, first seen this "Fall." *Argyll and Isles*—Skerryvore, May 31, one flying N. *Clyde*—Fairlie. Sept. 19, small party, two shot. *Solway*—Maxwelltown, Sept. 18, three from N.N.E. at sunrise.

BERNICLA BRENTA (Brent Goose).

Shetland—Unst, April 27, four. *Outer Hebrides*—Barra, April third week, left.

CYGNUS MUSICUS (Whooper Swan).

Shetland—Unst, March 30, passing; April 21, flying N. *Argyll and Isles*—Skerryvore, March 15, two in bay, rarely seen; Tiree, Oct. 27, twelve.

ANAS STREPERUS (Gadwall).

Argyll and Isles—Tiree, Jan. and Feb., more numerous than usual; Oct. 31, have come. *Clyde*—Eaglesham, Dec. 1, about, one. *Solway*—Nov., four in Wigtownshire (Sir H. Maxwell).

SPATULA CLYPEATA (Shoveller).

Outer Hebrides—S. Uist, May, first record of nesting ("Annals," 1903, p. 245).

DAFILA ACUTA (Pintail).

Solway—Auchencreeff, Sept. 18, a ♂ on loch.

QUERQUEDULA CRECCA (Teal).

Outer Hebrides—Lewis, first record of nesting in the island ("Annals," 1903, p. 245). Flannans, Oct. 8, Duck and Drake.

MARECA PENELOPE (Wigeon).

Argyll and Isles—Tiree, Sept. 22, a flock. *Solway*—Auchencreeff, Sept. 18.

FULIGULA FERINA (Pochard).

Orkney—Sule Skerry, March 13, two; *Forth*—Duddingston, Sept. 12, appeared.

FULIGULA CRISTATA (Tufted Duck).

Forth—Duddingston, Sept. 5, twelve appeared on loch. *Outer Hebrides*—S. Uist, first record of nesting ("Annals," 1903, p. 245).

CLANGULA GLAUCION (Golden-eye).

Argyll and Isles—Loch Arkaig, May 29, four ♂'s, adult. *Solway*—Maxwelltown, Oct. 20, a pair flying due south and high.

HARELDA GLACIALIS (Long-tailed Duck).

Tay—Bell Rock, April 5, left on this date. *Outer Hebrides*—Barra, May, last week, left. *Argyll and Isles*—Tiree, Oct. 6, Gott Bay.

COLUMBA PALUMBUS (Ring Dove).

Shetland—Unst, May 10, Halligarth. *Dee*—Inverurie, May 7, nest on ground in branches placed for pheasants. *Outer Hebrides*—Barra, May 31, one.

CREX PRATENSIS (Corn Crake).

Shetland—Unst, June 5, first heard. *Orkney*—Noup Head, May 20, first. Sule Skerry, May 26th and 31st, one each date. *Moray*—Garve, May 12. *Dee*—Inverurie, May 14. Aberdeen, Oct. 5, one. *Tay*—Auchinblae, April 26. Bell Rock, May 22, on rock. *Forth*—Cramond, May 4. *Tweed*—Halmyre and Broughton, May 5. *Outer Hebrides*—Barra, May, second week. *Argyll and Isles*—Achnacarry, May 20, one. *Clyde*—Dippen, April 29. Beith, April 30. *Solway*—Maxwelltown, May 7, unusually late.

Earliest, *Tay*, Auchinblae, April 26.

PORZANA MARUETTA (Spotted Crake).

Tay—Murthly, Nov. 2 ("Annals," 1902, p. 55). *Solway*—Dumfries, Sept. 3, one "wired" near Noblehill (*op. cit.*, p. 69).

GRUS COMMUNIS (Crane).

Orkney—Pentland Skerries, May 2. Immat. bird shot. ("Annals" 1903, p. 186).

EUDROMIAS MORINELLUS (Dotterel).

Moray—Buckie, May 9, adult ♂ (C. Kirk).

CHARADRIUS PLUVIALIS (Golden Plover).

Orkney—Sule Skerry, April 24, eight, Aug. 20, 22, and Sept. 7. *Dee*—Inverurie, Feb. 22, numerous. *Tay*—Auchinblae, Sept. 18, over sixty. *Tweed*—Cramilt, Feb. 23, several. *Outer Hebrides*—Flannans, May 1 and 18, Sept. 22, and Oct. 8. *Argyll and Isles*—Tiree, April 7 and 16, large flocks : Aug. 25, flocks returning ; Sept. 8 and Oct. 1, “swarms.”

VANELLUS VULGARIS (Lapwing).

Orkney—Sule Skerry, March 9, eleven, left following day ; April 10, four ; May 3, two ; Aug. 20, one, did not stay ; Sept. 6, one ; Sept. 22, two, remained about a week. North Ronaldshay, March 3, a flock ; Oct. 30, large flock. *Tay*—Auchinblae, March 1, returned to nesting ground. *Outer Hebrides*—Flannans, Jan. 5, March 15, and May 3, one each date ; Nov. 10, two. *Argyll and Isles*—Skerryvore, Sept. 21, one. Loch Lochy, Jan. 28, single bird arrived ; did not stay ; March 2, two came in from N.E., 10 a.m. *Clyde*—Carmichael, Feb. 9, returned. *Solway*—Maxwelltown, Jan. 6, Lapwings and Starlings in flight ; Jan. 12, passing up all day.

STREPSILAS INTERPRES (Turnstone)

Orkney—Sule Skerry, May 6, sixty or seventy in summer plumage, left about 10th, winter residents left about end of April ; June 4, a flock on passage ; Aug. 4, about sixty arrived, winter residents. *Outer Hebrides*—Flannans, Jan. 12, about a score ; Aug. 18, thirty. *Argyll and Isles*—Skerryvore, Aug. 4, first. Tiree, Sept. 3, have returned.

HÆMATOPUS OSTRALEGUS (Oyster-catcher).

Orkney—Sule Skerry, March 2, flock arrived. *Outer Hebrides*—Flannans, March 15, four.

PHALAROPUS HYPERBOREUS (Red-necked Phalarope).

Argyll and Isles—Tiree, June 8, on a small loch.

PHALAROPUS FULICARIUS (Grey Phalarope).

Orkney—Sule Skerry, Feb. 15, one, sent in flesh.

SCOLOPAX RUSTICULA (Woodcock).

Orkney—Auskerry, Oct. 24, in rush, five picked up. Pentland Skerries, April 30, one. Sule Skerry, Oct. 15, two; Nov. 8, and Dec. 2, one each date. Tayfield, Oct. 13, arrived. *Forth*—Burntisland, Oct. 31, three. *Tweed*—Cramilt, Sept. 10, one. *Outer Hebrides*—Flannans, Oct. 26, 29, and Nov. 16, one each date. *Argyll and Isles*—Tiree, Oct. 22, two.

GALLINAGO MAJOR (Great Snipe).

Clyde—Loch Fyne, Oct. end of, one shot near Otter.

GALLINAGO CELESTIS (Common Snipe).

Orkney—Auskerry, Oct. 24, in rush, one picked up. Sule Skerry, Sept. 12, two; 13th, eight. *Outer Hebrides*—Flannans, Jan. 20, seven; Oct. 10, one; Nov. 28, ten. *Argyll and Isles*—Skerryvore, April 17, on rock. Tiree, Sept. 21, arriving in numbers; Nov. 2, very numerous.

GALLINAGO GALLINULA (Jack Snipe).

Tay—Tayfield, Oct. 13, arrived. *Outer Hebrides*—Flannans, Nov. 16, one. *Argyll and Isles*—Tiree, Sept. 28, arriving.

MACHETES PUGNAX (Ruff).

Solway—Carsethorn, Oct. 10, Ruff and Reeve shot.

CALIDRIS ARENARIA (Sanderling).

Forth—Aberlady, Aug. 22, a few young birds. *Argyll and Isles*—Tiree, Feb., more numerous than usual; Sept. 3, have returned.

TOTANUS HYPOLEUCUS (Common Sandpiper).

Moray—Contin, April 24. *Tay*—Loch Rannoch, April 25. *Forth*—Kirkliston, April 18. Haddington, Sept. 21. *Tweed*—Broughton, April 26. *Outer Hebrides*—Barra, May, 2nd week. Flannans, Aug. 5, one. *Argyll and Isles*—Loch Lochy, April 22, three. Tiree, April 30, two. Skerryvore, July 18, on rock. *Clyde*—Netherlee, April 17. *Solway*—Beattock, April 21.

Earliest, Netherlee, Clyde, April 17.

TOTANUS CALIDRIS (Redshank).

Orkney—Sule Skerry, Aug. 22, three, stayed a few days. *Tay*—Auchinblae, March 15, arrived, numerous. *Tweed*—Broughton, March 14. *Outer Hebrides*—Flannans, May 20, one. *Argyll and Isles*—Loch Lochy, April 3, one.

TOTANUS FUSCUS (Spotted Redshank).

Solway—Carsethorn, Oct., one seen, but not obtained.

TOTANUS CANESCENS (Greenshank).

Forth—Aberlady, Sept. 21. *Argyll and Isles*—Tiree, April 17, two; Aug. 28, two. Loch Lochy, April 20, one, remained for several days.

LIMOSA LAPPONICA (Bar-tailed Godwit).

Forth—Aberlady, Aug. 2. *Clyde*—Fairlie, Sept. 19, four.

LIMOSA BELGICA (Black-tailed Godwit).

Forth—Dunbar, Oct. 10, one seen. *Argyll and Isles*—Tiree, Sept. 1, two at Faoghail.

NUMENIUS ARQUATA (Curlew).

Orkney—Sule Skerry, Aug. 7, nine arrived, winter residents. *Tay*—Auchinblae, March 6, returned to breeding-grounds. *Tweed*—Broughton, March 12. *Outer Hebrides*—Flannans, Aug. 5, 8, 12, and 24, passing. *Argyll and Isles*—Loch Lochy, Feb. 16, three flying south; March 7, a few arrived. Skerryvore, May 9, a flock flying north; July 6, flock flying south; Aug. 6, 18, and 24, passing. Tiree, Aug. 10, large numbers have returned. *Clyde*—Carmichael, Feb. 27, returned. *Solway*—Maxwelltown, Feb. 15, big general migration 5 to 8 p.m.; March 18, many passing at 7.30 a.m.

NUMENIUS PHÆOPUS (Whimbrel).

Orkney—Sule Skerry, May 9, two. *Sutherland*—Stirkoke, Oct. 8, adult ♂. *Forth*—Cramond, July 7. *Outer Hebrides*—Flannans, May 9, four; 29, twenty. *Argyll and Isles*—Tiree, Feb. 2, two seen; May 1, big flocks travelling N.; May 7, flocks daily; Sept. 14, several small lots passing; Skerryvore, April 30, one; May 31, two; June 8, two.

STERNA CANTIACA (Sandwich Tern).

Forth—North Berwick, April 10; Cramond, May 12; Aberdour, Sept. 28, several; Dalmeny, Oct. 3, two; Cramond, Oct. 14, feeding young.

STERNA FLUVIATILIS (Common Tern).

Dee—Aberdeen, May 2, many; Sept. 28, last seen. *Forth*—Portobello, May 14; Cramond, Oct. 14. *Outer Hebrides*—Barra, May, last week, arrived. *Argyll and Isles*—Tiree, May 11, four.

STERNA MACRURA (Arctic Tern).

Shetland—Unst, May 29, arrived. *Orkney*—Sule Skerry, May 16, large flock, last seen Sept. 10; Pentland Skerries, May 16, first appearance. *Argyll and Isles*—Tiree, May 18, have arrived.

STERNA MINUTA (Lesser Tern).

Dee—Aberdeen, May 2, twelve. *Outer Hebrides*—Barra, May 19, a pair. *Argyll and Isles*—Tiree, May 19, have arrived.

XEMA SABINII (Sabine's Gull).

Argyll and Isles—Easdale, Oct. 30, an immature ♂ at Belnahua ("Annals," 1904, p. 57).

LARUS MINUTUS (Little Gull).

Argyll and Isles—Skerryvore, Sept. 27, one flew about rock for over an hour.

MEGALESTRIS CATARRHACTES (Great Skua).

Shetland—Unst, April 9, arrived.

STERCORARIUS POMATORHINUS (Pomatorhine Skua).

Sutherland—Reay, Nov. 19, young bird caught alive at Shurrey.

PODICIPES CRISTATUS (Great-Crested Grebe).

Sutherland—May 7, a specimen in full breeding plumage on Loch Borrolan ("Annals," 1904, p. 127).

PODICIPES GRISEIGENA (Red-Necked Grebe).

Solway—Glencaple, Oct. 6, one shot.

PODICIPES AURITUS (Sclavonian Grebe).

Sutherland—Thurso, Dec. 5, young ♂. *Argyll and Isles*—Tiree, Jan. Feb. March, fairly numerous.

OCEANODROMA LEUCORRHOA (Fork-Tailed Petrel).

Orkney—Sule Skerry, Sept. 5, one at lantern. *Outer Hebrides*—Flannans, April 19, one.

LIMAX TENELLUS IN SCOTLAND.

By W. DENISON ROEBUCK, F.L.S., Leeds.

DURING the present autumn I have been working energetically at filling up blanks in our knowledge of the distribution of British slugs, especially of the genus *Arion*, for the forthcoming part of Mr. Taylor's Monograph of the Land and Freshwater Mollusca of the British Isles.

At my request Mr. Robert Godfrey of Edinburgh has collected in various parts of the Highlands for me, and he has now been rewarded with a most important find.

About the 26th of August he found a couple of small slugs in the forest of Rothiemurchus, and suspected them to be *L. tenellus* from the yellow slime, though they were not so strongly tinged with that colour as he had seen them in Switzerland. Rothiemurchus is in the Watsonian vice-county of Easternness.

On my receiving them I at once saw that they were of a species of *Limax* that I had never seen before, and had no hesitation in referring them to *L. tenellus*, Müll. I then studied them along with Mr. J. W. Taylor, when we saw that they were referable to the var. *fulva* as described in his Monograph.

I wrote to congratulate Mr. Godfrey on his find, and asked for more in order that we might study them in bulk. On the 29th and 30th August he sent me a dozen or more, including one or two fine well-grown examples measuring 30 mm. when crawling. But these examples were not like the first two, and were of the var. *cerea*, their waxy-yellow appearance showing that varietal name to be very appropriate. In collecting these Mr. Godfrey was assisted by his young friend Mr. Aird Whyte, by whom half the examples were gathered.

It was a great satisfaction to learn from Mr. Godfrey that the slug turns out to be the common or dominant species of the pine wood of the extensive and ancient forest of Rothiemurchus, and not a mere sporadic occurrence, thus firmly re-establishing its position as a real component of the British fauna.

It is, too, a great satisfaction that it has turned up in the very part of the kingdom that I have confidently expected it to do, the remoter and more primitive fastnesses into which this, evidently a retreating and decreasing species, has been driven by the pressure of the more dominant forms of molluscan life which have appropriated the more desirable districts and habitats.

Mr. Godfrey's description of its haunts coincides very closely with what we know of its characteristic habitats in Germany. He states that its chief haunts are on old pine branches lying half-smothered in the masses of blaeberreries, whortleberries, and heather. These branches are covered with decayed pine-needles and other rotten vegetation, amongst which the slugs are concealed. Several examples were also found under stones. Its companions are *Limax cinereo-niger* in its varieties *maura* and *luctuosa*, and *L. arborum* in its typical form but dark in colour, and its montane var. *alpestris*, as well as *Arion subfuscus* and *A. minimus*, specimens of all which I have seen and named, but Mr. Godfrey states that *L. tenellus* outnumberes them all, just as it does in the German forests, as stated in Taylor's Monograph.

The surprise is that, considering how dominant a species it is at Rothiemurchus, it should have escaped detection by British conchologists all these years.

But it is quite possible that the apparent scarcity of both this species and of *L. cinereo-niger* is the consequence of the superficial resemblance which each has to a very different slug, which causes them to be overlooked by observers who do not carefully note the *generic* character. *L. cinereo-niger* in its totally black form, var. *maura*, looks very like the typical form of the common *Arion ater*, and in like manner the general external appearance of *L. tenellus* as to colour and markings is very much that of *Arion subfuscus*.

This discovery will give an incentive to Scottish conchologists to examine other forests of similar character, such as the Athole forests, and to search the peaty and heathy tracts which have hitherto been shunned as unproductive of molluscan life.

Besides which the previous localities reported for Scotland should be re-examined. The absolute first record is English, for Co. Durham, and is very likely correct, as Joshua Alder made a very careful coloured drawing of it, which I have seen more than once, and which is a very faithful representation.

In 1862 Dr. Jeffreys recorded it for North Mavine in the Shetland Islands, "on stones in the watercourse of a mountain mill." This is extremely doubtful. The habitat suggests *Agriolimax levis*, and there is no evidence to show that the example was correctly identified, nor who identified it. Dr. Jeffreys himself is out of the question, for he did not profess to know the British slugs critically, according to his own statement.

In the *Naturalist* for July 1878, p. 177, Mr. John Conacher, jun., recorded it as found in great numbers in hedge bottoms near Irvine, Ayrshire, in June 1878, and also in the island of Bute, near Rothesay. Mr. Conacher and Mr. Whitwham, who also saw the specimens, particularly noted that the yellow colour was entirely due to the slime of the body, and also that they carefully examined the shield with the microscope. This latter statement would exclude the possibility of *Arion subfuscus* being the species found, but would not exclude *Limax flavus*. The date (June) is against the occurrence of an autumnal form like *L. tenellus*, and "hedge-bottoms" are an unlikely habitat on the face of it, unless there be primitive pine-woods close by. However, the verification of this record would be an easy task for any one resident in the chief cities of Scotland. Messrs. Conacher and Whitwham, both of them personal friends of my own for several years, were not professed limacologists, and might possibly have been mistaken in their identification.

Now that the British and Scottish status of this unmistakable species is firmly and finally re-established, I trust that much progress will be made in working out its actual geographical range.

Since writing the above I have received specimens from two other counties.

I sent my friend Mr. W. Evans, F.R.S.E., an example

of *L. tenellus*, with a note on its habitat, whereupon, the same day (Sept. 3), he visited the Forest, Clackmannanshire, and succeeded in finding eight or nine during a short afternoon's search. The first example was under a rotten branch, and most were under chips of wood and pieces of bark lying on the ground in the fir wood, but one was on a fungus, a species of *Russula*. There were also found a similar number of *Arion subfuscus* and one *A. minimus*.

On September 8 I received a collection of various slugs from Mr. Charles M'Intosh, who had collected them on the 6th above Inver, Dunkeld, in the vice-county of Perth Mid, which included *Limax arborum*, *Agriolimax agrestis*, *L. maximus* var. *fasciata*, all the species of *Arion* except *A. minimus*, and—to my great gratification—a characteristic and unmistakable example of *L. tenellus* var. *cerea*. We are indebted to Mr. A. Rodgers of the Perthshire Natural History Museum for inducing Mr. M'Intosh to collect, and thereby leading to this find for a third locality and county.

This prompt confirmation of the original discovery is most satisfactory, and no doubt now we shall hear of numerous localities.

On September 24, after the above was in type, I received from Mr. George Sim of Aberdeen a mixed collection of slugs from Invercannie, near Banchory, Kincardineshire, taken on September 23, including eight species, one of which was *L. tenellus* var. *cerea*, a fine example. This adds a fresh locality and a fourth county to its authenticated range.

ON SOME NEW AND RARE SCOTTISH DIPTERA.

By PERCY H. GRIMSHAW, F.E.S.

I. ONCOMYIA SUNDEWALLI, *Ztt.* (*new to Britain*).—I have much pleasure in recording the capture of two specimens of this fine and very distinct species by my friend Mr. J. W. Bowhill on the North shore of Loch Feochan, near

Oban, on the 27th August this year. So far as I can ascertain this species has never before been recorded as a native of Britain, and I believe that the other two British members of the genus, viz. *O. atra*, Fab., and *O. pusilla*, Meig., are both rare. The present species may be easily recognised by the peculiar light ashy-gray colour of the abdomen, along which runs a broad, more or less interrupted dorsal blackish stripe which extends from the base to at least the apex of the fourth segment. While this stripe is somewhat shining, the rest of the abdomen (except the extreme tip and genitalia) is quite dull. These specimens measure $6\frac{1}{2}$ millimetres in length, a size which far exceeds that of either of the other species. The following additional characters may be useful: antennæ black, the second joint below and the basal half of the third joint reddish-yellow, front reddish-yellow in front, blackish-brown in the upper half, eye-margins and epistome silvery, ground-colour of the latter pale yellow; thorax blackish and somewhat shining, covered with a slight grayish tomentum which leaves three fairly distinct longitudinal lines; wings slightly tinged with brownish-yellow in the apical half, but with both the veins and cells decidedly yellow at the base; legs yellow with the upper sides of the front and middle femora, the tips of the hind femora, the apical halves of all the tibiæ, and all the tarsi black. Pubescence on frons, thorax, abdomen, and legs throughout fine and black. For further particulars see Zetterstedt, "Dipt. Scand." t. iii. p. 942, and Schiner, "Faun. Austr." t. i. p. 382.

2. *SYRPHUS NITENS*, Ztt. (*new to Scotland*).—On the 25th August, while collecting at Aberlady in company with Lieut. Col. Yerbury, I took a solitary female of this interesting species, which, according to Verrall's recent work on the *Syrphidæ*, has not previously been taken north of Barmouth in Wales and Sutton in Warwickshire. The characteristic features of this species, which much resembles *S. latifasciatus*, Mcq., are, as Verrall points out, (1) the peculiarly undulating abdominal bands, (2) the brilliant purple colour of the vertex, (3) the extension of this purple for a short distance down the middle of the frons, (4) the presence of isolated central black spots on the ventral surface of the second,

third, and fourth segments, and (5) the superior size, examples usually measuring about $10\frac{1}{2}$ millimetres.

3. *PACHYMERIA PALPARIS*, *Egg*.—Several specimens of both sexes were taken by Mr. Bowhill on the shores of Loch Feochan, near Oban, in August, and Mr. James Waterston has shown me a male taken by him at Prestwick in Ayrshire on 15th September. It has also been recorded from Rannoch and Braemar.

4. *PLATYPEZA INFUMATA*, *Hal. (new to Scotland)*.—A male of this rare species was taken by me at Aberdour on the 7th July. All previous records appear to be from the south of England and North Wales.

5. *SCATOPHAGA VILLIPES*, *Ztt.*—A male taken on the same day and in the same locality as the last. I have also recently examined specimens from Orkney and Shetland. Although the species is given in italics in Verrall's "List" it now appears to be an undoubted member of the British fauna. The colour of the legs is somewhat variable, but the species may be easily recognised by its long and fine pubescence.

6. *DOLICHOPUS PLANITARSIS*, *Flu.*—Mr. James Waterston took seven or eight specimens of this very rare species at Cowdenbeath, Fife, on 11th June.

IMPORTANT PROSECUTION UNDER THE WILD BIRDS' PROTECTION ACTS.

IN Lerwick Sheriff Court on 23rd July Sheriff Moffat had before him the adjourned case in which the Rev. Albert Ernest Sorby, Darfield Rectory, Yorkshire, was charged with contravening the Wild Birds' Protection (County of Zetland) Order, 1902, section 2, by having on the 6th June last, at Burrafirth Voe, Unst, taken two eggs of the Great Skua, and also on 12th June, at the Neeps of Graveland, Yell, taken a Sea Eagle's egg; whereby he was liable to forfeit and pay a sum not exceeding £1 for each egg. Accused again failed to appear, and evidence was led in absence by the Procurator Fiscal (Mr. J. K. Galloway).

The Sheriff said he was satisfied with the evidence, and found the accused guilty of both charges, and Mr. Galloway asked that the eggs should be forfeited under the Wild Birds' Protection Act, 1902. Continuing, the Sheriff said it was a pity that a person in the position of the respondent, a clergyman, should be cited to answer for having broken the statute law. He had not thought fit to come here to explain the circumstances, and must assume the full guilt—that the contravention of the statute was committed wilfully and with the full knowledge of what he was doing. It was absolutely necessary that the law in this respect should be maintained. It would be exceedingly unfortunate if the curiosity or cupidity of any individual should bring about the extinction of the rare species of wild birds that existed in this county, some of them building here alone. He trusted that every endeavour would be made by the officers of the law, and all others interested in the preservation of the rarer species of wild birds, to assist in the detection and in the prosecution of parties who wilfully and deliberately broke the law. He sentenced the accused to pay a fine of £3, being the full penalty of £1 for each egg, for payment of which in the circumstances he would allow a period of fourteen days after due intimation had been given, and in default of payment to be imprisoned for the period of one month. The Sheriff also ordered the eggs to be forfeited and handed over to the Professor of Zoology in the University of Edinburgh, to be disposed of as he thought meet in the interests of science.

CONTRIBUTIONS TOWARD A FLORA OF CAITHNESS. NO. IV.

By ARTHUR BENNETT, F.L.S.¹

IN Mr. Grant's (and my own) communication we had to content ourselves with such records as "common, etc." In

¹ No. 1. "Scottish Naturalist" (with Mr. Grant), 1888, pp. 305-357; 1889, p. 97.

No. 2. "Ann. Scot. Nat. Hist.," 1892, p. 247.

No. 3. "Ann. Scot. Nat. Hist.," 'Plants of Stroma Isle,' 1900, p. 108.

this one I have endeavoured to give at least one locality to those species that we then did not localise ; besides adding many localities to the rarer species, and such new records as I have been able to accumulate since 1900 ; so that the future writer of a Flora of the County may have before him the material as it has been got together. No doubt there is material elsewhere, and I should feel much indebted to anyone for the slightest information respecting the Flora. It is probable there is information still to be gleaned from Robert Dick's herbarium ; and I had hoped some day to visit the county. Since Mr. Grant left Wick I have had no information as to the condition of Dick's herbarium. It would have been well if that collection had been sent to Edinburgh or London to be carefully examined, noted, and returned.

As the northern-most county of the mainland of Scotland the Flora of Caithness is especially interesting ; and when more complete it can then be compared with that of Shetland and Orkney, as well as of the Faroes.

I have also discussed as shortly as possible the claims of some species as Caithness plants ; no doubt, could we have the evidence obtained by Robert Dick from about 1836, we should be able to judge with some certainty the status of many species, but this was lost at his death. I have copied Mr. Watson's remarks on the marked catalogues sent him, as these may be of interest to Scottish botanists to show how he worked.

1. List of plants observed in driving from Thurso to Sandside Bay, Caithness, July 1831.¹ Mr. Watson's, MS., No. 40 at Kew.
2. Dr. R. Brown, Campster. London Catalogue, ed. 6, checked for plants seen in the county of Caithness, partly by himself, partly by the late Mr. R. Dick, with some additions subsequently (1872) made to the original list drawn up in 1861-2, by Mr. C. W. Peach (No. 161).
3. Mr. J. Grant, Wick. London Catalogue, ed. 7, marked for Caithness, 1880 (No. 162).

¹ "Journal of Botany," *et seq.*, p. 343, 1883.

4. Mr. M. D. Nicolson, Wick. London Catalogue, ed. 7, checked for plants seen in Caithness, with additions on faith of specimens in the herbarium of the late Robert Dick (No. 160).
5. *Hierochloe borealis*, R. et S. in Scotland.
Arthur Bennett, "Ann. Scot. Nat. Hist.," 230-5, 1899; "Journal of Botany," 328, 1899; J. Britten, "Journal of Botany," 488, 1899.
6. Rev. E. S. Marshall, "Journal of Botany," 266-275, 1901.
7. Mr. G. C. Druce, "Ann. Scot. Nat. Hist.," 168-173, 1904.
8. Mr. J. Grant, "Ann. Scot. Nat. Hist.," 179, 1904.

I am indebted for information, specimens, etc., respecting the Flora, to Miss Alice Geldart, Miss Grant, Mr. Nicolson of Wick (whose daughter, Miss J. Nicolson, kindly copied her father's catalogue), Rev. E. S. Marshall, Dr. Shoolbred, Mr. R. Lindsay, Rev. D. Lillie, Mr. G. C. Druce, Mr. D. Doull, Mr. A. Sutherland, Mr. J. Anderson.

THALICTRUM MAJUS, *Crantz*.—At Reay (besides the two forms of *T. dunense*, Dum.) there occurs rarely a plant that seems referable to the above species. Cultivated specimens from Mr. F. J. Hanbury's garden have become more like the plant of Crantz than the wild ones. In its long pedicels, large leaves without (or almost) any glands, it seems distinct.

T. FLAVUM, *L.*—Mr. Nicolson retains this in his "Catalogue of Caithness Plants" (1904). Mr. H. C. Watson in his "Geogr. Distrib. of Brit. Plants," 1843, p. 49, remarks, "Sandside, Caithness, Mr. Torrie in Watson's 'Outlines.' It is exceedingly likely that *T. minus* was the species seen by Mr. Torrie in this latter locality, as it certainly grows there." In "Top. Bot.," he says, "109, Caithness, a misnomer of *T. maritimum*," 4, 1883.

Yet *T. flavum* occurs in Sweden up to Nordland, in Lapland, N. and S. Norway (Finmark up to $70^{\circ} 3'$, *extremum terminium polareum specei hetenus cognitum*¹), Finland up to $67^{\circ} 30'$.²

It certainly occurs but sparsely in Scotland (native up to

¹ Norman, "Norges Arkt. Flora," 35, 1895.

² Wainio, "La. Fl. Lap. Finland," 60, 1891.

Argyle and Clyde Isles), but Mr. Watt tells me it is doubtfully native in Dumbarton.

RANUNCULUS TRICHOPHYLLUS, *Chaix.*, three miles from Wick in old quarries, J. Grant.

R. LINGUA, *L.*—Between Thurso and Reay, Mr. R. Lindsay, *ex. Druce, l.c.*

This has been reported from the Orkneys, and certainly occurs in E. Ross (Marshall, *sp.*). It is reported from W. Ross (R. M'Kay) and Davidson; "Scot. Nat.," 74, 1873. It is not a species of the extreme north, but extends up to 66° N. lat.

R. FLAMMULA, *L., f. MINIMA, mihi.*—In 1894 Dr. Shoolbred gathered in the Outer Hebrides a small (1½ to 4 inches high) form of this species, with the internodes very short, the lamina of the leaves much shorter in proportion to the stalk, the flowers small, and the achenes more strongly granulated with their margins more prominent. In 1897 the Rev. E. S. Marshall gathered on "grassy ground, top of Holborn Head," a somewhat similar plant, but less marked, especially the achenes. In 1903 Mr. W. Phillips sent from "Cliffs at Kiltree, Co. Clare, Ireland," a like form; and although the achenes are not ripe, they show that they would closely approach those of the Hebridian form. Mr. Phillips remarks "It is certainly a very distinct looking plant when growing, with its glaucous leaves, its almost prostrate habit, and stiff or rigid appearance. It is very abundant, almost replacing the grass in some parts near Kiltree." Contrasted with specimens of the type growing among *Carex kattegatensis* on the Wick river, the difference is very great. The achenes did not vegetate with me, as I had hoped they would, to have seen if the form would retain its character. Dr. Shoolbred remarks, "When I first saw it amongst the turf it looked most peculiar, and I hoped might be a *n. sp.*, but on tracing it further as I got to damper ground the specimens became larger, though none, even in quite moist ground, were like any ordinary form of *Flammula*," 26/10/1894.

R. ACRIS, *L., var. RECTUS, Boreau, sub. var. PUMILUS, Rouy, and Foucaud.*—Sandhills, Freswick Links, 1887, J. Grant, *sp.*

TROLLIUS EUROPÆUS, *L.*—Watten, Mr. A. Sutherland, *sp.*

ANEMONE NEMOROSA, *L.*—Caithness, Mr. Nicolson's Cat., 1904.

[*A. Pulsatilla* is marked by Mr. Nicolson, no doubt inadvertently. It certainly grows in Sweden up to the province of Nerike, but not in boreal Sweden.]

†ACONITUM NAPELLUS, *L.*—"Top. Bot." ed. i. 2.

- DRABA INCANA, *L., f. PROTRACTA, Norman*, "Fl. Arct. Norveg." 13, 1893.—Rocky ledges near the sea, Latheron, J. Grant, *sp.* Specimens from the Yarrow Hills (J. Grant) may also belong here, but are too young for certainty. Some of the lower pedicels on the Latheron examples are 1 inch long.
- SISYMBRIUM THALIANUM, *J. Gay, f. CILIATA*.—Wall top near Thurso, E. S. Marshall, *sp.* Type abundant on rocks near Forss Bridge, E. S. Marshall.
- CARDAMINE IMPATIENS, *L., R. Brown* in "Trans. Ed. Bot. Soc.," 329.—Very uncertain as a Scotch species.
- BARBAREA ARCUATA, *Reich.*—"Frequent, and I believe native, by the Wick River, two to five miles above the town," E. S. Marshall, *sp.* Agrees well with German specimens from Prof. Hauseknecht.
- EROPHILA PRÆCOX, *DC.*—Frequent at Dunnet Links, and on the grassy cliffs hard by, E. S. Marshall.
- ARABIS RETZIANA, *Beurling*, "Pl. vasc. Scand. nempe Suec. et Nor.," 4, 1859.—Dorrery hills at 500 feet, Dr. Davidson, *sp.* Looks very different in habit from the plant of the southern chalk downs.
- VIOLA RIVINIANA, *Reichb.*—Near Forss Bridge, E. S. Marshall.
- V. SYLVESTRIS, *Reichb.*—Bank near Bilbster Station, and among heather in the neighbourhood, E. S. Marshall.
- V. CURTISH, *Forst., var. MACKAIL*, "Lond. Cat.," 1867.—Links of Greenland, Dr. Shoolbred, *sp.* Between Achergill and Wester Water, J. Grant, *sp.*
- LYCHNIS FLOS-CUCULI, *L.*—Wick river by Milton, J. Grant, *sp.*
- SILENE CUCUBALUS, *Wibel.*—Watten, A. Sutherland.
- CERASTIUM TETRANDRUM, *Curtis.*—Reay, Thurso, Druce!. South Head, Wick, Grant, *sp.*
- ARENARIA PEPLOIDES, *L.*—Sandside Bay, Reay, Dr. Shoolbred.
- SAGINA APETALA, *L.*—Reay Links, W. F. Miller!.
- S. MARITIMA, *Don.*—Reay Links, Miller, *sp.* North Battery, Wick, J. Grant, *sp.*
- S. NODOSA, *Fenzl.*—Reay Links, bank of Isauld Burn, W. F. Miller.
- BUDA RUBRA, *Dum. (Spergularia rubra, Fenzl.)*.—By the railway at Geogemas, Druce, *l.c.*
- GERANIUM PRATENSE, *L.*—Mr. Nicolson marks this. It was gathered in E. Ross by Mr. Marshall in 1891, and in E. Inverness by Mr. Druce in 1888. It grows in Sweden, north

to Gefleborgs län (62° N. lat.) (but is wanting from all Nordland), and also in N. and S. Norway, and in Finland to Kola in about 69° N. lat.

- MALVA MOSCHATA, *L.*—This occurs sporadically in E. and W. Sutherland, but see Trail, "Ann. Scot. Nat. Hist.," 103, 1898, as to the status of the order in Scotland as a whole.
- CYTISUS SCOPARIUS, *Link.*—Near Thurso on the road to Reay, W. F. Miller.
- ANTHYLLIS VULNERARIA, *L.* (var. *rubriflora*, Koch = *A. Dillenii*, Schultz?).—Holborn Head, Druce. The Caithness plant seems better placed under var. *polyphylla*, DC., or var. *ochroleuca*, Fr.
- VICIA SEPIUM, *L.*—John o' Groats, Miss Geldart. Reay Bay, bank above Wick River, Dr. Shoolbred.
- V. CRACCA, *L.*, *f. humilis*, Neumann ("Bot. Not." 16, 1887).—Top of cliffs by the sea, Freswick Head, J. Grant, a very condensed form, "6-10 cm. long."
- V. OROBUS, *DC.?*—Mr. Nicolson's Cat., 1904. It certainly grows in Westernness, Co. 97, Macvicar, *sp.* Dr. Roy was shown it when in Sutherland, gathered in W. Sutherland by a lady ("Scot. Nat." 333, 1886). A species of limited distribution in Europe, wanting in the whole of Sweden. In addition to the counties in "Top. Bot." ed. 2, I have records from three English and eight Scottish counties. It does not seem to ascend to any high altitude, 700 ft., "Fl. Perth," 800 ft. "Fl. Dumfries," 1310 ft. in Hereford. "On Baikavel in Rum," Lightfoot, this is 1924 ft. high, but the altitude at which it occurred is not given.
- SPIRÆA FILIPENDULA, *L.*—Holman Head, J. Grant, has been doubted, I see, but it occurs in Lapland and S. Norway, in Finland at Aboë, and in the Aland Isles, and is one of those dry ground plants so difficult to grow if transplanted.
- RUBUS SAXATILIS, *L.*—Dr. Trail, "Ann. Scot. Nat. Hist.," 46, 1903, gives this only on the authority of R. Brown's Cat. in "Top. Bot." I have specimens from Resgill Burn (J. Grant) and Dick found it at Dirlot. It also occurs at Altnabrae on the Thurso River.
- ROSA MICRANTHA, *Sm.*—On the Thurso River, R. Dick.
- ALCHEMILLA ARVENSIS, *Lam.*—Yarehouse, cornfields at Wick, J. Grant, *sp.*
- A. ALPINA, *L.*—At 1000 ft. on Morven, also on the summit, R. Dick.
- A. VULGARIS, *L.* var. ALPESTRIS (*Schmidt.*).—Wick River, Thurso River, together with the type.—A. PRATENSIS, *Schmidt.*

- AGRIMONIA EUPATORIA, *L.*—In turf, Macdonald Square, Thurso, W. F. Miller.
- POTENTILLA COMARUM, *Nestl.*—Junction of the Milton Burn and Wick River, J. Grant.
- EPILOBIUM ANGUSTIFOLIUM, *L.*—Reay Hills, R. Dick, "Persian Willow."
- E. HIRSUTUM, *L.*—R. Brown's Cat. to H. C. Watson.
- RIBES ALPINIUM, *L.*—Thurso near the river, W. W. Reeves, *sp.*
- SEDUM RHODIOLA, *DC.*—Holborn Head, Messrs Reeves and Ward.
- [S. ANGLICUM, *L.*?—I can give no authority for this; it occurs plentifully by the sea cliffs in Sutherland (E. and W.), also in Outer Hebrides (Gibson, *sp.*!), Shetland, and W. Ross (Druce). In Sweden in Bohuslän only, in S. Norway, and very rare in N. Norway. It will be better to expunge it until confirmed.]
- SAXIFRAGA OPOSITIFOLIA, *L.*—R. Brown and R. Dick, Cat. to H. C. Watson. This occurs in St. Kilda (Barrington) and Outer Hebrides (Duncan, *sp.*). As this occurs at coast level in Cantire (A. Somerville, *sp.*) and W. Sutherland, it is probably correct.¹ It grows also in Shetland (Beeby, *sp.*).
- S. AIZOIDES, *L.*—R. Dick, J. Grant's Cat. to H. C. Watson. Grows in E. and W. Sutherland and in Orkney, and is probably correct. Common in Lapland and Norway, but is rare in Sweden, closely paralleled by *S. stellaris* in its distribution.
- S. TRIDACTYLITES, *L.*—Dunnet Links, E. S. Marshall, Robert Dick said "might be had by millions." This was doubted at Edinburgh in 1860, a Botanical Journal gravely suggested it only occurred on walls. In Suffolk I have seen it on the "Brecklands" carpeting the ground, and forming a mass of faint pink colour by its abundance.
- APIUM INUNDATUM, *Reichb. f.*—By the Thurso River, J. Grant.
- CONIUM MACULATUM, *L.*—Roadsides near Thurso, "Scott. Alp. Club Rep."
- SANICULA EUROPÆA, *L.*—Reay hills, Dirlot, R. Dick.
- ANGELICA SYLVESTRIS, *L.*—A stunted form on cliffs between Thurso and Reay, W. F. Miller.
- LIGUSTICUM SCOTICUM, *L.*—Dunnet Links, Dr. Shoolbred, cliffs by Dunnet Hill, W. F. Miller.
- SCANDIX PECTEN-VENERIS, *L.*—Oatfield between Thurso and Castleton, Shoolbred, *sp.*
- DAUCUS CAROTA, *L.*—Caithness, Mr. A. Sutherland, *sp.*, 1904.†
- GALIUM PALUSTRE, *L.*—Near Wick, Dr. Shoolbred.

¹ [And on rocks at Aberdour on the S. coast of the Moray Firth.—J. W. H. T.]

- G. ULIGINOSUM, *L.*—Opposite Milton Farm on Wick River, J. Grant.
- G. VERUM, *L.*—Wick, J. Grant.
- ASPERULA ODORATA, *L.*—Reay Hills, R. Dick.
- † VALERIANA PYRENAICA, *L.*—Nicolson's Cat., 1904. From a garden?
- V. DIOICA, *L.*—R. Brown, *l.c.*, 329. Seen in W. Sutherland by the "Scot. Alp. Club" in 1888, in Stirling (Somerville, *sp.*) and Fife.
- VALERIANELLA OLITORIA, *Poll.*—Field in Reay, W. F. Miller, *sp.*
- SAUSSUREA ALPINA, *DC.* var. MACROPHYLLA, G. et G. (*sp.*) non Sauter!—I have specimens of this gathered by W. G. Horn, Mr. Grant, and Mr. W. W. Reeves. There is nothing that exactly matches these specimens either at British Museum or at Kew. I do not find it given as a plant of sea-cliffs in any British Flora. Is it known on sea cliffs in any other part of Scotland? In Arctic Norway¹ it grows on the island of Landegode, on sandbanks with *Astragalus alpinus*, *Gentiana campestris*, and *Pimpinella Saxifraga*, and on many other islands on the coast, as Hestmandöen, etc., and is in flower from July 14 to September 20.
- LEONTODON AUTUMNALIS, *L.*, var. SORDIDA, *Bab.*—Wick, Dr. Shoolbred.
- TRAGOPOGON PRATENSE, *L.*, var. MINUS (*Mill.*)—Sandhills, Reay, W. F. Miller; Mr. Nicolson marks the type as the Caithness plant, but Mr. Miller says he believes the Reay plant is var. *minus*. Melvich (Sutherland) specimens are of that variety.
- SENECIO AQUATICUS, *Huds.*—Wick River, J. Grant.
- GNAPHALIUM SYLVATICUM, *L.*—Near Wick, Dr. Shoolbred!
- ARTEMISIA VULGARIS, *L.*—Dunnet to Brough, "Scot. Alp. Club," 1889.
- A. ABSINTHIUM, *L.*—R. Dick in Watson's MS. An alien in Orkney and Shetland, E. Ross (Druce).
- MATRICARIA INODORA, *L.*, var. SALINA, *Bab.*—Cliffs west of Forss Water, Reeves and Ward.
- M. MARITIMA, *L.*—Coast at Scrabster, E. S. Marshall, *sp.* Mr. Nicolson considers that all forms between the *M. inodora* and *M. maritima* can be traced on the Caithness sandy links; but the query is, is he dealing with the true *maritima*?
- † CNICUS ARVENSIS, *Hoffm.*, var. SETOSUS (*Bieb.*)—Nicolson's Cat., 1904.

¹ Norman, "Norges Arktiske Fl." 1, 632, 1894.

SONCHUS ARVENSIS, *L.*—Rocky ledges of Dunnet Bay, W. F. Miller !
[CREPIS NICÆENSIS, *Bolb.*—Railway bank. An introduced species
with seed ?]

HIERACIUM IRICUM, *Fr.*—Scrabster, Dunnet Head, W. F. Miller !

H. SAXIFRAGUM, *Fr.*, BOREADES, *Zahn.*—Berriedale, Linton.

H. ORARIUM, *Lindb.*, var. FULVUM, *F. J. Hanb.*—Thurso River, E. S. Marshall.

H. FARRENSE, *F. J. Hanb.*—Steep grassy slope west of river above
Thurso, top of sea cliffs, Thurso Bay, Dr. Shoolbred.

H. AURATUM, *Fr.*—With the last.

H. RUBICUNDUM, *F. J. Hanb.*, β . BOSWELLI, *F. J. H.*—“Caithness.”

H. SCOTICUM, *F. J. Hanb.*—Sandside and Isauld Burns, W. F. Miller.

H. PROXIMUM, *F. J. Hanb.*—Reay Links, Hanbury, *sp.*, 1885 ;
Thurso River, Hanbury ; between Thurso and Scrabster, E. S. Marshall, 1897.

H. MURORUM, var. CAMPTOPETALUM, *F. J. Hanb.*—Caithness.

H. STRICTUM, *Fr.*, var. RETICULATUM, *Lindb.*—Reay Sandhills, F. J. Hanbury, *sp.*

H. UMBELLATUM, *L.*—Isauld Burn and Reay, W. F. Miller. There
was some doubt about the Scouthall wood “*umbellatum*” of
Dr. Davidson.

PYROLA ROTUNDIFOLIA, *L.*—On the old road to the Ord of Caithness,
E. Sutherland, 10/7/1894 ; on the shore, Mrs. Wahab,
sp. Within a mile (?) of the Caithness border, as from the
description given me by Mr. Kidston it must have been
gathered somewhere between the Ord Point and Navidale
House ; and the plant may be found on the Caithness side.
The specimen is certainly the usual plant and not the var.
arenaria, Koch. (*P. maritima*, Kenyon). It occurs in Orkney.
Of the British species of *Pyrola*, this and *P. minor* extend up
to 71° 40' in Europe (Norman), while in America it grows at
Franz Joseph Fjord in 73° N. lat. (Copeland and Panch, *ex*
Lange). In N. America it is a plant of “dry woods,” and its
place is taken in bogs by *P. uliginosa*, Torrey ; while in
England our plant grows among *Cladium*, *Lastrea cristata*,
etc., and in wet seasons is difficult of access.¹

VACCINIUM VITIS-IDÆA, *L.*—Dunnet. “Scot. Alp. Club.”

V. MYRTILLUS, *L.*—With the last. This is known as the Blaeberry
generally in Scotland, and Dr. Prior seems to have been in

¹ See *P. rotundifolia* in E. Anglia. “Trans. Norf. and Norwich Nat. Soc.”
vol. vii. 512 (1902-3).

error in making it the name of *V. uliginosum*, L. All over the south of England *V. Myrtillus* is known as the Whortleberry, changed by local pronunciation to "Hurtleberry," and the fruit is known as Worts, and largely collected. Other names given to it in various parts of England are—Wimberry, Black-worts, Bilberry, "Blegs" in W. York (Lees's "Fl. W. Yorkshire").

V. INTERMEDIUM, *Ruthe* (= *V. Myrtillus* × *V. Vitis-idea*, L.).—
"Among heather," A. Sutherland; see *l.c.* p. 249.

LOBELIA DORTMANNA, *L.*—Loch Calam, Henderson.

FRAXINUS EXCELSIOR, *L.*—Mr. W. N. Niven¹ considers that the finding of the Ash in Post Glacial Deposits at the Bay of Keiss ("New Statistical Acc." vol. xv. 129, 1845) must be held to prove that the tree was indigenous to Caithness. Dr. Trail remarks, "Nativity scarcely to be determined."² Mr. H. C. Watson says, "Although the tree grows well even in the north of Sutherland I did not observe it either in that county or Caithness, except in spots where it appeared to have been planted."³

ARMERIA PUBESCENS, *Link.*—Dunnet, E. S. Marshall, *sp.*

PRIMULA VERIS, *L.*—Dunnet, "Scot. Alp. Club."

P. SCOTICA, *Hook.*—East Coast. "Fl. Scot." N. Coast, H. C. Watson. The Burgh near Wick, J. Grant; Links of Greenland, Dr. Shoolbred. "Found by Mr. Gibb of Inverness on Holborn Head, near Thurso in Caithness." Hooker in Curtis's "Fl. Lond.," 133, 1819. From a note in the "Journal of Botany," 136, 1899, it would seem that a Mr. J. Dunlop of Dunlop House (Ayrshire) found it about 1812. For interesting remarks on this species see "Exchange Club Rep." 34, 1880, and 155, 1886; "Science Gossip," pp. 20, 43, 66, 1881; "Journal of Botany," p. 24, 1881. Flowering season from middle of April to middle of September, D. Nicolson. Occurs at E. Watten and Scottach, near Watten (A. Sutherland, *sp.*), 5 miles from the sea.

TRIENTALIS EUROPÆA, *L.*—Among grass near John o' Groat's House, and thence to Duncansby Head, J. Grant.

ANAGALLIS TENELLA, *L.*—St. John's Loch at Dunnet. "Scot. Alp. Club." Thurso River, Dunbeath Water, Reay, John o' Groat's, J. Grant.

¹ "Brit. Assoc. Report" for 1901, p. 840.

² "Ann. Scot. Nat. Hist." 233, 1898.

³ "Cybele Brit." ii. 165, 1849.

(To be continued.)

NOTES ON SCOTTISH HEPATICÆ.

By SYMERS M. MACVICAR.

IN the 'Census of Scottish Hepaticæ' which appeared in the "Annals" for this year, p. 45, it was stated that notes would be given on the following species:—

Gymnomitrium adustum, Nees. I placed *Marsupella olivacea*, Spruce, as a variety of this species. In an exhaustive account of these minute plants in "Oester. Bot. Zeit.," Prof. Schiffner shows from an examination of Spruce's original specimen that the plant is undoubtedly a *Gymnomitrium*. In one of the plates are figures showing this. He examined many plants of the specimen which Spruce had isolated, and in no instance did he find a true perianth. In all the specimens from Scotland which I have examined, I have also found the plant to be a *Gymnomitrium*. There does not appear to be much difference between the two plants, but, for the present, I retain Spruce's as a variety.

Marsupella Sprucei (Limpr.) differs from *Mars. ustulata*, Spruce, in its larger leaf cells, bracts not cordate at base and with acute lobes.

Marsupella erythrorhiza (Limpr.). This is generally given as a variety or synonym of *Mars. sphacelata* (Gies.), but as they bear the same relation to each other as *Mars. emarginata* does to *Mars. aquatica*, I follow Schiffner in treating them as distinct species, though they are doubtless closely related. *Mars. sphacelata*, of which I have seen a Scottish specimen since the "Census" was published, is a larger plant than *M. erythrorhiza* and very flaccid, growing in large swelling tufts, in streams and wet places. It is an aquatic plant, and is typically of a dull green colour with the tips of the uppermost leaves brown. *Mars. erythrorhiza* occurs in places which are only moist, and is of a dark brown colour, and rather shining. Notes on the differences between the plants are given by Limpricht in Cohn's "Krypt. Flor. Schles.;" but too much weight must not be given to the purple colour of the rhizoids.

Marsupella Jörgensenii, Schffn., in 'Krit. Bemerk. ü. die eur. Leberm,' in "Lotos," 1901. This subalpine species does not appear to be very rare in Scotland. It occurs on moist stony ground in peaty places on the sides of hills. It is closely related to *Mars. erythrorhiza*, but has smaller leaf cells. The typical plant also differs in having the sterile stems equally leaved, not rapidly increasing in size towards the apex as in *M. erythrorhiza*; leaves broadly rotund-cordate, broadest below the middle, instead of ob-cordate and broadest above the middle as in that species.

Lophozia Wenzelii (Nees) is usually given specific rank, though considered by most botanists to be probably an aquatic form of the polymorphic *Loph. alpestris*. It differs from the latter chiefly in the leaves being broadest above, instead of below the middle. It is also more flaccid and usually lighter in colour. It has been found with us only by Mr. W. West on Ben Nevis at 3500 ft., and on Ben MacDhui. *Lophozia longidens* (Lindb.). This is probably a good species, though considered by some authors as a variety of *Loph. ventricosa*. It is readily distinguished from the latter by its reddish gemmæ and deeper sinus of the leaves with long narrow lobes. The squarrose habit and the thin-walled leaf cells also assist in identifying it. A full description is given in Lindb. and Arnell's "Musc. Asiæ Bor.," p. 50.

Plagiochila exigua, Tayl. I have given this in the "Census" as being the same species as *Plag. tridenticulata*, Tayl. It is in my opinion only a state of the latter due to being in a very moist and shady position. I have gathered plants on the west coast of Scotland with stems having all the described characters of *P. exigua*, in size, texture, and shape of leaf, long subulate persistent stipules; and such stems I have been able to trace to their junction with stems of undoubted *P. tridenticulata*, with the characteristic male inflorescence. Herr Kaalaas, to whom I sent specimens, is inclined to think that this view of the two plants is correct. He adds, "I also consider the fact that trifid leaves sometimes occur in specimens of *P. exigua*. This is at all events the case in the specimens which the Rev. Mr. Binstead

gathered at Adrigole in Ireland, and which Mr. Pearson has declared to belong to true *P. exigua*. The specimens of this species which I have gathered in Dirdal near Stavanger show, in general, bifid leaves, but occasionally one or other which is trifid occurs. With regard to the size, my plant is quite like *P. exigua*, but in the shape and in the deeper sinus of the leaves it bears rather more likeness to *P. tridenticulata*. Stipules are present, but sparingly. It occurred on a very shaded and wet side of rock." I have examined an original specimen of *P. exigua* gathered by Taylor at Cromaglow; and it is, I consider, only a wet-ground form of *P. tridenticulata*, and it is certainly not specifically distinct from it. The two plants are stated as frequently growing together; and if my view of their relation be correct, this is of course to be expected. I carefully examined Taylor's specimen for such mixture, but failed to find any other species. In the "Census" I gave *P. tridenticulata* as a synonym, having taken Taylor as the author of the species; but on re-examination of Hooker's description and figure of his *Jung. spinulosa* var. *tridenticulata*, I have little doubt that Hooker intended the same plant. The enlarged figure (Fig. 10 of Plate XIV.), though not accurate, appears to me to represent the plant. It does not bear a resemblance to any form of our other species. Hooker's name has several years' priority over Taylor's. It is interesting to note that Stephani in "Species Hepaticarum" queries *P. exigua* as a synonym of *P. tridenticulata* (Hook.).

ALIEN PLANTS NEAR EDINBURGH.

By WILLIAM EVANS, F.R.S.E., and W. EDGAR EVANS.

REFERRING to our paper on Alien Plants found in the Edinburgh District, published in the July number of this magazine (pp. 174-179), we have to add to the list the following species, practically all gathered during the past three months. Where no year is mentioned, 1904 is implied. We have to thank Mr. Edmund Baker, of the British Museum, for kindly giving us his opinion regarding a few of the

specimens. As before, only species not in Mr. Fraser's list are here given.

Adonis aestivalis, L.—Leith Docks and Slateford dumping grounds, July, a few small flowering specimens; but without fruit the identification is not quite certain.

Delphinium orientale, J. Gay.—Leith Docks, August and September, several small plants.

Eschscholtzia californica, Cham.—Craigmillar Quarry, July 1902, several; Slateford, September, one.

Hypocoum grandiflorum, Benth.—Leith Docks, July, one plant.

Matthiola bicornis, DC.—Slateford, September, one.

Barbarea præcox, R.Br.—Leith Docks, July, a few.

Malcolmia maritima, R.Br.—Railway siding, Kingsknowe, July 1902, one plant.

Brassica Tournefortii, Gouan.—Slateford, July, one; September, a dozen.

Rapistrum orientale, DC.—Slateford, September, one.

Silene conoidea, L.—Slateford, July, not uncommon.

Hibiscus Trionum, L.—Leith Docks, September, a single plant.

Malva Ægyptia, L.—Slateford, September, three.

M. verticillata, L.—Slateford, July-September, a few.

M. nicænsis, All.—Leith Docks, July-September, a few; Slateford.

Tropæolum majus, L.—Mouth of Esk, September, two.

Erodium moschatum, L'H.—Dunbar, September, 1903 (from Mr. M'Taggart Cowan); Slateford, September, two.

Ononis alopecuroides, L.?—Leith Docks, September, one.

Trigonella corniculata, L.—Slateford, July, several.

T. aurantiaca, Boiss.—Slateford, September, two.

Medicago tornata, Willd.—Regarding the specimen entered in our former list as *M. striata*, Bast.?, Mr. E. Baker writes: "I think your plant must be *M. tornata*, Willd. = *M. obscura*, var. *tornata*, Urban." We may explain that the specimen with which we compared it in the Herbarium here was labelled *M. tornata*, Dec., the specific name being struck out and *striata*, Bast. written over it.

M. turbinata, Willd.—Regarding a specimen from Slateford, August 1903, submitted to Mr. Baker, he writes: "This matches a sheet in Herb. Mus. Brit. of *M. turbinata* from Linnæus' Hortus Cliffortianus, but for the satisfactory discrimination of this species from *M. tuberculata* ripe fruit is necessary." Leith Docks, September, one in fruit.

- M. truncatula*, Gaertn.—Leith Docks, September, one specimen of what seems to be this form.
- M. elegans*, Willd.—Slateford, September, two.
- M. minima*, Desr.—Mouth of Esk, September, one.
- Hymenocarpus circinata*, Sav.—Slateford, September, four.
- Melilotus arvensis*, Wallr.—Slateford, etc., September, fruiting plants.
- Trifolium maritimum*, Huds. ?—Leith Docks, September, one starved example.
- T. supinum*, Savi.—Slateford, July, one.
- T. clypeatum*, L.—Slateford, September, one.
- T. tomentosum*, L.—Slateford, July, common ; mouth of Esk, one.
- Securigera coronilla*, DC.—Leith Docks, September, one.
- Ornithopus compressus*, L.—Leith Docks, July, three ; Slateford, September, one.
- Coronilla scorpioides*, Koch.—Leith Docks, July, two ; Slateford, September, not scarce.
- Phaseolus vulgaris*, L.—Leith Docks, August, several in flower.
- Onobrychis Caput-galli*, Lam.—Leith Docks, July, one plant.
- Vicia Ervilia*, Willd.—Slateford and Leith Docks, plentiful, a few plants bearing fruit.
- V. villosa*, Roth.—Leith Docks, August, one large plant.
- V. monanthos*, Desf.—Leith Docks, July, a solitary example.
- Lathyrus odoratus*, L.—Railway embankment near Inveresk, July, one plant.
- L. angulatus*, L.—Specimens of a *Lathyrus* from Leith Docks and Slateford appear to be this species, though ripe fruit was not obtained.
- L. amœnus*, Frenzl.—Slateford and Leith Docks, July, not scarce.
- Enothera pumila*, L.—Leith Docks, September, one.
- Ammi Visnaga*, Lam.—Slateford, August 1903, one.
- Scandix iberica*, Bieb.—Slateford, July, plentiful ; Leith Docks, several plants.
- Heracleum giganteum*, Fisch.—Plentiful on banks of stream below Whittinghame.
- Caucalis leptophylla*, L.—Leith Docks, September, two.
- Cephalaria syriaca*, Schrad.—Leith Docks, two plants.
- Scabiosa prolifera*, L.—Slateford, July and September, two.
- Anacyclus clavatus*, Pers.—Slateford, September, a few.

- Anthemis altissima*, L.—Slateford, July, not scarce.
- Achillea Santolina*, L.—Slateford, September, two—not in flower.
- Matricaria Chamomilla*, L.—Leith Docks, a few plants.
- Artemisia biennis*, Willd.—Leith Docks, a single plant.
- Senecio Ægyptius*, L.—Leith Docks, July, a small patch of the form *triflorus* of this species.
- S. erucifolius*, L.—Charlestown, Fife, one or two plants.
- Calendula arvensis*, L.—Leith Docks, September, three.
- C. officinalis*, L.—Kingsknowe, one, 1902; Leith Docks, one, 1903; railway embankment near Dunbar, September 1904, a good-sized patch.
- Carbenia benedicta*, Adans.—Leith Docks, August, a single plant.
- Cnicus syriacus*, Roth.—Slateford, August, one plant.
- Cichorium divaricatum*, Willd.—Slateford, September, a few.
- Rhagadiolus edulis*, Gaertn. (= *stellatus*, Gaertn. ?).—Slateford, July, common; Leith Docks, September, a few.
- Specularia Speculum*, A.DC.—Leith Docks, July, a single plant. (I have a specimen which I got in a field near Penicuik in 1868.—W.E.)
- Vinca major*, L.—Near West Wemyss, Fife, August.
- Anchusa stylosa*, Bieb.—Slateford, July, two plants.
- Omphalodes linifolia*, Moench.—Slateford, July, one small plant.
- Atropa Belladonna*, L.—Stirling Castle, 1902, one or two plants (an old locality); Leith Docks, August, a young plant of what appears to be this species.
- Linaria chalepensis*, Mill.—Slateford, July and September, four.
- Calamintha graveolens*, Benth.—Slateford, July, a few.
- Salvia Horminum*, L.—Leith Docks, September, one.
- Wiedemannia orientalis*, F. & M.—Slateford, July, a few plants.
- Molluccella lævis*, L.—Slateford, September, one.
- Blitum virgatum*, L. (= *Chenopodium capitatum*, Aschers.).—Near St. David's, Fife, August, a few plants (a specimen from the same neighbourhood, in 1903, was given to us by Mr. M'Taggart Cowan); Leith Docks, September, two.
- Salsola soda*, L. ?—Leith Docks, September, two.
- Panicum Crus-galli*, L.—Leith Docks, September, one.
- Phleum tenue*, Schrad.—Leith Docks, July, one or two plants.
- P. asperum*, Jacq.—Leith Docks, July, one.

P. Boehmeri, Wibel.—Specimens of a *Phleum* gathered at Slateford and Leith Docks in July seem to be of this species.

Calamagrostis epigeios, Roth.—Charlestown, Fife, a large patch, 1902-3-4.

Wangenheimia disticha, Moench.—Mouth of the Esk, Musselburgh, June 29, a solitary specimen.

Sclerocloa dura, Beauv.—Leith Docks, July, a single plant.

Triticum (*Ægilops*) *ovatum*, Rasp.—Leith Docks, July, one plant.

AJUGA PYRAMIDALIS, L., AS A SCOTTISH SPECIES.

By ARTHUR BENNETT, F.L.S.

REPORTED many years ago as a Carnarvon plant,¹ its only certain English locality is on Hill Bell, Westmorland (a hill of 2474 feet elevation), where it occurs between 900 and 1800 feet. Mr. Backhouse, the finder, records it as occurring in plenty and in great beauty.

In Scotland its distribution is peculiar, and very difficult to understand. In Scandinavia, contrary to what occurs with us, *A. reptans*, L., is a rare species, occurring only in the southern provinces of Sweden, *i.e.* Skåne, Halland, Blekinge, and Smaland, and again in S. Norway, while *A. pyramidalis* occurs in every province from Skåne right up to Nordland, Lapland, N. and S. Norway and in five of the southern botanical provinces of Finland. In Norway it grows up to 3500 feet and 5000 feet. In Scotland the highest record I know of is in Dumfries at 1750 feet; but it may occur higher, as there are specimens in Herb. British Museum, "Hort. Croydon, D. Dickson,² root from Ben Nevis"; but I have been unable to find any reference as to its height on this mountain.

The first actual record with station of this species in Scotland seems to be in Hudson's "Flora Anglica," ed. 2, 249 (1778)—"Supra montem Ben Nevis in Scotia, D. Hope."

¹ Not named in Griffith's "Flora of Anglesey and Carnarvonshire," 1895.

² Dickson (1738-1822) had a garden at Broad Green, Croydon, in which he grew many native plants.

So far as I have seen specimens, it seems to be all of one form in Britain, but in Scandinavia it occurs as the var. *β glabrata*, Hartm, and a *f. rubra* of Svanlund.

The flowering stems are said to be erect in many books, but this is true only of the central one, the others (in varying numbers) are at first procumbent and then erect. Dr. Syme in "English Botany," ed. 3, remarks¹ that "in the living plants he has seen from Orkney the bracts are herbaceous." In specimens from the Thurso river, R. Lindsay, May 1904; they are richly coloured with purple, and much more regular and equidistant than the figure in "English Botany" would lead one to suppose. This makes the specimens very unlike *A. reptans*. The plant is as certainly perennial in some parts (Inverness and O. Hebrides) as it is biennial in others (Sutherland). Under the name of *A. genevensis*, L., specimens have been reported in Britain. Dr. Syme says that Sir J. D. Hooker sent Mr. Watson a specimen among plants collected in Lanarkshire, and that there is an example of it from Wales in Buddle's Herbarium. *A. reptans* with scarcely any or very short stolons has been reported as *A. alpina*, L. Bentham combines the two, but looking at *genevensis* in its usual form I do not think they are difficult to separate.

Taking the counties in their Watsonian sequence it occurs, or has done so in—

72. DUMFRIES.

On Black's Hope about 1250 feet, J. T. Johnstone, 1888.

96. EASTERNESS.

Strath-Erric, Dr. Maclachlan in "Brit. Flora," 273 (1830). I have seen no specimens thence, and do not know of any recent occurrence of it.

97. WESTERNESS? DR. HOPE.

The query may be removed, as Mr. S. M. Macvicar has found it and sent me a specimen from Dorlin, Moidart, Acharacle, altitude 10 feet. Ben Nevis, in Lochaber, Dr. Hope, "Flora Scotica," 179 (1821).

98. ARGYLE.

Appin, Capt. Carmichael in "Fl. Scotica," 179 (1821). So far

¹ Vol. vii. 79, 1867.

as I am aware, no one has found it there recently; but Mr. Ewing¹ cites Mr. King as authority for that county.

104. EBUDES, N. SKYE.

Macvicar, *spec.* "On one of the Cuchillin Mountains," ix. 7, 1895.

106. ROSS, EAST.

Upon Tor Aichaltie,² a hill near Brahan Castle. Mr. Gibbs *spec.* in Herb. Brit. Museum, July 7, 1805. It was gathered on Tor Aichaltie about 1868, by Mr. W. S. Duncan and a friend. In Anderson's "Guide to the Highlands" it was said to have disappeared from this locality. I have seen specimens gathered in E. Ross by Mr. Hanbury.

107. SUTHERLAND, E.

Banks of the Burn of Killigower (Culdgower, 3 miles from the Ord, below Helmsdale), between Kinbrace and Kildonan, J. Grant; Ben Griam More, E. S. Marshall, *spec.*

108. SUTHERLAND, W.

On the cliffs opposite Handa Island, W. F. Miller, *spec.*³ Near Scourie, on rocks by the roadside to Laxford Bridge, W. F. Miller.

109. CAITHNESS.

Near Dunnet, R. Hedde, *spec.* Thurso river, Johnstone, *spec.*, 1884; R. Dick, 1863. Near Thurso, W. I. Fortescue, *spec.*, 1890; R. Lindsay, *spec.*, 1904. Far up the Thurso river, R. Dick's herb. Banks of the Thurso river near Cruives, J. Grant; Berriedale, W. R. Linton, 1888. Ord of Caithness, Dr. Hope.

110. OUTER HEBRIDES.

Roddell in Harris, Balfour and Babington; Scarp, Duncan, *spec.* Harris, S.W. side of the hill of Mardal, at about 100 feet, among dry grass, etc. It also grows near where *Orobanche rubra*, Sm., occurs, *i.e.* "Head of the sand of Northtown, near Creag Canna." On the rocky banks of a rivulet, about a mile S. of Stornoway, in August 1825, Mr. R. B. Bowman,³ and in 1901 by Mr. W. J. Gibson.⁴

III. ORKNEY.

Naversdale in Mainland, and Berriedale in Hoy, Dr. Syme, *spec.* Sides of a hill on right hand from Berriedale to Rackwick in 1820,

¹ "The Glasgow Catalogue of Native Plants," p. 105, 1899.

² This is described as a "beautiful wooded hill overhanging Loch Aichiltie, in Urray parish."

³ "Trans. Bot. Soc. of Edinburgh," i. 137 (1844).

⁴ "Trans. N. H. Soc., Glasgow," 281 (1902).

Dr. A. R. Duguid; Rackwick, Mr. R. Heddle; Hill of Hoy, Dr. Syme, "Bot. Gazette," ii. 107, 1850.

Reported also from "Mountains of Aberdeenshire," Mr. David Don and from W. Ross in "Gairloch," 1886, by J. H. Dixon. It also occurs in Ireland in Co. Clare, and in the island of Inishmore. For remarks on its stations, altitude, etc., see N. Colgan, "Journal of Botany," 310, 1892; A. Bennett, "J. B.," 50, 1893; S. M. Macvicar, "J. B.," 252, 1895; and "Trans. Bot. Soc., Edinburgh," 183, 1899, "Cybele Hibernica," ed. 2, 296, 1898.

I have a specimen from Scarp, O. Hebrides, just coming into flower, May 13th. It may be interesting to quote Mr. Duncan's observations on the growth in Scarp. On taking up specimens in November he found a central plant, with smaller ones around it; on inspecting the roots of these he found they ended abruptly, the surface looking like a healed wound. "From this appearance I inferred that these small ones were shoots from an older one, and that therefore the plant is perennial." In cultivation the process seems to be in this way. When the plant has grown sufficiently large, it produces an erect flowering stem, which is in flower first. Then semi-procumbent flowering stems are produced all round (varying, however, in number), as these flower and produce fruit, on the under side of these short stolons are produced whose leaves lie flat on the ground. These grow on until the autumn, and in November (or even the next January) become detached as separate plants. When grown from seed the leaves lie flat on the ground when full grown, but before this they are half closed together, and the hairs intersecting, they look just like a trap. They flower the second year.

ZOOLOGICAL NOTES.

An imported Black Rat in "Dee."—Whilst unloading a cargo of African Esparto Grass off the railway trucks here, our men killed a Black Rat (*Mus rattus*). I saw it a few minutes afterwards, and sent it in to Mr. George Sim for identification, who said it was a three-quarter grown specimen. It has doubtless come from abroad, but all the same it is rather remarkable that it should have stuck to the grass and done a fifteen-mile journey by rail besides.—THOMAS TAIT, Inverurie.

Jays in Argyll—correction of an error.—Mr. Heatley Noble has called my attention to the fact that it was on my recommendation that he gave his note on "Jays in Argyllshire in the "Ann. Scot. Nat. Hist." April 1904, p. 125. I must assuredly take all

blame for the mistake, which I can only account for as an act of sheer forgetfulness, and I am even yet at a loss to know how I could have committed the error. However, I fully apologise to Mr. Noble for having so led him astray in the matter.—J. A. HARVIE BROWN.

Hawfinch at Peterhead.—A male Hawfinch (*Coccothraustes vulgaris*) was shot at Grange gardens about the 20th of July, and has been presented to the Peterhead Museum. It frequented the garden two days before being shot. I am not aware of the Hawfinch being previously taken at Peterhead.—WILLIAM SERLE, DUDDINGSTON.

Great Grey Shrike in "Forth."—I am able to record a specimen, a male, of the Great Grey Shrike (*Lanius excubitor*) shot in May 1904, and sent in the flesh for preservation to Mr. Crockart, Gunmaker, Stirling, on 12th May. It was sent from Devonshaw, near the Rumbling Bridge. I saw the specimen to-day—15th September 1904.—J. A. HARVIE-BROWN.

Wryneck (*Iynx torquilla*) in East Lothian.—On the 9th of May last a Wryneck was found dead on the railway immediately to the east of Dunbar and taken to Mr. D. Bruce, who kindly sent it on to me.—WILLIAM EVANS, Edinburgh.

Capercaillie in Peebles-shire.—The following facts regarding an occurrence of Capercaillie (*Tetrao urogallus*) in Peebles-shire may be of interest to you. I first heard of it from Mr. Watson of Culterallers, who said that David Jackson of Unthank had been land-steward at Netherurd at the time, and could speak to the facts. I wrote to Mr. Jackson, whose information I give below. He has since called here and confirmed his letters, and further says that the birds have now altogether disappeared.

I may say that for the last two years I have been trying to put down Capercaillie here, but without success. In 1902 they were hatched under domestic fowls, and all died. Last year they were set under gray hens, but all the nests were destroyed by vermin.

This year they were put under gray hens, but have not yet hatched. I have my doubts as to whether they will do in this part of the country, owing to the scarcity of wild berries. On the 4th June Mr. Jackson wrote me as follows:—

"In reply to yours of the 31st *re* Capercaillie at Netherurd, I first noticed a cock bird about twenty-five years ago, but the hen may have been there too, for a year or two later I came upon a nest, and since then they have nested in the Netherurd woods. When I left eight years ago there were two cocks and one hen, to my knowledge, and the latter was sitting on eggs when I left.—I am, yours respectfully, DAVID JACKSON."—HENRY B. MARSHALL, RACHAN, Broughton.

Marking Gannets at the Bass Rock.—During the first fortnight in August 1904 forty young Gannets and fifty-two old ones were ringed on the Bass Rock, at my request, by Mr. John Laidlaw, Principal of the new Bass Rock Lighthouse. The rings, which were buckled on to their legs with a small catch, are what are sold to poultry breeders as white metal pedigree-rings, and are stamped thus:—



It is hoped by means of this experiment (that is, if the Gannets do not pull the rings off) to obtain some items of information as to the winter wanderings of this species, and also to ascertain if the same individuals always keep to the same breeding stations.—J. H. GURNEY, Keswick Hall, Norwich.

Hobby at Kelso.—An adult male Hobby (*Falco subbuteo*) a species of rare occurrence in Scotland, was shot at Kelso on the evening of 29th June.—H. W. ROBINSON, Lancaster.

Albino Sea Eagle in Yell, Shetland.—For a number of years a couple of pairs of Sea Eagles (*Haliaetus albicilla*) have nested in Yell, but lately only one pair has done so. Some few years ago the nest was robbed of its two eggs, and the birds removed their “eyrie” and placed it in a cliff about 400 feet high, about midway in the cliff, evidently thinking it would be more difficult of access. Last year a “man with a gun” came upon the female while she was engaged feeding upon the carcass of a dead sheep, wounding the bird, which escaped, but which was afterwards found dead on a croft. The bird was got by a local taxidermist, who stuffed it. The male disappeared after the death of its mate, but returned in about 14 days with another much smaller than itself and an “Albino.” This year the nest was robbed, but the person who took the egg, was prosecuted and fined the maximum penalty, and the egg was ordered to be forfeited.

Every inducement is offered in the way of money for the “albino” dead, but a great interest in them is taken by the people in the vicinity who will not destroy the birds.—JOHN S. TULLOCH, Lerwick.

[Under the Wild Birds Protection Acts now in force in Shetland, the Sea Eagle is protected “throughout the whole year,” and it is to be hoped that if the bird is shot, or otherwise captured, the offender or offenders will be fined and the bird confiscated.—EDS.].

The breeding of Woodcocks in 1902 and 1904.—The following remarks were written on 8th August 1904, and I shall be curious to know what may follow at later dates, after the shooting season opens. I have already spoken of this in a prior note (“Annals,” 1904,

p. 190). What I now have to record is merely confirmatory evidence. On the estates of Touch and Upper Polmaise, Stirlingshire, the keepers say that never in their experiences have they known of so many Woodcocks nesting in the covers as in the middle of May 1904. When searching for wild Pheasants' eggs, it was no uncommon thing to find from ten to twenty Woodcocks' nests with eggs in one day, and *often* Woodcocks' eggs were found laid in Pheasants' nests! These layings were nearly one month late of hatching off, *i.e.*, instead of hatching off by the 20th-25th April, eggs were found unhatched as late as the 15th May. And, where the usual favourite covers were so congested, the flat mosses—grouse-ground in the lower open "kerse-lands"—showed up many young birds. The keepers believe that, "If these coverts were shot now (say 8th August, 1904) 50 couple might be killed in a day." As we know the same thing happened in May 1902. Woodcocks were "crushed down" and Snipe also. That was in my opinion clearly to be accounted for, by the destruction of *first* layings of eggs (or young?) further north in Scotland. That destruction was brought about by *one night's severe frost* (17 degrees) on the 3rd May 1902. The Snipes' young in the open and exposed situations were all killed, but the Woodcocks had their nests and eggs better sheltered from the north-east winds which succeeded that awful night's frost, and the eggs were successfully hatched and the young reared. I repeat these facts for comparison with what took place *this year, 1904.*

The same things happened in May 1904; but with this difference that there was no severe frost to decimate the young Snipe, though the north-east winds howled, and snow blizzards were frequent from the 5th May 1904 onward to the close of the month, throughout the northern counties of Scotland.

I will only add, that I believe that abnormal seasons and circumstances, reversing the usual order of things either locally or more generally, teach the field observer many times more than a long series of normal conditions can do. And, if meteorologists could combine with their normal series of observations the parallel phenomena which accompany the changes, a better appreciation of nature might be attained to.—J. A. HARVIE-BROWN.

Woodcock and Snipe in Dumfriesshire.—Woodcocks (*Scolopax rusticola*) now nest here regularly. I remember ten years ago shooting a Woodcock on the 12th August, and it was thought a great curiosity. Last year I was told that while driving Grouse in Kirkcudbright one or two Woodcocks had been shot. This year while out shooting no less than thirteen different Woodcocks have been seen between 12th and 22nd August; of these twelve were shot. These twelve included both young and old birds, and would seem to prove that in this part of Dumfriesshire the Woodcock is

breeding extensively. All the Woodcocks were taking cover in thick bracken, on the moors.

We have seen Woodcocks here in every month of the year, but have never in August seen the amount we have seen this year. As regards Snipe (*Gallinago caelestis*), these birds are more than usually plentiful in this locality. I should say they are nearly three to one more numerous than I have ever seen before.—HUGH S. GLADSTONE, Thornhill.

Killdeer Plover at Peterhead in 1867.—While overhauling the bird collections in the University Museum, Aberdeen, in July last, I discovered a specimen of the Killdeer Plover (*Aegialitis vocifera*). It is apparently an adult, though not in absolutely perfect plumage,—of course it is now much soiled with age and dust,—but apart from this it is not a clearly marked specimen. It bore a label, old and yellow, which ran as follows:—"Charadrius hiaticula, Ringed Dotterel, shot at Peterhead, by Andrew Murray, jun., Esq., 1867." You will notice that the month in which the bird was killed is not stated. Since no one at the time ever had any suspicions that this bird was anything other than what it seemed I don't think there can be any question as to its genuineness. This therefore now ranks as the *first* British killed specimen.

Professor J. Arthur Thomson, to make sure, very kindly interviewed Mr. Andrew Murray for me. He, as one would have expected, had no recollection of shooting this particular bird, but said that at that time he did a good lot of shore shooting, and presented several small waders and other birds to the Museum. This was apparently one of them.—W. P. PYCRAFT, South Kensington.

Whimbrels in "Forth."—An old bird (male), Denny Hills, 10th September 1904. The only one seen on that day. Wind north-north-west. Bird flying south-west or thereby when shot.

Whimbrels usually migrate by this route in autumn from 17th to 22nd August (or thereby),—these are young birds in flocks, tame and fly low, and do not often pitch on the moor,—then there is a short pause.

Old birds follow singly, or in at most companies of two or three together. These fly higher, often pitch on the moors, and remain a day or two, they are much wilder and not so easily "called."

The bulk of migration *here* is over by the first week in September, and this specimen is a *late one*.

This specimen has been sent to the Edinburgh Museum of Science and Art in the flesh, same day as shot, as the Museum desired specimens.—J. A. HARVIE-BROWN.

Late appearance of the Iceland Gull on the coast of Mull.—An immature Iceland Gull (*Larus leucopterus*) was observed by me

on 17th May. This is the latest date I have hitherto recorded for the occurrence of this bird on the Mull coast. Being belated, it only remained for one day. This year's bird and the one of last year (30th April-2nd May), had clearly wintered further south, and their appearance was synchronous with an influx of Lesser Black-backed Gulls (*Larus fuscus*). A peculiarity in the bird of this year was that the feathers were puffed out in a wonderful manner, completely altering the general appearance of this trim and elegant gull. I believe Faber, from observation in Iceland, noticed this peculiarity under certain circumstances.—D. MACDONALD, Tobermory.

Salmo fario v. Salmo salar.—Unwilling to recognise the virulence of a blood feud between two noble families nearly akin to each other, I have always cherished the hope that the alleged mischief done by river trout upon their migratory cousins was exaggerated by those interested in salmon preservation. Unhappily, during this year two flagrant instances have been exposed under my eyes of the injury wrought by *Salmo fario* upon *Salmo salar*. The first was in the river Helmsdale, where a common trout weighing intact, $1\frac{1}{4}$ lb., took a trout fly, and was found to contain seven salmon smolts. I did not see the smolts taken out of the fish, but they were shown to me in a jar of spirits afterwards. The second case was even more remarkable. Fishing the Rauma river, in Norway, at the end of last May, my companion killed a trout of 2 lbs. on a salmon fly nearly three inches long. My attention was attracted by the distended state of its abdomen. I opened it with my own hands, and found no fewer than ten salmon smolts; pretty, silvery fellows about five inches long. Another trout of $1\frac{1}{4}$ lb. weight, which took my salmon fly the same morning about half a mile distant from the other, contained nothing but a mass of gravel, with debris of larvæ. This suggests that all river trout do not yield to the same depraved appetite; for the smolts were making their annual migration at the time, and one of these fish had as good a chance as the other of preying upon them. But it is clear that some individuals of the *fario* race are as destructive to salmon as any pike. There is no instance on authentic record of retaliation, even on the part of a kelt salmon.—HERBERT MAXWELL.

Chimæra monstrosa in Hebridean Seas.—For the past ten days previous to July 29th considerable numbers of the enclosed remarkable looking fish have been caught on long lines in deep water by the fishermen working out of Loch Roag. This is the first time in the memory of the oldest fisherman in the district that such fish have occurred.—J. MACKENZIE, Stornoway.

[A specimen of *Chimæra monstrosa* received.—EDS.]

Andrena helvola in the Forth District.—Among some aculeate Hymenoptera sent by me recently to Mr. Edward Saunders for

examination was a ♀ specimen of *Andrena helvola* (Linn.) taken on 2nd July 1902, at Musselburgh. This is the first recorded appearance of the species in the Forth District. It appears to be rare in Scotland, the only recent record of its capture is one in "Ent. Mo. Mag." vol. xxxvii. page 259, from the Clyde District.—A. E. J. CARTER, Musselburgh.

Sphinx Convolvuli in Moray.—Mr. W. Taylor, Lhanbryde, has sent me a fine specimen of this moth taken at Lossiemouth in Elginshire, about 12th September last.—HENRY H. BROWN, Cupar-Fife.

Calyptostoma Hardii, Cambr., in South-west Perthshire.—When ascending Am Binnein from the Balquhidder side on 25th September 1902, I found under a stone at an altitude of about 3500 feet, and on the "Forth" side of the watershed, a reddish mite which the Rev. O. P. Cambridge tells me is an example of his *Calyptostoma Hardii*. The species was described by him in 1875 in the "Annals and Magazine of Natural History" (vol. xvi. 4th series, p. 384) from two specimens found on Cheviot Hill, Northumberland, by the late Dr. Hardy of Oldcambus.—WILLIAM EVANS, Edinburgh.

BOTANICAL NOTES AND NEWS.

Vaccinium intermedium, Ruthe, in Scotland.—This hybrid of *V. Myrtillus*, L., and *V. Vitis-idea*, L., has been sent me by Mr. A. Sutherland from Sconiclett Braes, near Watten, Caithness.

It was described by Ruthe in his "Flora der Mark Brandenburg und der Niederlansitz," 377, 1827; and I am indebted to the late Dr. Schumann for a fragment of the original specimens in the Berlin Herbarium (from the neighbourhood of Berlin, *i.e.* "Jungfernsheide, the Heath of Virginius in English"), also for a specimen gathered by the late Dr. A. Braun.

Dr. Ascherson¹ gives the name of *V. Vitis-idea Kablikiana Opiz* as a synonym, and Garcke² calls it *V. Myrtillo—Vitis-idea*.

It was first reported in Britain in "Science Gossip," 248, figs. 174-175, 1872, under the title of 'A curious British Plant,' by Mr. R. Garner, F.L.S. Mr. Garner kindly sent me specimens from Camp Hill, Maer Wood, Staffordshire, under the name of *V. hybridum*, and wrote—"It was first found by D. Ball, Esq., F.R.C.S." There are specimens also from Cannock Chase, Staffordshire, by Prof. G. T. Bonney (1886), and Mr. G. Nicholson (1888); and Mr. Baynell, "Flora Stafford.," 40, 1901, adds "Norton Bog, 1898."

¹ "Flora Brandenburg," 408, 1864.

² "Fl. Nord und Mitt.-Deutschland," 220, 1858.

A full account of the plant will be found in the Linnean Society's "Journal," pp. 125-128, 1888 (with an excellent drawing by Miss Smith), by Mr. N. C. Brown.

The Caithness plant may at once be known from *V. Myrtillus* by the rounded stem, the much more entire leaves, only here and there with a crenation, and being evergreen (though a few leaves do fall in Staffordshire)—from *V. Vitis-idea* by the leaves wanting the characteristic glandular-punctate dots (here and there stipitate glands do occur) on the under surface, and the margins not being revolute (only slightly recurved) and not so entire. With more of the characters of the latter, the aspect is more that of *V. Myrtillus*.—ARTHUR BENNETT.

Carex riparia, Curt., in Caithness.—Mr. D. Doull of Bower has kindly sent a specimen of the above *Carex*, an additional species to the known flora of Caithness.

It was gathered in West Ross (Co. 105) by Mr. Ewing,¹ but is not noticed by Mr. Druce in his paper on that Flora; also from East Ross (Co. 106), but both are queried by Dr. Trail ('Top. Bot.² of Scotland,' "Ann. Scot. Nat. Hist." 36, 1900); and there is an old record of the Outer Hebrides (Macgillivray). It is on record from Banff (Birkenbog (near Turriff) Rev. G. Gordon, "Coll. Fl. Moray," 27, 1839). In Kincardine it rests very doubtfully on the Stat. Account. In Aberdeen three localities (two on doubtful authority) are given; in Dickie's "Botanist's Guide," Dr. Trail has found it on the coast in North Aberdeen ("Ann. Scot. Nat. Hist." 176, 1901). It was found in Easternness (E. Inverness) in 1888 by Mr. Druce. Mr. Doull's specimen takes it farther north (about 58° 31' N. Lat.) than any other certain or uncertain record. *C. acutiformis*, Ehrh. (*C. paludosa*, Good.) occurs very near the same latitude by the Isauld Burn, whence it was sent me by Mr. W. F. Miller.

In Sweden *C. riparia* extends to Gefleborgs län (about 62° N. Lat.), and it occurs, but rarely, in South Norway.

In Finland it occurs, though rarely, at 61° 15' N. Lat., but it is entirely wanting from mid and north Finland and from Russian Lapland. It is not given by Warming in his Tables of the Greenland, Iceland, and Faroe Floras, 1888; nor by Ostenfeld in his "Fl. Arctica," 1902; but it extends north in North America to James Bay and Cumberland House above Lake Winnipeg, 55° N. Lat., where the winter cold is much more intense than in Caithness.—A. BENNETT.

The Sea Lyme Grass (*Elymus arenarius*, L.) in North-east Scotland.—This is now one of the most conspicuous plants along

¹ "The Glasgow Cat. of Native and Estab. Plants," 143, 1899.

² "Trans. Bot. Soc. Edinburgh," xx. 165, 1894.

the sea-front of the dunes that extend for miles along the coast north of Aberdeen. It forms a more or less marked belt, varying in width usually from a few feet to about twenty yards, but extending landward to a considerably greater breadth in a few places, usually near the mouths of streams. It seldom rises much beyond fifteen feet above sea-level, and the upper limit of the belt is visible from a distance, the Lyme Grass, both in colour and in size of leaf, forming a marked contrast to the vegetation higher on the dunes. It is a very valuable defence to the dunes, growing almost to the tide mark, and retaining the sand from being washed or blown away. It thus leads to the formation of new dunes by catching the wind-driven sand. Near the sea it is the only grass, but may be associated with *calicle maritima*, or, less often, with other plants of the foreshore. After the sand has accumulated for some time, the Marram (*Psamma arenaria*), sand Fescue (*Festuca ovina*), and sand Couch-grass (*Agropyrum junceum*) find room among the *Elymus*, at first in very small numbers, but increasing until the upper limit of the belt is reached, and they become dominant grasses. Very few dicotyledons appear able to invade the *Elymus* belt, an occasional plant of *Thalictrum dunense* or *Lotus corniculatus* showing here and there, but few others.

In view of the existing abundance of *Elymus arenarius* on the coast of Aberdeenshire it is worth noting that even in Dickie's "Botanist's Guide to the Counties of Aberdeen, Banff, and Kincardine," published in 1860, we read "sandy seashores. Rather local." It is there particularly recorded as "Near Aberdeen, a small patch at the south end of the Fish-town, Footdee; and at the mouth of the Don on the north side, G. D.; coast at Cruden, Mr. A. Murray; at the village of St. Combes, parish of Lonmay." It was thus apparently a very local, if not rare, plant on this coast in the middle of last century. There are no records for it on the Banffshire coast in the "Botanist's Guide"; and I found only one small patch of it on that coast in August 1895, on the beach near the west end of Sandend Links. In Aberdeenshire it occurs on sandy coasts as far west as the parish of Pitsligo. On the coast of Kincardine there are few places suitable for its growth; but I have seen it in small quantity near the mouth of the Burn of Benholme, and in fair abundance on the beach along the Links of St. Cyrus. Near Aberdeen the roots of *Elymus* very often bear numerous irregularly formed small galls, the work of a nematoid worm very closely allied to *Tylenchus Hordei*, the cause of the disease of Barley known as *Krok* in Sweden. This grass also suffers considerably from the attacks of a smut fungus (*Ustilago hypodytes*) which covers the stems below the leaf-sheaths, often filling the interspace for several inches with soot-like spores. The infested plants grow tall and lanky so as to be easily distinguished even from some distance, and do not bear a flower-head. The *Elymus* belt is the favourite habitat of an interest-

ing cup-fungus—*Peziza (Geopyxis) ammophila*—which in autumn may be found there on the Aberdeenshire coast locally plentiful.—JAMES W. H. TRAIL.

CORRECTIONS.—In ‘Additions to the Flora of Orkney’ in “Ann. Scot. Nat. Hist.” July 1895, p. 179, under *Pyrola rotundifolia*, Linn., delete “A. R. Duguid,” and “The specimen was given to me by Miss Mary Gold, who received it from Dr. Duguid,” and insert instead “Miss G. Gold, August 1869.”—HENRY H. JOHNSTON.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—July-September 1904.

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

ZOOLOGY.

THE CELTIC PONY AND THE TARPAN. “R.L.” *The Field*, 6th August 1904, p. 276.—Draws attention to a paper by Dr. L. Stejneger, of the U.S. National Museum, in *Naturen* on the relationship of these two forms.

ON A NEW BRITISH VOLE FROM THE ORKNEY ISLANDS. By J. G. Millais. *Zoologist*, July 1904, pp. 241-246.—This paper describes an interesting and important addition to the British Mammalian Fauna. The species is described as new under the name of *Microtus orcadensis*, and most of the specimens were obtained in the parish of Sandwick, Pomona, where they are especially numerous. See also *The Field*, 30th July, 1904, p. 229.

ON A HEBRIDEAN MARSH. “G. S. H.” *The Field*, 30th July 1904, p. 230.—A sketch of the bird-life observed near a loch (not specified) in one of the Outer Hebrides.

YOUNG PTARMIGAN. John M'Donald. *The Field*, 30th July 1904, p. 230.—Two young birds found near Roy Bridge which were perfectly white and without a trace of gray feathers.

BUFFON'S SKUA (*STERCORARIUS PARASITICUS*) AT ABERDEEN. Geo. Sim. *Zoologist*, July 1904, p. 266.—A pair shot near New Pitsligo on 23rd May.

GADUS POUTASSOU AT ABERDEEN. Geo. Sim. *Zoologist*, July 1904, p. 268.—A male, eleven inches long, caught by trawl 140

miles N.E. by E. of Aberdeen, in 80 fathoms of water, on 26th May.

MONOGRAPH OF THE LAND AND FRESHWATER MOLLUSCA OF THE BRITISH ISLES. By John W. Taylor. Part 10 (6th June 1904).—In this important work a large number of Scottish records are given, far too numerous to quote.

LAPHRIA FLAVA IN SOME NUMBERS NEAR NAIRN. J. W. Verbury. *Ent. Mo. Mag.*, September 1904, pp. 211-212.—An interesting note on the habits of this species, with hints as to the best method of capture. The species is also recorded from the Abernethy Forest.

LIST OF BRITISH DOLICHOPODIDÆ, WITH TABLES AND NOTES. By G. H. Verrall, F.E.S. *Ent. Mo. Mag.*, July and August 1904, pp. 164-173; September 1904, pp. 194-199.—Several Scottish records are given, including *Psilopus wiedemanni* and *Hygroceleuthus diadema* from Aberlady, *Dolichopus planitarsis* from Aberdeen, *D. atripes* from Braemar, and *D. discifer* from Lairg.

SOME SPRING-TAILS NEW TO THE BRITISH FAUNA, WITH DESCRIPTION OF A NEW SPECIES. G. H. Carpenter and Wm. Evans. *Proc. Roy. Phys. Soc. Ed.* 1902-4, xv. pp. 215-220, pl. 4.—Deals with four species, *Isotoma sexoculata*, *Achorutes manubrialis*, *A. propinquus*, sp. n., and *Xenylla maritima*, all taken in Scotland.

BOTANY.

FUMARIA CAPREOLATA, L., IN ORKNEY. By Edward S. Marshall. *Journ. Bot.*, 1904, p. 186.—Notes as found there the form *capreolata*, L., proper (= *pallidiflora*); *purpurea*, Pugsley, *Borzi*, Jord.; and *confusa*, Jord.

NOTES ON THE DRAWINGS FOR "ENGLISH BOTANY." Compiled by F. N. GARRY, M.A.—Issued as a separately paged (201-248) supplement to *Journal of Botany*, in issue for June, includes from *Potamogeton trichoides* to *Holcus mollis*.

GALIUM SYLVESTRE IN WORCESTERSHIRE. By Frederick Townsend. *Journ. Bot.*, 1904, p. 240.—Under this heading there are references to its occurrence (vouched by specimens in the British Museum) in Lanarkshire (M'Nab) and in Sutherland (E. S. Marshall).

ADDRESS DELIVERED TO THE BERWICKSHIRE NATURALISTS' CLUB (9th October 1902). By Sir Archibald Buchan-Hepburn, Bart. *Proc. Ber. Nat. Club*, xviii. pp. 201-209.—Contains interesting notes on the Conifers introduced at Smeaton House, East Lothian, on the effects of the severe winter 1860-61 upon them, and on their size in 1902.

REPORTS OF MEETINGS OF THE BERWICKSHIRE NATURALISTS' CLUB FOR 1902 (*l. c.* pp. 215-287).—Notes some of the less common plants observed at Cockburnspath (p. 225), at Stobbs (pp. 249-250), at Dalwick House (pp. 251-252), at Thirlestane Castle (pp. 264-265).

BOOK NOTICES.

THREE SUMMERS AMONG THE BIRDS OF RUSSIAN LAPLAND. By Henry J. Pearson. With History of Saint Triphon's Monastery and Appendices. London: R. H. Porter, 1904.

Next to the bird-life of their own islands, the avifauna of no other lands has offered the same attractions to British ornithologists as the continental countries lying to the north-east of our shores. The reason for this is not far to seek, for these regions afford nesting haunts for a great number of birds which periodically visit our shores as winter guests or as birds of passage. Scandinavia has now few secrets to disclose regarding her interesting summer visitors, but it is otherwise with Russian Lapland, and ornithologists of all countries are much indebted to Mr. Henry J. Pearson for his valuable contribution to the birds of that inhospitable and, to most, inaccessible region. This volume, as its title indicates, is the result of three summers spent amid the wilds bordering the Arctic Ocean, the Ukanskoe River, the Kanin Peninsula, and of the interior of the country south of Kola. Its chapters teem with interesting and original field notes on the numerous species observed; while the nature of the country they frequent is graphically described by pen and camera. Pictorially the book is probably the best of its kind that has ever been produced, since it affords absolutely faithful pictures of Arctic scenery, and of the sites of the nests of a number of species that are not to be found elsewhere—beautiful reproductions of no less than sixty-eight excellent photographs. A useful appendix affords, in tabulated form, a complete list of the birds of Russian Lapland, a hundred and eighty-two in number, culled from various sources, together with their distribution in the various districts and remarks.

Mr. Pearson is to be highly complimented on the excellent work he has accomplished, and on the appearance of the handsome volume in which his investigations are recorded. It is one of the best books ever written on the ornithology of Northern Europe.

PARADISI IN SOLE PARADISUS TERRESTRIS. By John Parkinson. Faithfully reprinted from the edition of 1629. (Methuen and Co., 1904.)

To all interested in gardens this re-issue of one of the most

valuable and scarce of the old works will be most welcome, as the book has for years been scarcely procurable even at a high price. It is full of information upon the history of gardening in England up to 1629, expressed in language that adds to its value, and is illustrated with many plates of excellent illustrations of all plants thought by the author worthy of a place in the garden. The reproduction is extremely successful, and brings great credit to the publisher and the printers (the Aberdeen University Press) alike for its accuracy and its beauty.

The introduction into a work relating to a local flora of any British area of the system of classification so well known through Engler's "Die Naturalischen Pflanzenfamilien" marks a departure worthy of notice and likely to find favour in growing measure. For this reason, and also for its own merits as an excellent example of a local flora, "A Flora of the Island of Jersey, with a List of the Plants of the Channel Islands in general, and Remarks upon their Distribution and Geographical Affinities," by L. V. Lester-Garland, M.A., F.L.S. (1903, London: West, Newman, and Co.), may be commended to the notice of readers likely to visit the Channel Islands, or interested in their peculiar flora.

MANUAL OF BRITISH BOTANY. By the late Charles Cardale Babington, M.A., F.R.S. Ninth Edition. Enlarged from the Author's manuscript and other sources. Edited by Henry and James Groves. (London: Gurney and Jackson, Paternoster Row, 15th July 1904. 9s. net; on thin paper in leather, for the pocket, 10s. 6d.)

The twenty years that have passed since the issue of the third edition of the well-known "Students' Flora of the British Islands," and the still longer period since that of the eighth edition of the equally familiar "Manual of British Botany," have been marked by constant and great progress in the study of the British flora, and by the publication of numerous papers and several books dealing with various parts of the subject. Much of the additional information bears on the distribution within our islands of species and varieties already known as British; but a more critical study has revealed some species and numerous varieties not previously known as British, and has shown more accurately the relations of our flora to the floras of other lands, while the standpoints with respect to the values of characters and systems of classification have changed. Again, the vexed questions of nomenclature have led to many changes in the names of genera, species, and varieties, which often make it hard to recognise old friends under the names that it is found they should bear. Thus it has been felt by students of the British flora that there has been great need of a book that would in condensed and trustworthy form give the results of the last twenty years' advance.

Since the announcement some time ago that Messrs. H. and J. Groves were engaged in the preparation of a new edition of Babington's "Manual" the volume has been eagerly looked for.

The editors explain that "it was Mrs. Babington's particular wish that the text as amended by the author should not be interfered with. Owing to this limitation, we have been unable to make alterations in the treatment of some of the critical genera which might perhaps have been desirable. These species and varieties and additional characters and remarks which we have inserted are printed in smaller type, and, where interjected in the text, are included in square brackets." They express their indebtedness for specimens and often for notes and other aid to specialists and others, the critical genera being usually treated with reference to the views of the recognised authority on each.

There is much in the book to welcome gladly, and the editors have done much to bring within access the chief results attained; but the regret arises that they had not been free to treat the whole subject from the modern standpoint, for which the old framework is far too narrow. In its general arrangement the "Manual" remains unchanged, even to the retention of *Gymnospermæ* as a 'Division V' of the *Dicotyledones*, and *Cryptogamæ* as 'Class III.,' co-ordinate with *Dicotyledones* and *Monocotyledones*, and including *Equisetaceæ*, *Filices*, *Marsileaceæ*, *Lycopodiaceæ*, *Characeæ* as 'Orders' merely. To points of biological importance there are few direct references; and except in the case of very local plants distribution is briefly indicated by the habitat and the letters, E., S. and I., for England, Scotland, and Ireland.

Among critical forms the treatment has not in all cases been quite alike. *Rubus* has been left in the body of the work little changed, "though it was clear that he (the author) had intended to rewrite it, but, by permission, a conspectus of groups and species has been reprinted, as an appendix from Rev. W. Moyle Roger's "Handbook of British Rubi." *Rosa* has been revised and added to by the editors. A "new account of the genus *Hieracium* has been drawn up under the direction of Mr. F. J. Hanbury, from his notes and specimens." It includes ninety-seven 'species' and ninety-four named 'varieties,' while under *H. murorum* and other species it is stated that "many other varieties have been distinguished that cannot be mentioned here." *Euphrasia* is treated as in Mr. F. Townsend's 'Monograph' in the "Journal of Botany." *Salix* remains much as before, but with notes indicating the views of Dr. Buchanan White and Mr. E. F. Linton. *Potamogeton* has been treated in accordance with the views of Messrs. Fryer and Ar. Bennett. With respect to the nomenclature the editors inform us that "we have adopted the earliest names as far as we have been able to ascertain them, taking 1753 as the starting-point for both genera

and species." The changes are indeed often very great, e.g. *Radicula*, Hill, for *Nasturtium*, and *Alsine* replacing *Spergularia*, *Lepigonum*, and *Buda*. It is perhaps too much to expect that we shall yet for a time obtain a fairly permanent scientific nomenclature, but there can be no doubt that the names employed in this Ninth Edition come nearer to this than do those employed in preceding British floras.

Despite the limitations under which the work has been done, the book will be found most useful, indeed indispensable, by all students of the British flora ; while it gives rise to the wish that the editors had been free to give us a work fully representative, both in form and in substance, of the present standpoint of botanical science applied to that flora.

Messrs. Gurney and Jackson have in preparation a new book on British Mammals by our friend Captain Barrett-Hamilton, a well-known authority who has devoted many years to the practical study of the subject and to an examination of its voluminous literature. It will to some extent be based on the work of the late Professor Thomas Bell, inasmuch as the popular and readable portions of that classic volume will be retained, but it will also be thoroughly scientific and up to date. The work will be illustrated by a series of coloured plates and other illustrations. Captain Barrett-Hamilton will be glad to receive information relating to Scottish Mammals. His address is Kilmanock House, Arthurstown, Waterford, Ireland.

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