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# THE IRISH NATURALIST.

A Monthly Journal

OF

GENERAL IRISH NATURAL HISTORY,

THE OFFICIAL ORGAN OF

*The Royal Zoological Society of Ireland ; The Dublin Microscopical Club ;  
The Belfast Natural History and Philosophical Society ;  
The Belfast Naturalists' Field Club ; The Dublin Naturalists' Field Club ;  
The Armagh Natural History and Philosophical Society ;  
The Cork Naturalists' Field Club ; The Limerick and Clare Field Club.*

EDITED BY

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AND

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VOL. X.

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DUBLIN: EASON & SON, LIMITED,  
85 MIDDLE ABBEY STREET, AND 40 LOWER SACKVILLE STREET.  
BELFAST: 17 DONEGALL STREET.  
LONDON: SIMPKIN MARSHALL, HAMILTON KENT & Co., LTD

1901.

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PRINTED BY ALEX. THOM & CO. (LIMITED), 87, 88, & 89, ABBEY-STREET, DUBLIN.

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## ERRATA.

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- Page 92, line 24, for *Malthodes* read *Malachus*.  
" 115, " 24, for *secundarus* read *secondaries*.  
" 115, " 27, for Bar-tailed read Black-tailed.  
" 115, " 33, for Hanly read Howly.  
" 163, " 10, for *terris* read *berus*.  
" 202, " 17, for *nimar* read *minor*.  
" 202, " 18, for *narrus* read *nanus*.



# The Irish Naturalist.

## VOLUME X.

### THE MIGRATION OF BIRDS.<sup>1</sup>

BY R. J. USSHER.

IN August last a book appeared for which ornithologists have been waiting for years, and like many things long expected, it has finally taken by surprise those who know of the enormous accumulations of facts, that had to be digested, contained in the Irish lightkeepers' reports of eighteen years. The last annual report, for 1897, has only been printed within the present year, yet the entire series has been analysed with untiring research and power of appreciating the varying facts of the several birds' migrations. Mr. Barrington states that he has availed himself of the assistance of Mrs. Barrington (who has taken an active interest in the work), and of Mr. Moffat, whose acute mind and painstaking help have largely contributed to its success; while the author's own grasp of the subject has enabled him to achieve what is certainly a new departure in the study of migration.

The special merit of this work is that its careful statements rest on data which are presented to the reader for verification. What is merely inferred is always distinguished from what is proved, and the reasons in each case are given; while the cautious estimate of the evidence is frequently indicated by such remarks as, "It is true in the main," "It has been demonstrated," or "There seems some reason to think."

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<sup>1</sup> **The Migration of Birds as observed at Irish Lighthouses and Lightships**, including the Original Reports from 1888-97, now published for the first time, and an Analysis of these and the previously published Reports from 1881-87; together with an Appendix giving the measurements of about 1,600 wings. By RICHARD M. BARRINGTON. Pp. 285 (Analysis), and 660 (Reports). London: R. H. Porter; Dublin: Edward Ponsonby, 1900. Price, 25s.

Another feature is that each species is treated of separately, which brings out the wide differences in the migrational habits of birds. The author confines himself almost exclusively to strict inductions, and generally denies himself the luxury of theorizing on many fascinating questions which are prominent in most writings on migration.

Mr. Barrington's analysis abounds in facts and statistics, though they follow no hard and fast rules, as the tabulated statements applicable to one bird are replaced in the case of other species by displays of different facts that are elucidated by their study.

Where a bird is known and distinguished by the lightkeepers, their notices of it are tabulated and compared with the records of specimens received, and the latter generally corroborate the results of the former; but where the observers have not learned to distinguish species reliably, the specimens alone are cited as evidence.

These specimens, amounting to more than 2,000, consist chiefly of legs and wings of birds which have killed themselves by striking against the lanterns at night. This is the readiest means of accurate identification, and was suggested by the late A. G. More in 1884; but at Mr. Barrington's request, strange birds have been sent to him entire, and these have in not a few instances turned out to be additions to the list of Irish-taken species or birds of extreme rarity in the country. The following seven species thus obtained, were new to Ireland:—

Woodchat Shrike.	Short-toed Lark.
Redbreasted Flycatcher.	Lapland Bunting.
Lessor White-throat.	Mealy Redpoll (var. <i>rostrata</i> ).
Yellow-browed Warbler.	

The Sheathbill, an antarctic bird, would make an eighth, if its occurrence could be attributed to natural causes; while the Great Spotted Cuckoo, which appears to have been observed on the Skelligs on 30th April, 1897, has been accurately described. Unless a mistake occurred, this is the second instance of the latter bird in Ireland.

Besides the above species, others of a greater or less rarity have been taken at or near light-stations, as the Pied Flycatcher (seven times), Golden Oriole, Barred Warbler, White

Wagtail, Hawfinch, Wryneck, Sand-Grouse, Roseate Tern, Eared Grebe, and Surf Scoter. The Pied Flycatcher has been shown to be an irregular autumn visitor in immature plumage to the south coast of Ireland, and a good many other summer migrants have occurred in late autumn or winter.

But apart from exceptional occurrences, Mr. Barrington has brought to light most important facts about the distribution and seasonal movements of the commoner birds. The portions of the coast where each species has occurred are carefully detailed, and the reader is thereby led to infer the routes by which birds arrive. This is suggested by the lines which limit their range on arrival, given at p. 267 for the spring migration. It is probable that spring migrants arrive approximately at right angles to these lines, and accordingly that they come to our eastern and southern shores from the direction of Wales or Cornwall. The Co. Wexford receives the densest portion of the host, and some species make it their special point for landing.

This is the case in autumn also, as regards the Passerine visitors which come to winter in Ireland, or touch it at that time on passage.

It is remarkable that the Whinchat, Garden Warbler, and Yellow Wagtail, which breed more towards the North or West of Ireland, have been received almost exclusively from southern or south-eastern light stations on migration.

While the arrivals of some species, like the Sky-lark in autumn, seem to be uniform in numbers from north to south, other birds, like the Black Redstart and the Brambling, occur almost exclusively at the southern and south-eastern stations.

The coasts of Connaught are shown to be less visited than any others by birds which arrive chiefly in the south-east, but a certain proportion of these occur at Down and Antrim stations.

Another group of winter migrants are chiefly noticed on that side of Ireland least frequented by the former. The Woodcock is an instance of this. Its most frequent and earliest occurrences are on the coasts of Donegal and Connaught, and extend to western Kerry. Ulster stations yield more than half of the records for the whole Irish coast. These are most numerous furnished from Inishtrahull, which appears to lie in the way of the largest arrivals from the north of Europe.

Mr. Barrington's data of the arrivals of Woodcocks make me realize more fully than when I wrote in the "Birds of Ireland," that the early appearance of these birds in western Kerry and Cork points to their having come down the west coast, rather than from the south-east of Ireland and the direction of Wales.

My remarks in the above work on trans-marine migration were made from my separate examination of the reports, at the cost of much time and labour, and they generally agree with the statements in Mr. Barrington's volume. I had, however, written on the *Passeres* and some other groups before the later reports were printed, and I was unable to digest exhaustively the migration records, being more occupied with the inland distribution and other aspects of our ornithology. Therefore, I wish to state that if discrepancies are found between us, Mr. Barrington's work upon migration should carry the greater weight to which his superior acquaintance with his branch of the subject entitles him.

The west coast, Donegal to Kerry inclusive, has also been shown to be that most frequented in autumn or winter by the Greenland Falcon, Mealy Redpoll, Snow-Bunting, Common Snipe, Whimbrel, Glaucous and Iceland Gulls, and Barnacle Goose; while the Twite, Water-Rail, and Purple Sand-piper are considered by Mr. Barrington to have a tendency to strike on the north and west coasts, though for proof of this more instances are desirable. Most of the above species breed out of Ireland—in Iceland or in arctic countries, and the Water-Rails and Snipes that occur on our north-west coasts probably arrive in autumn from the same direction.

The spring occurrences of Wagtails at Inishtrahull, one of which proved to be a White Wagtail, are very interesting, for when taken in connection with the repeated captures of this bird in Co. Mayo in April, we may infer that it uses the western coast of Ireland on its journey to the north. Mr. Eagle-Clarke has shown that it travels up the west coast of Britain at the same season (Report of British Assoc., 1900).

The Wheatears which strike western lighthouses at the end of April, are supposed by Mr. Barrington to be also on their journey to the far north.

The records of the numbers of birds that strike the lanterns are influenced by a circumstance hitherto unnoticed, which

was pointed out by Mr. Moffat ; namely, that on the moonlight nights much fewer birds are attracted by the lighthouses, but that within a week of new moon the greatest numbers thus fall victims in the dark. It will therefore require extended observations to embrace years when the lunar phases are similar about the same dates.

But taking the results arrived at since 1882, Mr. Barrington gives a series of judiciously drawn tables and figures for the times of the migration of each species. By these he shows, in the case of the commoner birds, the months and parts of months when the maximum immigration takes place, and it thence appears that the migrants arrive in the greatest numbers later (and sometimes a good deal later), than the dates when their first appearance is wont to be noticed in the country.

It has been established by this whole enquiry that many species called resident or sedentary come to Ireland in great hosts when the cold season commences, and many birds which were not suspected to quit the land have been shown to migrate in considerable numbers, as the Redbreast, the Rook, and the Water-Rail; while others are not found to migrate—for instance, the Creeper, Bullfinch, and Jay, the presumption being strong against these.

Concerning Thrushes, Blackbirds, Larks, Chaffinches, Starlings, and several other species, it is found that after the numbers that are killed striking have greatly diminished during mid-winter, there is a distinct increase of them in February or March. Such cases might be supposed to be those of departing birds which had wintered in the country; but one of Mr. Barrington's most remarkable announcements is that they are more probably the arrivals of a spring immigration; that these birds may be coming at that season to breed in Ireland, or further north, and that birds are very seldom seen to depart at any season. For this conclusion he gives several reasons; among the rest, the land-birds seen by daylight are, except in a very few cases, making for the Irish shores. Then again, the birds seen at the season at which they might be expected to emigrate are frequently in an exhausted or dying state, as though they had just crossed the sea by a long flight. The numbers of both summer and winter visitors recorded from light-stations are comparatively small at their

seasons of departure, though the summer visitors should be much more numerous when reinforced by their young reared in this country. Most of the birds that visit us in winter only, like the Redwing and Fieldfare, strike the lanterns very rarely in spring. On the other hand, Thrushes, Blackbirds, Sky-larks, and Starlings, though they strike much less numerous in spring than in autumn, still do so in a far greater proportion than those purely winter visitors do. This supports the idea of a second immigration of the former in early spring.

Mr. Eagle-Clarke, in his recent report above referred to, speaks of the emigrations of the Song Thrush observed in autumn on the eastern and southern shores of Ireland. He has had the advantage of studying the Migration Reports, 1881-87, from all the British Islands, and has doubtless much additional information besides. It is to be hoped, therefore, that he will describe more particularly the evidence for these emigratory movements, especially as regards Ireland; for Mr. Barrington has dwelt on the comparative difficulty of obtaining satisfactory proof of such movements from Irish light-stations; though, no doubt, whether it is observed or not, emigration takes place. The solution of this apparent divergence between our authorities will be welcome.

Why departing birds so seldom strike the lanterns is partly explained by the darkness of the latter on the landward side, so that they fail to attract birds which are leaving the land. Swallows, indeed, and Starlings appear to leave by daylight more than other birds do, as flocks have been seen departing; while Sedge Warblers, whose habits are partly nocturnal, strike the lights in early autumn much more than other summer visitors. Birds of the latter class must, indeed, be supposed to be on their way out of Ireland when they strike in autumn.

Among the summer visitors, several have been taken at light-stations late in autumn or in winter, notably the Black-cap, and some of them—the Barred Warbler and the Yellow-browed Warbler, are of extremely rare occurrence;<sup>1</sup> while the Pied Wagtail, which is partially a summer visitor to Great Britain, visits Ireland largely in winter.

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<sup>1</sup> The Rufous Warbler shot by Mr. F. R. Rohu at the Old Head of Kinsale, in September, 1876, is a similar case, but as Mr. Rohu was not (as I stated in mistake), a light-keeper, this occurrence cannot be numbered among the lighthouse records.

Strange immigrations of Rooks are described, which were observed in November, 1884, 1887, and 1890. These chiefly arrived on the extreme points of Kerry and Connaught, the birds flying in from the Atlantic at a great height, sometimes for many days together, and in an exhausted state.

Then again it is recorded (p. 282), that rushes of Starlings and Rooks have been seen passing westward into the Atlantic from the furthest points of Connaught. These cases, which occurred in October and November, are not connected with those great stampedes or races for life towards the western coasts and islands which occur in severe frost and snow. An instance of these took place at Samphire Island, Tralee Bay, in February, 1895, when vast numbers of Starlings, Sky-larks, Thrushes, and Redwings were noticed going south all day in heavy snow. Next day they were still going south continuously.

Mr. Barrington alludes to birds which reach Ireland in winter that have stopped at some half-way house, and to the constant tendency of the Starling to pass westward on the renewal of cold weather, but he might have treated separately of those supplementary immigrations and westward movements which occur at any time of winter or early spring, when hard weather sets in. On such occasions the number of trans-marine arrivals is very great, and must considerably modify the statistics, for they must increase above their normal proportion the totals for each month after the autumn migration is over.

The carnivorous propensities of Gulls, which swallow whole birds as large as a Blackbird, are described, with the probable suggestion that birds of feeble flight diminish this danger by crossing at night.

A totally original portion of this volume contains measurements of about 1,600 wings, with the dates and localities of capture. The result given is that in every species of which a sufficient number were measured, the longest-winged individuals arrived first in spring; while in the majority of species the same rule applies to autumn, the apparent exceptions at that season being the Fieldfare, Wheatear, White-throat, Willow Wren, and Gold-crest. Where the males are larger than the females, as in most *Passeres*, the measurements show that the former arrive first in spring; and if it is assumed that the adults are larger than the young birds of the year, then the former migrate first in autumn in nine species out of thirteen.

Another point ascertained, as was pointed out by Mr. Eagle-Clarke in 1896, is that the direction of the wind does not apparently affect migration, though its force does so.

At page xxv. an extensive table relates to forty-two species, including thirty-one *Passers*, and gives in each case the dates of the arrival of the majority, of their departure or second immigration, statistics of specimens received, whether longer or shorter-winged, the earliest dates in spring and in autumn when they were killed, and the northernmost and southernmost stations where they occurred at each season of passage. This valuable table is based exclusively on specimens, and is quite original.

The articles on the several species richly repay separate study; but reference to them would have been facilitated if a short paragraph in distinct type had been placed at the head of each, stating as briefly as possible the range and season of the bird's migration, and any other characteristic facts.

But the chief drawback to the work seems to be the order of classification, which is not that now generally adopted since Mr. Sclater described it in the *Ibis*, 1880, and since it was embodied in the *Ibis* List, 1883. The 4th edition of Yarrell in 1871, commenced, as was then usual, with the birds of prey, which made it impossible to adopt the modern classification through the later volumes. This inconsistent and piecemeal arrangement, resulting from a period of transition, was adopted in the earlier migration reports, and has been continued. This makes it difficult for anyone familiar with the more natural order now recognised, to find a species without the help of the Index; besides which it tends to perpetuate exploded ideas as to the affinities of birds; shrikes, for example, being placed next birds of prey.

Over 600 pages, or more than two-thirds of the volume, are occupied by light-keepers' observations for ten years ending 1897, and extracted from their schedules. These notices are arranged under the head of each species, or of each name, such as "Sand-Larks," when several species are comprised. And here a tribute is richly due to those by whose patient and gratuitous labours so vast a store of information has been collected. Though not trained in ornithology, their attention to bird-migration all the year round has improved their observation and knowledge and led to most interesting results.



It seems sad that they have so little instruction to identify the species of birds, for though many of these are now recognised by light-keepers which they formerly ignored, they still misapply many names so as to render their reports about them almost useless. Instances of such names are—"Black-cap" for Stone-chat and other birds, "Warblers" or "Wrens" for divers small species, "Tits" for Pipits; "Linnets" or "Bullfinches" for other *Fringillidæ*; "Puffins" for Razor-bills or Guillemots; "Barnacles" for Brent or Barnacle Geese, indifferently. Then "Hawks," "Pigeons," "Sand-Larks," "Gulls," and "Ducks," are each terms applied to several species so as to tantalize and bewilder the student of the reports. Though information may occasionally be misunderstood, yet its good effects were manifest after the Commissioners of Irish Lights had, in 1884, presented to six isolated stations copies of Morris's "British Birds." These books, which were illustrated, have often been referred to by the light-keepers as a great help, and it may safely be assumed that in this matter no greater reward for the past and help for the future could be bestowed on the lightkeepers by the Commissioners, than copies of the volume now produced.

Looking back upon the work of eighteen years so perseveringly done by Mr. Barrington, and conducted at his own expense since the British Association discontinued their grants in 1887, some reflections arise—The inquiry, so unpromising at first, has yielded richer results as the years have passed, and both the light-keepers' interest has been enlisted and their entries have become more numerous and intelligible. Then again, the fluctuating data obtainable require a long series of years to draw conclusions from them with confidence, and facts arise which explain what had been obscure, or confirm previous inferences. Therefore, the longer the inquiry is continued, the clearer will be the lessons which the Migration Reports will teach; and long may it be the privilege of Ireland to have this work carried on by so able and painstaking an ornithologist as the author of the book before us.

It is much to be regretted that only 350 copies have been printed, so that when all are sold, he will not be recouped for half his heavy outlay on its preparation.

EARLY GEOLOGICAL MAPPING  
IN IRELAND.

BY PROF. GRENVILLE A. J. COLE, F.G.S., M.R.I.A.

Now that Professor Judd (1) has traced back the foundations of Sir Richard Griffith's geological map of Ireland to the year 1812, a time when the discoveries of William Smith were making themselves generally felt, it is of interest to recall that one of the earliest geological maps of any part of the British Isles was published for the Royal Dublin Society in 1802. This is the map drawn up by the Rev. G. Vaughan Sampson, M.R.I.A., to accompany his well-known "Statistical Survey of the County of Londonderry." The work is of course mainly "geognostical," that is to say, it represents, by signs and colours, mineral differences among the rocks, rather than geological horizons. But Smith (2) himself had drawn up his manuscript map of the environs of Bath only three years before, and it is unlikely that the breadth and importance of his work had been realised in 1802 beyond the circle who discussed matters with him in the west of England. The colours used in Sampson's map of Londonderry are reserved for surface-deposits, such as brown for "heath and bog," yellow for "sand," green for "rich loams," &c. But he was fully alive to the desirability of representing the more massive and underlying deposits, which he does by signs scattered over the surface of the uncoloured areas of the map. On Slieve Gallion, in a space of about one square inch, we can thus trace the occurrence of "white lime" (the Chalk), the overlying basalt, and the granite mass stretching to the west. On the fine hills above Dungiven, we see how the Chalk runs as a band under the basalt capping of the range; while below it comes a band of "marle," where the Triassic beds now appear upon the map of the Geological Survey. No defined boundaries are given to these various formations; but we are clearly provided with the basis for a true apprehension of the district. The fact that Sampson's main purpose was agricul-

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(1) "The earliest geological maps of Scotland and Ireland," *Geological Magazine*, 1898, p. 148.

(2) See Judd "William Smith's Manuscript Maps," *ibid.*, 1897, p. 439

tural is shown by his note, "The parts without colour are infertile." From his treatment of the fertile areas, and the way in which one colour is there made to terminate against another along an engraved line of boundary, it is clear that the principles on which our "drift" maps are coloured at the present day were grasped by Sampson in 1802. That he did not apply these principles to the representation of the larger geological features was doubtless due to the conditions under which his work was prepared. In providing an index to the colours employed, Sampson was also a pioneer. When Professor Judd describes Smith's manuscript map of Bath, coloured in 1799, as "the oldest *geological* map in existence, if we distinguish geological from agricultural or soil maps," it is pleasant to note that Sampson and the Royal Dublin Society produced an engraved map only three years later, which represents several geological features, and which has thus good claims to be regarded as a geological map. So far as I know, it is the oldest geological representation of any part of Ireland, and was issued thirteen years before Smith's magnificent map of England and Wales was engraved and became public property.

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## CURRENT LITERATURE.

### A. Bramble-book.

The publication of Rev. W. Moyle Rogers's "Handbook of British Rubi" (Duckworth, 1900, 5/-) will be welcomed, though few of our Irish botanists elect to explore the thorny path of batology. The fruticose section of the genus, which includes all British forms except the Raspberry, Stone Bramble, and Cloudberry, runs to exactly 100 species as enumerated in this latest pronouncement on these bewildering plants. Mr. Rogers's book is distinctly attractive, being excellently printed; the descriptions are full, the characters marking each form being picked out in italics, and interesting notes on character and distribution are added. In an appendix the distribution of each is shown by a list of the Watsonian numbers of the counties in which it has been found; as regards Ireland, the author departs from this plan for reasons that are not stated, and quotes the names of counties instead. We cordially commend the book to our botanical readers.

## REVIEWS.

### THE NEW DEPARTMENT.

**Journal of the Department of Agriculture and Technical Instruction for Ireland.**—First Year, Nos. 1 and 2. Pp. 180 and 192. Dublin: H. M. Stationery Office. August and November, 1900. Price, 1s. each.

For the information of agriculturists and educationalists in Ireland and elsewhere, our new Department issues a quarterly journal, the two first numbers of which are before us. It is a gratifying sign of the interest taken in the work of the Department that the first number is already out of print. It contains a full report of the first meeting of the Council of Agriculture with the address delivered thereat by the Hon. Horace Plunkett. A very important article on the Irish flax industry is contributed by Prof. Johnson, who gives a full account of the process of retting as practised by continental flax-growers and points out the importance of bacteria as agents in the process. Prof. Carroll of the Model Farm, Glasnevin, gives the outline of experiments on foods furnished to sheep, with regard to their manurial value in promoting the growth of cereals on the land, and also to their food value as tested by the production of mutton. We observe also articles on the Warble Fly, and on enteric disease in calves, as well as a valuable summary of the Irish agricultural statistics for 1899, and a number of notes of general interest.

The main feature of the second number is Prof. J. C. Ewart's valuable article on the ponies of Connemara. Instead of conforming to one type, as generally supposed, these hardy little animals may be grouped into five tribes. Prof. Ewart, whose experience of horse-breeding is well known, believes that Connemara "could produce ponies—say one thousand annually—suitable for mounted infantry (alike in size, hardiness, staying power, and intelligence) at a lower figure than any other district in Great Britain or Ireland." Mr. W. S. Green, Inspector of Fisheries, contributes a valuable paper on Fishery Development with especial reference to instruction in sea-fishing, and we notice an excellent picture of the s.s. *Helga*, recently acquired for the scientific marine researches of the Department, and already at work on the western seaboard. There are abstracts of the agricultural statistics for 1900, short papers on the Turnip "Fly" and Wire-worms, reviews of the work of the Irish Land Commission and the Congested Districts Board, directions as to the prevention of tuberculosis in cattle and fungoid disease in potatoes, and a number of short notes bearing on the wide range of subjects which come within the scope of the Department's work.

### BOG-MOSSES.

**The European Sphagnaceæ** (after Warnstorff) by E. CHARLES HORRELL, F.L.S. *Journal of Botany*, May to December, 1900.

Since the appearance of Dr. Braithwaite's fine work on the bog-mosses in 1880 nothing of importance has appeared dealing with the British species. Mr. Horrell's work, which forms a pamphlet of 88 pages, and appeared first in the *Journal of Botany*, does not profess to be original, but to place before British bryologists Warnstorff's latest arrangement of the bog-mosses as the most natural classification yet published.

It is however more than a mere translation. There is an interesting introduction, a useful bibliography, references to British works are inserted, and numerous localities given for species and varieties, so that the work will be indispensable to British students of the genus. These are followed by a clavis of the European species and elaborate descriptions of species and varieties. There are 41 species and 110 varieties numbered and described, while the whole number of varieties referred to or described amounts to 210. Even so, we learn that this formidable array is not complete, "innumerable varieties" have been mercifully omitted. The great majority of these species have been found in Britain, and a lesser number of the varieties. Braithwaite's *Sphagnaceæ* recorded 20 species and 47 varieties as British, the *London Catalogue* of 1881, 16 species and 34 varieties, while the number in Dixon's *Handbook* of 1896 was reduced to 12 species and 40 varieties (including sub-species).

Irish localities are conspicuous by their absence in the long lists given, and it might be supposed there was no great variety of bog-mosses in the land of bogs, or that Irish bryologists had neglected the study. I suppose no doubt is intended to be thrown on recent Irish records (for example *Sphagnum medium* Limpr. and *S. Austini* Sulliv. have been recorded in the *Irish Naturalist*), but if an author only wishes to vouch for specimens he has seen, this should be stated. Several important works have appeared of late with accounts of the distribution of British mosses in which most recent Irish records of importance are ignored.

The *Sphagnaceæ* form a compact and natural family, but are hard to divide up into natural well-defined species and varieties. The fructification so useful in other families fails us here. Warnstorff's system accordingly depends chiefly on the cell structure, and ascribes great importance to the position and form of the chlorophyllose cells of the branch leaves, and to the form and distribution of the pores in the cell walls. To determine the species, it is therefore necessary in many cases to make sections of the leaves. Students of the old school will be sorry to find that their plants cannot be determined in the field, and will not take kindly to the system, but there is no doubt the older arrangements left troublesome intermediate forms, often impossible to determine. It remains to be seen if the new system will clear up these difficulties.

Much work remains to be done in correlating British and continental forms; many slight varieties depending only on colour, &c., will likely be discarded, and others of more importance peculiar to these countries described, and fitted into their places.

## NEWS GLEANINGS.

### Belfast Municipal Museum.

An important and interesting addition has been recently made to the natural history department of this museum by the donation of an extensive and valuable series of marine, fresh water, and land shells from the representatives of the late Mr. George Horner, J.P., of The Lodge, Cliftonville. This collection, to be known as the "Horner Collection," was largely collected by the late Sir James Emerson Tennent, Governor of Ceylon, and sent home to Mr. Davidson, M.P., of The Abbey, White abbey, at whose sale they were acquired by the late Mr. Horner.

### The Limerick Field Club.

The Limerick Field Club in their winter programme include two evenings devoted to "Natural History and Archæological Exhibits followed by short papers from members of the Club." This should be useful in popularizing the meetings. The scientific lectures on the programme include "A Botanical Ramble in the English Lake District" by Miss Bennis, and "Some Limerick Wild-flowers" by Mr. Praeger.

### Exploration of Dunmore Cave.

Professor A. C. Haddon and Messrs. Seymour (Geological Survey), Halbert (National Museum) and Praeger have been investigating the Cave of Dunmore, in Co. Kilkenny, both as regards its geology, and its past and present fauna. A number of the small animals which render the Mitchelstown cave so interesting were taken. The full results will be published shortly.

### Dublin Museum Demonstrations.

We call attention to the advertisement of the Museum Demonstrations now being held in Dublin, which appears on the back of our cover. This form of practical instruction in science and art has proved a success in the past, and its originator, Col. Plunkett, is sparing no pains to make the demonstrations of the present year as interesting as heretofore. The demonstrations already held have been largely attended.

### Field Club Union Conference.

The Committee of the Irish Field Club Union have decided on holding the Triennial Conference of 1901 in Dublin, in the month of June. This will be a departure from the plan of the two previous conferences, inasmuch as the whole time will not be devoted to country excursions; visits under skilled guidance to the various scientific institutions of the metropolis will be an important item of the programme; but the beauties of counties Dublin and Wicklow will not be lost sight of.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a monkey from Mr. S. Johnson, a pair of Wild Goats from Sir Douglas Brooke, a Pigmy Bull from Major Lambert, a Polar Bear from Mr. A. B. Walker, a Yellow-fronted Amazon from Mrs. Hall, a Sulphur-crested Cockatoo from Mrs. Downs, a pair of Tanrecs from Dr. C. B. Ball, a Civet Cat, a pair of Spotted Woodpeckers from Mr. J. W. Lentaigne, and a Fox from Messrs. E. and D. Carton.

4,962 persons visited the Gardens in November.

### DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 1.—The Club met at Leinster House. Dr. SCHARFF showed a transverse section of a new species of terrestrial Planarian worm. The worm was discovered by him last year at Faux Chaudes in the Pyrenees, and recently described as *Rhynchodemus Howesi* (*Linn. Soc. Journal, Zool.*, vol. xxviii., 1900). The section, which was cut at the anterior end of the body, showed the structure of one of the eyes clearly, as well as the sensory grooves—a characteristic feature of many planarian worms. The ciliated epithelium is confined to a narrow tract on the lower surface of the body. Sensory pits appear to be absent in this species. *Rhynchodemus Howesi* has a length of no less than 5 inches; it is therefore just twice as long as the largest member of the genus hitherto known to science. Five other species of *Rhynchodemus* occur in Europe, one of which is peculiar to Ireland and another to the Pyrenees, while *Rh. terrestris*, to which the new species is nearly related, has a much wider range.

Mr. MOORE showed on one slide various ornamental appendages from the flowers of *Bulbophyllum* and *Cirrhopetalum*. These appendages mostly take the form of hairs. They are brightly coloured, and as they are very slender at point of origin, the slightest wind causes them to move about, thus making the flowers conspicuous. In some cases the colouring matter is in the cell sap; in others the walls of the cells have become stained.

Mr. M'ARDLE exhibited *Scapania ornithopodioides*, Dillenius and Withering (*Scapania planifolia*, Hook.), which was collected by himself and the Rev. Canon Lett last June in a rocky gorge on the N.E. side, and near the summit of Mount Brandon, Co. Kerry, probably in the same place where it was first found by Dr. Taylor in 1813, and some years later by two celebrated bryologists, Messrs. Mitten and Wilson. Mount Brandon is the only known locality in Ireland. This rare and beautiful Hepatic has never been found in fruit. Mr. M'Arde exhibited a specimen showing how the plant reproduces itself by adventitious budding.

Mr. HENRY J. SEYMOUR exhibited a thin section of a rock (hornblende-kersantite), occurring as a dyke on the east coast of Co. Down. The rock is of special interest, as it contains a blue amphibole not hitherto known to occur *in situ* in Ireland, and which is an addition, therefore, to the list of Irish minerals. It occurs as a secondary growth in crystallographic continuity with the primary green hornblende of the rock, and is probably arfvedsonite.

## BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 7.—ANNUAL CONVERZSAZIONE.—The Annual Conversazione was held in the Free Library. At half-past six o'clock tea was provided for the visitors on the ground-floor rooms. In the Reference Library was a display of exhibits which was well up to the average. The collection embraced the following:—GEOLOGY—Dr. G. Abbott (Rochester Field Club), magnesian limestone concretions; W. Swanston, New Red Sandstone concretions from Connecticut Valley, U.S.A.; J. Wright, foraminifera from Pleistocene clays, Isle of Man; C. Bulla, Irish and American Carboniferous crinoids; W. J. Fennell, quartz from the Mourne; R. Bell, cephalopoda from Liassic and Cretaceous rocks of Derry and Antrim; W. Gray, Liassic Cephalopoda, and minerals from the basaltic rocks of Antrim; J. St. J. Phillips, rock sections (micro.); J. Orr, Carboniferous fossils from Ayrshire; Rev. P. Quail, rocks from County Down; Miss Blackwood, collection of Liassic fossils (prize). ZOOLOGY—R. Welch, genus *Helix*, British and foreign, the genus *Clausilia*, British and foreign, shells collected on the Club's excursions, 1900; W. A. Green, a year's collecting in Ulster; G. Reilly, a beginner's collection; R. Welch, living specimens of *Helix aspersa* five years old; W. Gray, reversed specimens of *Helix*; J. Donaldson, pond-life (micro); H. L. Orr, the genus *Cyprina*, British and foreign; R. Welch, *Patella athletica*, with coralline growth; C. Elcock, selections from the Horner collection just presented to the Free Library Museum; T. Brown, pearls and precious stones; W. H. Patterson, cameos; R. May, cameos; J. Hamilton, shells used as foghorns; F. J. Bigger, shells from the Andaman Islands; R. Patterson, a series of Stoats from Ireland, England, and Scotland, a series of Weasels from England and Scotland, collection of Irish bats, and stuffed fishes and birds; J. Hamilton, locusts recently taken in South Africa, and other insects recently taken on the Amazon; W. F. McKinney, the caterpillar of *Hepialus virescens*. BOTANY—Rev. C. H. Waddell, flowering plants, and mosses; Rev. Canon Lett, fungi; W. H. Phillips, illustration of apospory in *Athyrium Filix-femina*, some recent fern finds; Mrs. Stelfox, marine algæ (mounted); Miss M. C. Knowles, rare grasses recently collected; H. Hanna, algæ from the Arctic Seas, phyto-plankton, Atlantic, West Coast of Ireland; J. H. Davies, growing mosses; J. Vinycomb, original drawings of plants, by Worthington Smith, F.L.S.; Major-General Bland, set of illustrations of British fungi, drawn by exhibitor; Royal Botanic Gardens (Glasnevin), carnivorous plants; F. J. Bigger, the cotton plant; N. Carruthers, mounted plants, collected on summer excursions; Botanical Committee, recent additions to Club's herbarium; J. Malcomson, prize collection of plants; S. A. Stewart, old botanical books; Richard Hanna, old botanical books; W. Gray, an old botanical book; J. Vinycomb, herbal with illustrations by T. Bewick. ANTIQUARIAN—The President, original sketches of round towers, by the late W. F. Wakeman; W. H. Patterson shells from shell-mounds and sand-dunes; W. Gray, the effect of decomposition of ancient Irish celts; Miss Walkington, weaver's old



candlesticks; R. May, old Irish lamps; W. J. Fennell, F. J. Bigger, and H. Hughes, plans, drawings, and rubbings made in 1900; J. Vinycomb, Basin Loaning.

At nine o'clock the President (Mr. Francis J. Bigger, M.R.I.A.), in opening the proceedings, cordially welcomed the many friends of the Club, and hoped that the exhibition had given them every satisfaction.

The lights having been turned down, a number of beautiful views were thrown on the screen by Messrs. Fennell, Hogg, Welch, M'Kinney, and Wm. Gray. The pictures were those taken by members of the Club during their summer excursions to Downpatrick, Carrickfergus, the Valley of the Boyne. During the evening microscopic demonstrations were given by Messrs. Donaldson, M'Cleery, Phillips, Stelfox, Wright, Welch, and Gray, while relics and mementoes relative to South Africa were taken charge of by Messrs. G. Donaldson and W. Swanston. The art collection on the upper floor of the Library attracted considerable attention. It may be mentioned that before the close of the proceedings a special vote of thanks was passed to Dr. G. Abbott, of Tunbridge Wells, who sent an excellent series of concretions of the magnesian limestone of Durham.

NOVEMBER 27.—The Winter Session of this Society was opened. Mr. Rodman exhibited an excellent collection of lepidoptera. Miss Wheeler exhibited some interesting examples of humming-birds' nests. At eight o'clock the President delivered a lecture on "Irish Ecclesiastical Architecture," dealing with the peculiarities of our primitive structures, beehive huts, oratories, round towers, &c., with which Ireland is so richly provided. The influence of the Norman invasion and subsequent times was also very fully explained, and the lecture was copiously illustrated by lantern slides produced by our best photographers. The meeting was closed by the election of new members.

### DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 20.—The chair was taken by Mr. W. DE V. KANE in the absence of the President. Forty-two members and visitors were present.

Mr. G. W. NICHOLSON read a paper on "Natural history observations made on a visit to the marine floating laboratory of the Royal Dublin Society, at Ballynakill Bay." The speaker gave a most interesting account of the work done in the floating laboratory. He described the various measures adopted for the capture, preservation, and classification of marine zoological specimens. The interior of the laboratory, its appointments and contents were also described. Many very beautiful marine organisms are frequently obtained, and while still alive and active are submitted for examination.

Mr. Nicholson referred to the importance of studying the structure of animals as well as their habits. The paper was one of general interest, for it dealt not only with the natural history of marine animals but also with the land fauna of Ballynakill. Mr. Nicholson enumerated

the insects and birds he observed in the district. His remarks on birds were illustrated with many well executed lantern slides. He finished up his paper by giving a popular account of the wild, healthy life which he spent with the rest of the crew of the floating laboratory.

Dr. C. J. PATTEN (Hon. Sec.), considered that the Club was much indebted for the most interesting communication. He (Dr. Patten) had visited the laboratory also and had seen the good work done there. The country was rich in animal life. In addition to the foregoing list made by Mr. Nicholson, Dr. Patten had noted several large seals and many additional birds.

Rev. W. ELLISON remarked that although he had not investigated the natural history of Ballynakill still much valuable work could be done in remote parts of the West of Ireland. He gave an account of an expedition to Slieve More in Achill Island. There he saw the Golden Eagle now so rare in Ireland. He also noted the Chough. He had recently visited Mayo and Sligo, including the coast lands of Killala and Ballina. He observed that the Curlew—usually a wild and wary bird—was quite tame and easily approached. He referred to his observations on Sandymount strand, Dublin. He gave a list of numerous sea and shore birds from that district, and pointed out that the Heron was seldom seen.

Miss MAHAFFY stated that it was most remarkable that Herons should be so common on the north side of the River Liffey—Sutton and Dollymount—and so rare on the Sandymount Strand.

Dr. PATTEN offered an explanation by stating that probably in the former localities suitable food was more abundant.

Mr. CUNNINGTON said that he had visited the marine laboratory when stationed at Inisbofin. Birds were so abundant that many were used as articles of diet. The Oyster-catcher in his estimation is a very edible bird.

Mr. OTWAY had made observations on the Donegal coast, where he saw many Seals and Ravens.

Mr. PRAEGER gave an account of his travels over Slieve More, and pointed out that it is a district full of interest to the naturalist.

Mr. A. WILLIAMS briefly touched upon his observations made in Achill Island. Seals were common. The avi-fauna, rich and varied, included many rare birds which had visited the coastlands and sea-board of the island. He had observed Eagles from time to time.

Mr. DE V. KANE described some of the beautiful lakes and mountains in the west of Ireland, also the nature of the bays and inlets. In June he found the Puffin and Great Northern Diver swimming on inland lakes in Monaghan thirty miles from the coast.

Dr. ALCOCK and Dr. PETHYBRIDGE also offered remarks on Mr. Nicholson's paper.

The following were elected members:—Miss Dorothy M. Hudman, Rev. D. F. R. Wilson, S. Ball, J. H. Chomley, E. Cumming, H. R. Nelson, Alfred Purser, J. Holmes Pollok, C. E. Steele, and A. Bell.

**CORK NATURALISTS' FIELD CLUB.**

NOVEMBER 30.—An exhibition of scientific objects and apparatus was held in the School of Art. The Cork Club for the first time departed from its accustomed role and included photography among its exhibits. A large number of people inspected the exhibits.

Mr. FARRINGTON pointed out that though the progress of the Field Club was to a certain extent slow, it was sure, as could be judged by the exhibits around. One example he would give as encouragement to beginners in field work. He picked up a small plant one day, and not knowing it, asked a specialist about it, and found it was a plant not found before in Cork. Another interesting branch of work would be following out the life history of animals.

Mr. PORTER then gave a short account of volcanoes, and showed specimens of the various rocks.

Professor HARTOG gave some interesting exhibits of microscopic slides. He also spoke of the necessity of Irish Clubs looking after the birds of Ireland. He knew on the authority of Professor Bergin that many native birds have Gaelic names which have never been recorded. The prize for the best collection of natural objects among junior members he was very glad to award to Miss Queenie Harrington.

The exhibits of the Society were many and varied. Those of the two most youthful members of the Club deserve a word to themselves. Masters Stephen Farrington and Cecil Brooke Hughes each sent in a collection of shells, which, considering that both lads are under twelve, augurs well for their future scientific work. The following is a list of the exhibits:—Mr. W. Ringrose Atkins, photographs; Mr. J. L. Copeman, two cases of butterflies from Ladysmith; Mr. W. C. Corin, photographs and some models of Celtic crosses from Cornwall; Mr. T. Farrington, transformations of Vapourer moth; Miss V. Farrington, book of botanical specimens; Master T. Farrington, case of shells; Rev. P. Hurley, P.P., some rare books and the views from early edition of Scott's novels, and some photographs; Mr. Osborn Bergin, B.A., ancient MS. in Gaelic; Mr. W. Miller, portable sundial and compass, radiometer, redometer, planisphere; Mrs. M'Laine, a case of silkworm cocoons and silk spun in Cork; Mr. W. H. Johnson, cases of specimens of wood and shells found in a submerged bog in Ballycotton; Mrs. W. H. Johnson, cases of shells found at Ballycotton; Miss Martin, cases of shells and fossils, and case of minerals and precious stones, presented to High School by the late Mr. Ruskin; Mr. Rohu, stuffed specimens of Glossy Ibis, Velvet Scoter, Bittern, and a Death's-head Moth found on Parnell Bridge. Professor Hartog, D.Sc., showed a splendid collection of microscopes and slides; Master Cecil Brooke Hughes, case of shells; Mrs. Brooke Hughes showed a fine collection of orchids, ferns and nature prints; Mr. C. Baker, lead ore, copper ore.

## NOTES.

### BOTANY.

#### *Sphærotheca mors-uvæ* in Co. Antrim.

This, the "Gooseberry Fungus," appeared in the garden at Whitehall, Broughshane, Co. Antrim, last spring. According to Mr. Ernest Salmon, F.L.S., it is the first appearance of this species in Europe. Mr. F. W. Moore, of Glasnevin, also received specimens.

S. A. BRENNAN.

Knocknacarry, Co. Antrim.

#### Truffles in Ireland.

Seeing in the November *Irish Naturalist* a note of the discovery by Major Elmitt, after much trouble and research, of Truffles in the Co. Galway, may I be allowed to inform readers that this fungus has been known to exist at Castle Taylor for about forty years, and that I have partaken of this home-grown delicacy when staying there with my friends. Truffles have often been gathered there by myself and many others.

FRANCES M. MORE.

Dublin.

#### *Elymus arenarius* in Co. Dublin.

In the November number of the *Irish Naturalist* Mr. N. Colgan writes on this grass as found in a new station about a quarter of a mile north of the Bray River, and states that all appearances are in favour of this conspicuous species having been long established, and that it is remarkable it should have so long escaped discovery there. I have lived for years quite near to this spot, which, of course, I know well, it being only separated from my house by a couple of pasture fields. Being absent from this district during the greater part of the years 1898 and 1899, my attention was first attracted to this striking species last summer, but as the slope and granite embankment in which it is growing was constructed not more than three years ago, I felt no doubt that it had been introduced in some manner; especially as some hundreds of tons of stiff clay and other materials were brought from Glenageary, Wicklow, and other places along the railway line, and deposited there by the workmen, and used to face the sloping banks before placing the granite stones in position. Also, higher up on the banks I found a gigantic species of *Briza*, with spikelets quite half-an-inch in length, which is not even a native of the British Isles. Both it and the *Elymus* are offered in flower and seed catalogues under the heading of Ornamental Grasses. Had I had any evidence of the *Elymus* being native there, I would have let the plant's station be known to Irish botanists. On the appearance of Mr. Colgan's note, I determined to settle the question of its introduction be-

yond doubt. I interviewed a man who was engaged as overseer at the construction of the embankment referred to, and I found my suspicion of this grass being introduced confirmed. From him I learned the rather interesting information that it had been sown there by the Railway Company. When one half of the work had been completed, it occurred to some of the engineering staff that the planting of a grass might help to protect the clay banks from the action of the sea. As a result, seeds of a suitable grass were procured. My informant did not know the species (no doubt the *Elymus*), and two workmen were detailed to plant on the banks and among the crevices of the granite embankment what is now a flourishing colony of about one hundred yards. I find, on referring to a hand-book on grasses, that this is the identical species used to protect the coasts of Holland. I have not seen the Skerries station, but the claims of *Elymus arenarius* as native in Co. Dublin seem to be slender.

JOSEPH MEADE.

Old Connaught, Bray.

### **Hieracium hypochæroides and Listera cordata in Co. Cork.**

I have much pleasure in adding these two interesting plants to the flora of this county, as the result of an excursion to the Millstreet mountains in July last. *Hieracium hypochæroides*, Gibs. (= *H. Gibsoni*, Backh.), a plant peculiar to the British Isles, I found growing with *H. iricum* and *H. anglicum* on rocks over Gurtavehy Lake, certainly a most unexpected locality to find it in, as in its only hitherto known Irish station, Glencolumbkille, Co. Clare, and in the few localities in which it occurs in Great Britain, it is apparently confined to the Mountain Limestone, whereas the Millstreet mountains consist altogether of Old Red Sandstone. The little orchid, *Listera cordata*, R. Br., is plentiful on the same and several other mountains in the district. The identity of my hawkweed was verified by Rev. E. F. Linton, M.A., to whom my best thanks are due.

R. A. PHILLIPS.

Cork.

### **Matricaria discoidea and Arenaria tenuifolia in Ireland.**

To the list of counties recently given in the *Irish Naturalist* in which *Matricaria discoidea* has been found, I can add Co. Tipperary, having seen it growing abundantly by a damp roadside between Nenagh and Dromineer last July, thus showing that it has begun the invasion of Munster as well as Ulster. I have also seen it during the past summer at Galway, Ballinasloe, Athlone, Claremorris, and Ballyhaunis. *Arenaria tenuifolia* also seems to be spreading rapidly; I have noticed it this year at Roscrea in Co. Tipperary, Clara in King's County, and at Loughrea, Ardrahan and Attymon junction in Co. Galway.

R. A. PHILLIPS.

Cork,

**Chenopodium ficifolium, Sm., in Ireland.**

Early in September of last year I noticed, in an enclosed space at Lisburn, Co. Antrim, where soil and some rubbish had been deposited, a Chenopod, differing so much in form of leaf and general habit from *C. album*, with which it was growing, as to lead me to suspect it to be *C. ficifolium*, and to keep it under observation. It was so much belated that the inflorescence did not appear till the middle of November, long before which time *C. album* and *Atriplex angustifolia*, with which it was associated, had died away and disappeared. The suspicion formed proved right the identification having been verified by Mr. Stewart and Mr. Colgan; also by Mr. Arthur Bennett, who writes, "It is, no doubt, fine *ficifolium* Smith." The records in the first edition of "Cybele Hibernica" have, in the second edition, been discredited on the ground that they were "not confirmed," and "are probably all errors." The present thus seems to be the first satisfactory record for Ireland, and the plant, therefore, comes as a candidate for admission to the flora. Its proper standing as Irish remains to be fixed. Pending further enquiry, it can hardly be accepted as other than a suspected alien, which is the view entertained by Mr. Colgan. It seems to be a species not often constant in its localities, but it may probably have been overlooked with us, and, I think, will not unlikely be seen again elsewhere in the neighbourhood.

The Chenopods and *Atriplices* have not much attraction for many observers, and have, perhaps, been too much neglected. Though said to be near to *C. album*, our plant, where seen growing, is strikingly different. The several specimens observed at Lisburn were very large and robust, one of them being over four feet high, the stem near the base more than an inch in diameter, closely branched and densely leafy, and pyramidal in outline. The odour is peculiar, resembling that of stale dried fish.

J. H. DAVIES.

Lisburn.

**Lesser Broom-rape on White Clover.**

Far from finding *Orobancha minor* "exclusively on *Trifolium pratense*," I find it in Co. Wexford abundantly on *Trifolium repens*. This summer I persistently noted that the parasite was in full flower on *T. repens* in six different localities before I had seen a single spike of it on *T. pratense*. There was no Red Clover in the vicinity of any of the plants above referred to. I have a note of finding *Orobancha minor* in flower on Sweet Pea in the garden at Ballyhyland, in the third week of November, 1895.

C. B. MOFFAT.

Ballyhyland.

## ZOOLOGY.

### *Vanessa c-album* in Ireland.

A short time ago the Rev. C. L. Garnett, M.A., Rector of Ardtra, Co. Tyrone, was on a visit in this neighbourhood, and came to see my collection of insects. He informed me that he had seen *Vanessa C. album* in Co. Dublin, and on my asking for a detailed account of the matter, very kindly informed me of the circumstances. It was about  $1\frac{1}{2}$  miles from Malahide, on the Dublin road, that he met with the insect, in either July or August. The butterfly settled and remained basking in the sun with its wings expanded, so that Mr. Garnett had a full and clear view of it. He made an attempt to catch it, but missed, and the butterfly immediately made off at full speed. Mr. Garnett returned to the spot several times, but failed to meet with the insect again. I have submitted the evidence to Mr. Kane and agree with him that it is satisfactory proof that it was *V. c-album*; but that, of course, it was a case of casual migration.

W. F. JOHNSON.

Poyntzpass.

### *Vanessa io* in Ulster.

The Peacock butterfly seems to have made a regular invasion of Ulster this year. We have already records of Miss Campbell's capture of it in Co. Londonderry, and Mr. Kane's records of it from Co. Monaghan and Newry, and I have seen a specimen from Donegal, and now have to report its occurrence in Armagh in the garden of Mr. John M'Watters, and at Ardtra Rectory, Co. Tyrone, where it was seen by the Rev. C. L. Garnett, while the Rev. Canon Lett showed me the remains of one which he found at Loughbrickland. I must say that the Peacock showed very bad taste in not coming to Acton Glebe, where it would have had every accommodation in the way of butterfly nets, chloroform, pins, and setting boards!

W. F. JOHNSON.

Poyntzpass.

### Roller in Co. Donegal.

On 27th September, 1900, Mr. Thomas Sheen shot a female Roller (*Coracias garrulus*), at Fure, Co. Donegal (about 7 miles from Londonderry); it frequented the neighbourhood for some days before it was shot, and was reported to be an escaped parrot.

D. C. CAMPBELL.

Londonderry.

### Tawny Owl in Co. Down.

On November 19th, a Tawny Owl (*Syrnium aluco*, L.), was sent in to me for inspection. It was shot in the early morning of November 16th, 1900, in a wood in Belvoir Park, near the River Lagan. I examined it carefully in the flesh, and there was no trace of confinement. It was moulting, and the "pen" feathers were so numerous that Sheals declined to skin it. However, it was successfully skinned by Mr. Stears, the owner. I afterwards dissected the body and found it to be a female; but from the size of its ovaries, I do not think it is a bird of the year. Its stomach contained the remains of a full-grown rat, with a tail six inches long. The rat's two hind-legs and portion of the back and ribs were there; but the fore-legs and skull were missing. The stomach was lined with the fur. I made a special journey to Belvoir Park, and cross-examined the gamekeeper who shot it. He was quite unaware of the rarity of his capture, but knew it was not a Long-eared or a Short-eared Owl. He told me that the gardener, wishing to have a bird to fill an empty glass case, asked him to give him the first bird he shot. He took his gun the next day, and on coming to this wood was attracted by the screaming and calling of Blackbirds and Thrushes. Thinking a Stoat was the cause, he advanced cautiously and saw the Owl perched in a tree. He was going away, when he remembered the gardener's wish, and shot it for him. At the time, he noticed the number of feathers he knocked out of it. I have seen the place where it was shot, and do not doubt the genuineness of the occurrence. This being the first authenticated record of the Tawny Owl in Ireland, I have thought it right to give all the information I have in detail.

ROBERT PATTERSON.

Belfast.

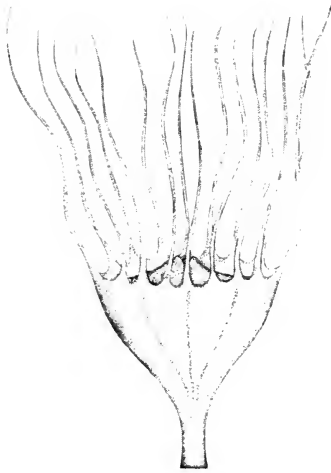
### The Hedgehog near Belfast.

It may, perhaps, interest some northern readers to know that the Hedgehog lives and breeds within a mile and-a-half of Belfast; it seems strange that such a shy animal should live near so large a city. I have noticed them for the last eight years in a garden close to the town. They crop up every now and then, usually found by a dog or the gardener—we do our best to protect them; I have kept one for a whole winter, and found it a source of great amusement; it got quite tame, and would eat beef out of my hand and run after me for it. We noticed that it would run backwards and forwards time after time, always turning about the same point. I do not know whether this is the habit of every Hedgehog. I have never seen the fact mentioned in any natural history book; but some naturalists may have observed it.

W. H. WORKMAN.







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DEVELOPMENT OF CHRYSAORA ISOSCELES

NOTES ON THE REARING OF  
CHRYSAORA ISOSCELES IN AN AQUARIUM.

BY MAUDE J. DELAP.

ON June 21st, 1899, I picked up a damaged specimen of the jelly-fish *Chrysaora isosceles* on the shore of Valencia Harbour, and placed it in an aquarium for examination. On the following day I saw numbers of tiny particles moving about in the water, and found that they were ciliated planulæ, which had been liberated from the medusa. On June 27th the planulæ were attaching themselves to the glass and hanging down from the surface film of the water.

Two days later the tentacles began to develop, showing that the free-swimming planula stage was over, and that a fixed hydroid-like stage, known as the *Scyphistoma*, had commenced. At first the Scyphistomæ had four tentacles, then four more appeared, one midway between each of the first tentacles, and later on eight others to make up the full number of sixteen. Some of the Scyphistomæ had their full number by July 13th. I kept a large number of these Scyphistomæ in an ordinary 12-inch bell-jar throughout the winter. About twice a week some fresh sea-water was put in. A supply of copepods was kept in the bell-jar, but the Scyphistomæ, I found, preferred to feed upon small medusæ, such as *Sarsia*, and little ctenophores—*Pleurobrachia*. In December a few of the Scyphistomæ budded young ones from the base of the polyp.

On April 3rd, 1900, I saw an *Ephyra* swimming in the bell-jar containing the Scyphistomæ, which I had reared from the *Chrysaora* taken during the previous summer, and on looking next day five more were found. It was evident that they had only just been liberated from a *Scyphistoma*, as two specimens were still united. On April 14th I found a *Scyphistoma* just beginning to start the process of segmentation, and kept it under observation. The tentacles of the *Scyphistoma* were gradually absorbed, and the animal changed in colour from white to pink. A series of transverse rings next appeared, dividing the body into a number of segments. Each segment developed into an *Ephyra*. Segmentation began at the anterior end of the polyp, and proceeded downwards, so that the *Ephyræ* were liberated one after the other, but occasionally in

the struggle for freedom two or three came off together, and separated afterwards.

A Scyphistoma in the process of segmentation is known as a *Strobila*. In the specimen under observation, Ephyrae were liberated three days after the commencement of strobilization. The Ephyrae when first liberated were pinkish, but soon changed to a translucent white. They measured about 2 mm. in diameter. The disc or umbrella was flat and divided into eight marginal lobes, each bearing a sense-organ (tentaculocyst). The next step was to try the experiment of rearing an Ephyra up to the adult stage, and to see how large the medusa would grow in confinement. On April 17th six Ephyrae, liberated on 3rd and 4th April, were placed in a bell-jar containing some *Sarsia tubulosa*; the latter were soon eaten, in spite of their being much larger and more active swimmers. By April 22nd the largest Ephyra was beginning to assume its adult form.

The umbrella measured half an inch in diameter, and four tentacles had developed on the margin. The tentacles when fully expanded were about 4 inches in length. The circular mouth of the Ephyra was now surrounded by four oral arms. Their food supply consisted chiefly of small medusae, which were greedily devoured. The largest of the Ephyrae (measured on April 22nd) increased in size more rapidly than its companions, and proved itself to be the survivor of the fittest by eating them. On May 16th the survivor measured  $1\frac{1}{2}$  inches across the umbrella. The oral arms, now frilled, were  $2\frac{1}{2}$  inches in length. Four more tentacles had appeared, and others were just visible, one on each side of every sense-organ.

By May 22nd it had reached the normal form of the adult (just seven weeks old) having 24 marginal tentacles. The umbrella measured  $2\frac{1}{2}$  inches in diameter, and the frilled oral arms 5 inches in length. On June 4th the brown markings on the top of the umbrella began to appear. The umbrella now measured  $3\frac{3}{4}$  inches across, and the oral arms 9 inches. By June 13th it had become too large for its bell-jar (12 inches across and 8 inches deep), so it was removed to another 14 inches across and 12 inches in depth, holding when full about 4 gallons of water. At this stage the umbrella was 5 inches

in diameter. On June 21st the umbrella had increased to 6½ inches in diameter and 3 inches in thickness; the frilled oral arms extended to the bottom of the bell-jar. The colouring of the marginal lobes and the top of the umbrella was now as bright as in a specimen taken from the sea—a rich dark brown colour.

About July 8th the medusa—13 weeks old—reached its maximum growth. The umbrella was 9 inches in diameter; the oral arms and tentacles extended to the bottom of the bell-jar. The gonads were visible, showing quite yellow through the umbrella.

The difficulty of obtaining a sufficient food supply owing to the stormy state of the weather, and the increased temperature of the water, gradually affected the health of the medusa. It began slowly to decrease in size, the umbrella became smaller in diameter, and the oral arms and tentacles shorter. It spent, too, a great deal of its time at the bottom of the bell-jar bumping the top of the umbrella upon the gravel, instead of swimming round and round at the surface. By August 13th its condition became critical, and as it was not likely to live much longer I preserved it in a solution of formaline. The umbrella had decreased to 6 inches in diameter.

The chief trouble connected with the rearing of this medusa was to obtain a sufficient supply of food; its appetite was enormous. I soon found out what kind of food *Chrysaora* preferred by placing different pelagic animals in the bell-jar, and watching the result.

It had a great liking for small Antho-medusæ and Lepto-medusæ, such as *Corymorpha*, *Margelis*, *Sarsia*, *Amphinema*, *Phialidium*, *Laodice*, *Euchilota*, &c.; also for the siphonophore *Agalmopsis*, and the ctenophores *Pleurobrachia* and *Bolina*. It had no objection to *Tomopteris* and *Sagitta*. There were, however, two animals it would not touch, even after a few days' starvation—the antho-medusa *Tiara pileata*, and the ctenophore *Beroe ovata*. It is well known that young fish are often found under the umbrella of the large Scypho-medusæ, especially *Pilema (Rhizostoma) octopus*. One day I put a small fish, about an inch in length, into the bell-jar. The medusa caught it and held it for some time in the frills of the oral arms, but finally let it go without doing any harm to it. I kept afterwards two small fish for some weeks in the bell-

jar along with *Chrysaora*, but it never attempted to catch them. Copepods and other crustacea were placed in the bell-jar, but the medusa did not eat them. It seems clear that *Chrysaora* mainly lives upon jelly-fish, using the term in a popular sense.

The long marginal tentacles are used for catching animals, and the lightest touch is sufficient to hold securely a small jelly-fish. The tentacle is then drawn up and towards the frill of one of the oral arms; the frill seizes the captured medusa and passes it up into the mouth. When *Chrysaora* was hungry it stretched out the tentacles to an enormous length and also the frilled arms; but when quite satisfied it kept both contracted. A good meal consisted of several dozen medusæ and ctenophores.

The water in the large bell-jar was changed daily, about one gallon removed and a fresh supply added. The temperature of the water in the bell-jar was often taken and compared with the surface temperature of the sea. The bell-jar stood on a table near a window with an eastern aspect, sheltered from the sun. In the early part of the year the water in the aquarium was below the surface temperature of the sea. In February as much as 3 to 5 degrees (sea minimum 47.5° F.; aquarium 42° F.) In March the temperature became more equalized, and later on the water in the aquarium was above the temperature of the sea. During May and June the aquarium was usually about 3-4 degrees in excess (aquarium 59°-62° F.) In July there was a short spell of hot weather, which increased the temperature of the aquarium to 66° F., the sea being 64° F. This was the highest temperature recorded in the aquarium.

Valencia, Co. Kerry.

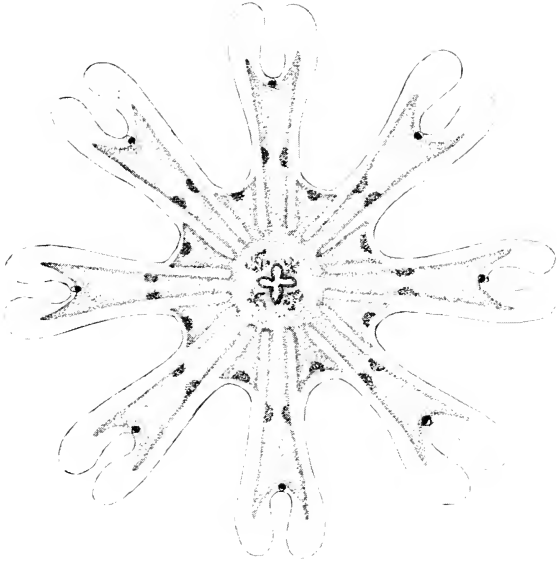
#### EXPLANATION OF PLATES.

##### PLATE I.

- Fig. 1. *Chrysaora isosceles*—Scyphistoma stage, × 25.  
 „ 2. A Scyphistoma beginning to strobilize, × 25.  
 „ 3. Strobila stage, showing Ephyrae ready for liberation, × 25.  
 „ 4. Young Ephyrae just liberated, × 10.

##### PLATE 2.

- Fig. 5. An Ephyra, oral view, × 35.  
 „ 6. An advanced Ephyra, three weeks old, × 2½.  
 „ 7. An advanced Ephyra, four weeks old, × 2½.



5



6



7

DEVELOPMENT OF CHRYSAORA ISOSCELES

*To face page 28.*





## BOTANICAL FIELD-WORK IN 1900.

BY R. LLOYD PRAEGER, B.E.

THE last of the five seasons' field-work devoted to the collection of material for "Irish Topographical Botany" was extensive and varied. Before its commencement I drew up somewhat elaborate comparative tables showing the strength or weakness of the floras of the various county-divisions, and the final season was devoted to working up those divisions which most required further exploration. Nearly fifty days were spent in the field, and few of the Irish counties lay beyond the range of the summer's excursions.

The season was late, and June 9 was the first date on which I ventured afield. On that day, I worked across the western side of Meath, from Athboy to Hill of Down. *Ranunculus Auricomus* near the former place, and *Orchis Morio* at the latter, were the best additions to the Meath list. The upper reaches of the Boyne, which I followed for some miles, proved uninteresting. Next day I examined the gorge of Poulaphouca, on both the Kildare and Wicklow sides. The most remarkable feature of the flora of this lovely spot is the group of strongly calcicole plants which grow on the slate rocks (Ordovician) of the gorge, no limestone being present, nor within several miles. *Arabis hirsuta*, *Geranium columbinum*, *G. lucidum*, *Carlina vulgaris*, *Avena pubescens*, all grow abundantly, and mixed with them we find an equally characteristic calcifuge group—*Lepidium hirtum*, *Cytisus scoparius*, *Jasione montana*, *Digitalis purpurea*. Two Hawkweeds, not yet named, grow here, and again at the pretty fall above Ballymore, though no species of the genus is in record from these places. In the hotel grounds at Poulaphouca *Poa nemoralis* (recorded by Dr. Scully) is particularly abundant. From Ballymore I returned by road to Blessington, finding *Trifolium filiforme* abundantly on a dry-built fence by the way—its second station in Kildare. With it was *Lamium hybridum*, new to the county.

On June 13 I disembarked at Drumhawnagh in Co. Cavan. *Matricaria discoidea*, on the railway there, represented the first station in Ulster of this ruthless invader, and *Linaria viscida*, which grew with it, was also new to the northern

province. Passing through Scrabby, I examined the winding western shores of Lough Gowna. Quite the best plant found was *Typha angustifolia*, which grew in both Cavan and Longford, forming a connecting link between its widely separated stations on Lough Derevaragh and Lough Neagh. *Lastrea Oreopteris* and *L. æmula* occurred on the lakeshore, and *Potamogeton heterophyllus* in its waters; *Lamium hybridum* was gathered near Granard in the evening. Next morning I started from Drumod in Leitrim, and worked down the Shannon to Newtownforbes, and thence to Longford. Two excellent plants rewarded my exertions. On a patch of stony river-margin near Roosky *Teucrium Scordium* was found. Though so characteristic of the great expansions of the Shannon—Loughs Derg and Ree—this plant was unknown north of the latter lake; and a search which I made of the head-waters of the Shannon around Loughs Key and Gara three years ago was as unsuccessful in yielding the Water Germander as Mr. Stewart's exploration of Lough Allen. I found it again a couple of hours later inside the Longford boundary, and the occurrence of these isolated patches stimulates the hope that it will yet be found around some of the head-water lakes. The Roosky station adds *T. Scordium* to the flora of District IX. The other plant represented a wider extension of range. This was *Viola stagnina*, formerly recorded only from a limited area in Clare and Galway. It grew in peaty ground close to the edge of the river below Roosky, in Co. Longford. Lough Forbes proved of no special interest, but yielded *Carex Pseudo-cyperus* and other marsh plants, and a detour into a bog here added *Rhynchospora fusca* to the flora of Longford.

An afternoon ramble by the Liffey above Leixlip on June 17 yielded *Ranunculus Auricomus*, *Orobanche Hederae* and *Poa nemoralis*. Next morning I cycled from Birr to Kinnitty, at the northern base of the Slieve Blooms, and spent some hours examining the fine glens that run into the mountains there. A large number of calcifuge species were added to the King's Co. list; *Equisetum variegatum* and *Lycopodium clavatum* were the most interesting plants seen—and *Ulmus montana*, apparently truly native in a mountain gorge. In the evening I rode through miles of bog to the desolate village of Frankford. The following day was devoted to bog-

trotting. Bearing some miles east of Frankford, I made for a mysterious depression in a vast bog, marked Tumduff on the maps. It is a flat grassy tract, dotted with willow and birch, and yielding a *marsh* rather than a *bog* flora—*Vaccinium Oxycoccus*, *Melampyrum pratense*, *Orchis incarnata*, *Cladium Mariscus*, *Carex limosa*, *Osmunda regalis*, were among the rarer species. Thence westward over endless bog, across a deserted road, to Lough Boora, a lonely and desolate bog lough. On the way thither I found a large breeding-colony of Black-headed Gulls among a maze of pools, the margins of which were bright with the alien flora which these birds bring with them from the cultivated lands. *Rhynchospora fusca* turned up near Lough Boora, for the third time in King's Co. In the afternoon I rode to Pallas Lough and gathered some plants, but awful thunder-showers, which could hardly be surpassed by tropical rain, compelled a retreat to Tullamore, and half submerged the country.

June 22 found me in Carrick-on-Suir. The short first day was spent in working across the Waterford hills to Portlaw, and back by the river. An outcrop of Old Red conglomerate south-east of Carrick yielded *Corydalis claviculata* in abundance, and the limestone near Portlaw added several species to the extremely limited calcicole flora of Waterford. Next day I made a pilgrimage to the famous Slievenaman, in South Tipperary, which, though one of our loftier Irish mountains, had never, so far as I can make out, been ascended by a botanist. At the southern base of the hill a good calcifuge group was met with, the best plant being *Filago minima*. On the summit (2,364 feet) *Carex rigida* was the only alpine, but the view was worth a dozen alpine plants. A long walk brought me back to Carrick. An evening stroll revealed the plant of Carrick-on-Suir—*Bromus diandrus*—growing in profusion on walls, and the rare *Nasturtium sylvestre* was gathered on both sides of the river; it has been already recorded from further up the Suir, at Clonmel. That night I shifted quarters to Cahir, to continue the exploration of South Tipperary. The 24th was spent in working down the Suir to the picturesque village of Ardfinnan, thence across to the lovely river-gorge at Knocklofty, and back to Cahir. This is an undulating fertile limestone district, hemmed in by the fine mountain-ranges of the Galtees, Knockmealdowns,

and Comeraghs. The best plants seen were *Cynoglossum officinale* near Ardfinnan, *Carex muricata* at Knocklofty, and *Bromus erectus* on the railway bank at Cahir—but only one patch, and so must be marked †. *Carex divulsa* is a characteristic plant of the district. Starting next morning from Bansha, I crossed the famous Vale of Aherlow, with the Galtees towering in front. A gravel-pit here yielded several good plants. *Picris hieracioides*, already recorded by me from Queen's County and Kildare, was abundant; with it were *Galium Mollugo*, *Papaver Argemone*, *Orobanche minor*, and quantities of *Ophrys apifera*. Forging the flooded river, and ascending through pinewoods carpeted with *Lastrea æmula* I was soon well among the Galtees, and in due course reached Lough Muskry, a deep tarn with no visible outlet, shut in by a semicircle of stupendous cliffs. Mr. Hart has described the alpine vegetation of this spot, which possesses considerable variety, and is remarkable for the immense profusion and luxuriance of the plants which compose it. *Cochlearia alpina*, *Sedum Rhodiola*, *Saxifraga umbrosa*, *S. stellaris*, *S. hirta*, *S. hypnoides*, *Oxyria reniformis*, *Cystopteris fragilis*, and *Asplenium viride*, tenant the cliffs in delightful abundance. *Botrychium Lunaria*, gathered here at 2,250 feet, extends its Irish vertical range by 500 feet. On the summit of the hill above (Greenane, 2,636 feet), *Carex rigida* was plentiful. Thence down the long southern slopes, which are devoid of interest, and back by road to Cahir. The following day, the country between Bansha and Cahir was explored. An esker-ridge with gravel-pits in it proved the most productive ground, yielding *Calamintha Acinos*, *Cynoglossum officinale*, *Carlina*, *Torilis nodosa*, and *Orchis Morio*, most of them wanted for my South Tipperary list; the first is new to District II. That evening I returned to Dublin.

Next morning I was off on a flying visit to Donegal and Fermanagh, with the object of forming an opinion as to the standing of one or two disputed plants. Reaching Belleek in the afternoon I cycled to near Brown Hall in Donegal, to seek *Helianthemum vulgare*, found there by Mr. H. C. Hart in 1893. In addition to the scant published information, I had the advantage of a marked map and full description of the station, kindly supplied me by the finder of the plant. My search was unsuccessful. The point marked by Mr. Hart

on the map proved to be the top of a whale-backed cultivated ridge. Half a mile west of this, just south of Rockhill, I found limestone ground answering to the description, even to the gable-ends of a ruined cottage which Mr. Hart told me would be a sign that I was "hot." But no trace of the Rock-rose could be seen; and until the discoverer vouchsafes further information as to the exact circumstances under which the plant occurs—or occurred—its range, and quantity, I for one cannot follow Mr. Hart in claiming for the species a place in our indigenous list, and must perforce follow the lead of "Cybele." We want to know more about it. In the evening, however, I was recompensed for my journey of 150 miles and fruitless day by the addition of an interesting plant to the flora of Donegal and of Ulster—namely *Rhynchospora fusca*, which grew on the bogs south-west of Belleek with *Drosera intermedia*, *Carex limosa*, &c. The latter two crossed the border into Fermanagh, where they were very welcome, each having only one station in District X., but the Beak-rush I saw on the Donegal side alone. Late the same evening I rode on to the little inn at Garrison, on Lough Melvin. The edge of the lake here was fringed with patches of the rare *Potamogeton filiformis* in beautiful fruit. I have already recorded it from the Leitrim side of Lough Melvin.

In the *Irish Naturalist*, v., 188 (1896) Mr. W. MacMillan, the finder of several rare plants, recorded the Globe-flower, *Trollius europæus*, as growing "in an unquestionably wild state on the shores of one of the larger Fermanagh lakes." There was no inherent improbability in his statement, as the plant grows wild in the adjoining county of Donegal. Nevertheless the record is not even mentioned in "Cybele." So I was up betimes next day, and rowed from Garrison through the morning mists towards the island on Lough Melvin to which Mr. MacMillan had kindly directed me. There are three islets at the north-east end of the lake. The one which is named on the one-inch map Bilberry Island is locally called Heathery Island, on account of the long heather with which it is covered. Close outside it is the low Sally Island. More to the west is Gorminish (one-inch map) or Bilberry Island according to local phraseology. For this place I steered, and as the boat's keel grated on the pebbles, I saw a leaf of *Trollius* floating in the water. Landing, the plant was found

at once, growing along the rough stony shores amid a tangle of Meadow-sweet, Purple Loosestrife, and similar plants. I examined the island carefully. The Globe-flower grows at intervals right round its one mile of shore, being abundant at the western end, rare at the eastern. It forms a belt just above storm-level, where it gets shade from the trees. The flora of the island is strictly indigenous, and clearly it has never been cultivated or planted. Oak, Holly, Alder and other native species constitute the dense arboreal vegetation. *Luzula maxima* almost monopolizes the drier ground under the trees. Not a single non-native species occurs, and it would be an absurdity to question the plant's being truly native here. I returned to Garrison well satisfied, presented mine host with a root of *Trollius* for his garden, and cycled round the southern side of the lake, where I made a desperate attempt to discover the Globe-flower on the shrubby lake-shore, and so add it to the flora of Leitrim and of District IX. But it was not to be found, and remounting I next halted in Co. Sligo, among the bogs that lie between Cliffony and the gaunt limestone mountains. A couple of hours spent here added *Rhynchospora fusca*, *Carex limosa* and other bog plants to the Sligo list. Thence to Mullaghmore, where some botanizing was done among the sand-dunes, and then back to Belleek *via* Bundoran and Ballyshannon. At Belleek station in the evening *Crepis taraxacifolia* was noticed growing in a rock-cutting, an addition to the flora of District X., and here far north of its recorded limit.

On July 1st I went west, finding that the little-known eastern portion of Galway (Divisions 15 and 17) needed further exploration. North-east Galway—perhaps the least known botanically of all the Irish divisions—consists of an unbroken stretch of low-lying and frequently bog-covered limestone. The geological maps showed that on the extreme northern boundary alone might one hope to find a flora not dominated by the calcareous rocks. Accordingly, I cycled west from Milltown, and behind Dunmore found a range of bare brown stone-strewn hills of Old Red Sandstone, and was rewarded by a good calcifuge flora, including *Graphalium sylvaticum*, *Chrysanthemum segetum*, *Raphanus Raphanistrum*, *Spergula*, and *Digitalis*. *Galium uliginosum* was a less expected find. On the 3rd I spent a long day in East Mayo,

north and west of Claremorris. The more interesting ground in this bare country consisted of eskers, bogs, lake-shores, and turloughs. The plants found included *Rhynchospora fusca*, *Plantago maritima* (here very far from the sea), *Rhamnus catharticus*, and a beautiful set of thistle hybrids, showing every gradation from *C. pratensis* to *C. palustris*. At the railway station *Matricaria discoidea* was present as usual.

Next day was wet, but I visited Knockmae, west of Tuam, the highest hill in this flat country. *Epipactis atro-rubens* is by no means rare here (see *Irish Naturalist*, viii., 181), but I searched in vain for *Saxifraga hypnoides*, recorded in Wade's "Plantæ Rariores" (1804), but apparently never seen here since. The rain clearing off, I made a forced march to Lough Corrib, but botanizing was interrupted by a boating adventure that came very near putting a definite stop to my work on "Topographical Botany," and I was glad to retreat to Tuam, wet and empty-handed. The following morning I rode to Annaghdown, and in company with Mrs. Frank Joyce explored fresh portions of the Lough Corrib shores. *Neotinea intacta*, growing sparingly by the lake, was the best find. In the evening we cycled southward thirty miles to St. Cleran's. A halt on the way at Coolarne (where Mrs. Joyce has found *Vicia Orobus*) revealed *Ophrys muscifera* growing abundantly and very large, and on the bare limestone *Erica cinerea*, for the first time in all N.E. Galway.

The following day I went with Mrs. Joyce to Chevy Chase, lying on the western slope of the broad Old Red Sandstone ridge of Slieve Aughta. This place is famous as the only mainland Galway station of *Euphorbia hiberna*, discovered here by Mr. Hart in 1873. We found the plant at once, accompanied by *Thalictrum collinum*, and I traced it up the Owendalulleegh River for four or five miles, and downwards almost to Lough Cooter. Other similar streams descend these western slopes, which should be searched for it; but it is apparently not on the eastern slopes—at Dalystown for instance. The day's work added many calcifuge plants to the list for S.E. Galway. Next day I botanized round Lough Cooter, then north for seven or eight miles, and back into Gort. Lough Cooter was chiefly remarkable for the variety of its Orchid flora; I gathered thirteen species in half an hour—*Habenaria conopsea*, *viridis*, *bifolia*, *chloroleuca*; *Orchis*

*Morio, mascula, pyramidalis, maculata, incarnata; Ophrys apifera, muscifera; Listera ovata, Epipactis palustris.* The best plants seen elsewhere were *Cornus sanguinea* and *Geranium columbinum* on bare limestone some miles north of Gort. On the 8th I had a long and delightful day over the classic ground of Garryland, and away across the bare limestone to the Burren hills, thence to Kinvarra, and back by Garryland to Gort. Garryland is a delightful combination of wild limestone "crag," lake, and wood. Its characteristic plant is *Spirea Filipendula*, which grows in great profusion, filling some meadows with its cloudy masses of blossom as we may see the Meadow-sweet doing at home. The stunted arboreal vegetation of the "craggs" includes the Yew and both species of Buckthorn, as long ago noted by Mr. More; and the peculiar flora of the western limestones attains here a full development. A level billowy waste of bare grey rock, stretching away to the abrupt grey mountains of Burren, was next crossed. As the Clare border was approached *S. Filipendula* diminished and *Dryas octopetala* increased. I sampled one or two of the limestone hills (the flora of which has been frequently described), and turning north crossed the low ground to the sea at Kinvarra. The cultivated land here yielded an unusually varied set of uncommon weeds; here is a sample list, jotted down in one field:—*Papaver Rhæas, dubium, hybridum; Lepidium campestre, Brassica alba, Stachys arvensis, Euphorbia exigua, Linaria Elatine, Valerianella dentata, Centaurea Scabiosa, Anthemis Cotula.* Kinvarra yielded its quota of plants, and turning eastward again I recrossed the low grounds, and came through the mazy woods of Garryland to Gort, and next morning returned to Dublin.

July 11–13 was spent with the Belfast and Dublin Field Clubs on the Boyne; some brief note of the botany of the excursion has already appeared in these pages (*Irish Naturalist* ix., 230–231). On the 15th I revisited Navan, and driving north to Rathkenny, turned eastward to explore the uplands of Slieve Brehg (753 feet), the western end of an irregular Ordovician ridge that crosses Louth and plunges into the sea at Clogher Head. *Agrimonia odorata*, new to District V., was perhaps the best plant found, but the addition of at least twenty calcifuge species to the flora of Meath was to me a matter of greater interest. I rejoined the railway at Dunleer.



On July 17 I started on a northern tour. That day was spent in Louth, round by Ballymascaulan and Ravensdale. *Valerianella rimosa* was the best plant found; my hostess, Mrs. Swan, got a better one in *Geranium columbinum*, but as it grows here on a wall off the limestone, I fear it must be marked †. On the 18th Mr. Allen Swan and I had a splendid day round by Bush, Whitestown, Greenore and Carlingford, and over Carlingford Mountain back to Dundalk. The sandy fields near Greenore yield many good colonists, including *Silene noctiflora*, *S. anglica*, and *Saponaria Vaccaria*, and the coast flora is full of interest; *Erodium moschatum* is frequent, and *Galium Mollugo* and a *Cuscuta* not yet in flower, presumably *C. trifolii*, occurred. On Carlingford Mountain, high above the limits of cultivation, *Aquilegia* grows in clefts of the rock along streamlets, looking absolutely indigenous. On the summit of the hill we were fortunate in stumbling across one of the few plants of the Parsley Fern that exist there—a stunted but healthy patch on a high rock. Thence across the hills to Bellurgan, where *Agrimonia odorata* grew luxuriantly. This walk was perhaps more productive in variety of plants than any of which I have a record, upwards of 400 species having been noted during the day. Shifting quarters next morning to Ballybay in Monaghan, a useful day was spent on the hummocky lake-strewn Ordovician country south of that town. *Polygonum minus*, *Scleranthus annuus*, *Habenaria albida*, *Potamogeton alpinus* and *obtusifolius*, were among the plants obtained, the flora being essentially calcifuge. Next day I worked through similar country from Glasslough to Ballybay. *Polygonum minus* and *Potamogeton obtusifolius* were most characteristic, and Annaghmakerig Lough yielded a good haul of *Characæ*. *Sedum Telephium*, growing abundantly on rocks at Rockcorry, appears to be the first record for District X. The two days' work gave a considerable increase to the flora of Monaghan as shown by the previous lists of Mr. Somerville, Mr. Waddell, and myself. Two days were next spent in Fermanagh, with Enniskillen as centre. Under Mr. Plunkett's guidance, a number of low-level bogs were explored, which stretch along the base of the Florencecourt range of hills. The bog-flora of Fermanagh being hitherto practically *nil*, a number of desiderata were obtained. *Drosera*

*intermedia* grew in great abundance with *D. anglica*, but *Andromeda* and *V. Oxycoccus* were conspicuous only by their absence. In these points the flora resembled that of the western bogs rather than those of the Central Plain; and another point of resemblance appeared in the discovery, after a long search, of *Rhynchospora fusca* in its second Ulster station, being an addition to the flora of District X. It grew luxuriantly in a wet patch of bog west of the hill of Clontymullan, the elevation of which (242 feet) is marked on the one-inch map. Florencecourt demesne yielded abundance of *Epipactis latifolia*, *Carex strigosa*, and *C. pendula*; the limestone hills above were tenanted by the usual limestone flora, with *Listera cordata* under the long heather. Next morning was spent on the shores of Lower Lough Macnean, which were singularly unproductive; the best plant was *Rosa involuta* var. *Nicholsonii*, Crépin, the species being new to District X. and the variety to Ireland. *Potamogeton nitens* appears to be also new to X. In the afternoon I was joined by Mr. W. West, of Portora Royal School, who with his colleague, M. W. N. Tetley, has recently made some excellent finds in Fermanagh, to some of which I lately referred (*I. Nat.* ix., 285). We examined the hills lying north of the lake, but they proved devoid of interest. That night I proceeded to Ballysadare, and next day worked across the humpy quartzite ridge and made a long round over the limestone past Annaghmore, &c. It was characteristic of the varying fortunes of field-work that an evening stroll of an hour within half a mile of Ballysadare yielded twice as many additions to the Sligo list as the whole day had done; and these included some interesting plants, such as *Diplotaxis muralis*, *Stellaria palustris*, *Potamogeton nitens*.

July 27 to 31 were spent in Mayo; of the botany of this trip some account has already been given (*Irish Naturalist*, ix., 224-229). Other duties now compelled a cessation of field-work, but on August 12 I started northward from Cloughjordan in Tipperary, and worked through Knockmachree wood and over Scohaboy bog to the conspicuous pointed hill of Knockshigowna, which is crowned with a modern-antique ruin. Thence over too-fertile ground, through Ballingarry southward. *Campanula Trachelium*, growing in a rough

ledge far from a cottage, inspired a hope that I might be on the outskirts of a native colony of this rare plant; but the appearance under similar circumstances of *Iris foetidissima* dispelled the illusion. The best ground found was about some eskers south-west of Cloughjordan. *Galium Mollugo* was there, and *Erysimum cheiranthoides* appeared in some abundance as a colonist in cultivated land; on the railway *Arenaria tenuifolia* grew with *Linaria viscida*. *Atriplex erecta* and *Galium Mollugo*, growing at Cloughjordan, were new to District VII. Next morning I visited a further portion of the eskers. From the train a few years ago I had fancied I saw *Geranium sanguineum* here, and now found it growing in immense abundance over a considerable area—an interesting habitat, as the plant is almost confined to the coasts, the limestone “craggs” of the west, and the limestone shores of the great lakes. With it were *Erigeron acre* and other similar plants. A bog beyond the eskers yielded *Potamogeton alpinus* and *Chara polyacantha*. Thence I made a long march southward to the Old Red Sandstone hills near the source of the Nenagh River, but got hardly any calcifuge species; so I dropped back on Toomavara, where a car was waiting to take me to catch the evening train from Cloughjordan to Limerick. Of the three most interesting days that followed I have already written in this Journal (ix., pp. 260–5).

On the morning of August 19 I cycled from Longford to Ballymahon. An outcrop of Old Red Sandstone near Castlereagh, visited on the way, yielded some welcome calcifuge species. Striking westward for Lough Ree, Gorteen bog was crossed, and its vegetation proved to be chiefly composed of *Rhynchospora fusca* and *R. alba*; the former, though unrecorded for the county (save on a previous page of the present paper) proved to be one of the most abundant plants of western Longford. The mouth of the Inny yielded in interesting flora, as recorded by Messrs. Barrington and Vowel in 1887, including *Lathyrus palustris* and *Sium latifolium*. Thence north-west along the shore and over boggy ground to the Bilberry River, getting *Potamogeton coloratus*, unrecorded in the Lough Ree report, and *Lemna polyrhiza*, recorded from one station in Westmeath. Bilberry River was deep and slow, full of water-plants, with treacherous floating margins, and I swam it with some difficulty, getting on the bank *Galium uliginosum*, which

also had one previous Lough Ree station. Swampy ground beyond the river yielded *Lastrea Thelypteris*, growing among *Carex filiformis* and *C. teretiuscula*; though unrecorded by Barrington and Vowell, it has now turned up by the lake in all three counties bordering on it. Close by, *Polygonum minus*, new to Lough Ree and to District VII., grew abundantly on the peaty lake-shore. I walked round Saint's Island, getting on the western shore *Galium Mollugo* and *Stachys Betonica*, both new to Lough Ree and to District VII. The credit of the latter discovery does not belong to me, as Miss Rosa Smith sent me last year specimens of this rare plant both from Saint's Island in Longford and from the opposite promontory of Noughaval in Westmeath. It is the best addition to the Lough Ree flora which I have to record. I returned by Derrymacar Lough to Ballymahon. A morning stroll up the Inny next day revealed *Mercurialis perennis* abundant at Newcastle bridge. The Royal Canal north-west of Ballymahon yielded little except *Sparganium affine*, new to District VII., and I cycled away to Elfeet Bay on Lough Ree. Here a big haul of light-soil plants, most of them wanted for Longford was made; *Erysimum cheiranthoides*, *Ononis arvensis*, *Filago germanica*, *Convolvulus arvensis*, *Valerianella rimosa*, *Valerianella dentata*, *Anthemis Cotula*, *Erigeron acre*, *Calamintha officinalis*, *Lamium amplexicaule*; most of these are unrecorded from Lough Ree, and the last is new to District VII. There were also many plants of roadsides and old buildings, such as *Coronopus Ruellii* (common), *Hyoscyamus*, *Verbascum Thapsus*, *Nepeta Cataria* (common). Along the lake shores from Elfeet Castle to Collum Point, where *Teucrium Scordium* was now in full bloom, the interesting Lough Ree flora was fully developed, and *Erigeron acre* was added to the list. From Elfeet Bay my cycling route lay over a cultivated ridge, and then across vast bogs. Several times I stopped and sampled them for *Rhynchorpora fusca*, which always turned up at once. Longford was reached via Lyneen Bridge. Next day I determined to make an attempt to verify the ancient record of *Euphorbia hiberna* on Slieve Bane in Roscommon, for which the authority is the MS. catalogue of Patrick Browne, made in 1788, and now in the Linnean Society's library. The station is, on the face of it, rather improbable, and apparently no botanist has ever attempted to prove or disprove it.

Accordingly I cycled westward, sampling the bogs now and then and always getting *Rhynchospora fusca*. The Shannon was crossed at Lanesborough, and a dead straight road led north-west to the base of the hill. Slieve Bane is a long smooth north-and-south ridge, with twin points rising to 857 and 839 feet. It is a simple, denuded anticline, the limestone of the plain lapping against Old Red Sandstone on its flanks, and this in turn against the Ordovician rocks which form the mass of the hill. The grassy slopes capped with brown heather above, looked quite hopeless, and I devoted my attention to the streams, ascending one rivulet and descending the further slope by another, and recrossing the hill by a similar pair. This exhausted all the ground I could see that appeared to offer the slightest chance of success, but not a trace of the plant was seen. *Lastrea Orcopteris* was the only uncommon plant found on the hill. Heavy rain set in as I rode back to Lanesborough, but I did some desultory botanizing on both sides of Lough Ree during the afternoon, getting *Teucrium Scordium* abundantly everywhere, though in Barrington and Vowell's report it is stated to become rarer towards the north end of the lake. Early next morning I migrated to Ballinamore in Leitrim, and spent the day round Garadice Lough. Plants were few and rain heavy, but the day's work was accomplished in the filling of fifteen blanks in the Leitrim list. *Polygonum minus* grew abundantly here, not only on the lake-shore, but in the potato fields. The Calp limestone produces a strongly calcifuge flora, as was well shown in the potato fields, which were choked with a luxuriant crop of *Senecio sylvaticus*, *Bidens tripartita*, *Galeopsis Tetrahit*, and *Polygonum Hydropiper*. On the 23rd I took train to Drumshanbo, and sampled the south-end of Lough Allen amid continual thunder-showers. *Polygonum minus* was met with again, though not recorded in Mr. Stewart's report, and other calcifuge species. Passing through Drumshanbo, I came eastward towards Ballinamore, but the lakes, which here form the best ground for botanical operations, were hopelessly high, and at Lough Scur my five years' field-work came to a conclusion amid lightning and deluges of rain.

## THE GREAT AND SOOTY SHEARWATERS ON THE SOUTH COAST.

BY R. J. USSHER.

THE Great Shearwater, and still more the Sooty Shearwater, have been recorded so seldom round Ireland that every occurrence of these antarctic-breeding birds is of interest. The former has indeed been observed in large numbers on the Kerry coast by Chute in 1854, and speaking of Ireland generally, it is off the South and South-West that both species have been chiefly met with; while August and September are the months when most of the occurrences of Great Shearwaters have taken place, and all the occurrences of Sooty Shearwaters that are known. The only preserved Irish-taken specimens of the latter are—one at Chute Hall, and a second in the possession of Mr. Lloyd Patterson. Our Dublin Museum does not possess one.

As Great Shearwaters have been repeatedly taken on fishing-lines, and will readily seize refuse thrown to them, it is to be hoped that new specimens may be obtained to afford fresh evidence as to the state of the internal organs and the season when these birds breed.

In 1899 I was favoured by Mr. H. Becher with observations of both species made that autumn off the coasts of Kerry and Cork; and I am happy to be able to give the following account received from him of notes made during his cruise in September, 1900, when he found these birds surprisingly numerous off the coasts of Kerry, Cork, and Waterford:—

“ My brothers and I had a cruise of about ten days this year in our boat ‘Zulu,’ starting from Queenstown, going to Dingle Bay and back to Kingstown: we were sailing about six or seven days, and I think except on two days I saw Sooty Shearwaters and Great Shearwaters every day. The first occasion was on the 11th of September; we had sailed from Baltimore, and had got near the Bull Rock in the afternoon, when one Sooty Shearwater passed. On September 13th when returning from Dingle Bay a Great Shearwater passed the ‘Zulu’ near the Skelligs. The next morning we were off

Crookhaven about 4 a.m., but a good way off the land; and between 4.30 a.m. and 7.30 a.m. (when we got into Baltimore) I saw about ten or twelve Sooty Shearwaters, chiefly near the Fastnet Rock. All these birds were either single or in pairs, they did not go in flocks at all, and during the same time I saw nearly as many Great Shearwaters, about eight or ten. Of course they soon fly out of sight, so that the same birds may have passed us more than once, but I am sure there were a great number of both kinds about that day.

“On the 16th September we left Baltimore for Kingstown; there was very little wind all day, so that we only got off the Old Head of Kinsale at 10 p.m. Both Sooty and Great Shearwaters kept passing at intervals all day: I must have seen half a dozen of each.

“The next day, 17th September, we were off Mine Head about 6 a.m. and between there and the Saltee Islands I saw seven or eight Sooty Shearwaters and rather more of the Great Shearwaters. I did not see any of the Sooty further east than the Barrels lightship, but I saw one Great Shearwater nearly as far up the channel as the Blackwater Bank off Wexford.

“We tried very hard to get a shot at these birds, but I do not think they will come near enough to a yacht of any size, as the sails must frighten them. A Sooty Shearwater is a very easy bird to identify at a distance, and it is very easy to tell either it or the Great from the Common Shearwater on account of the more frequent beat of the wings in the smaller bird.

“I saw very few other birds, in fact I think there were fewer Common Shearwaters than Great Shearwaters. I should say that the Sooty Shearwater cannot be nearly so rare about the S.W. coast of Ireland as is supposed, because I have only cruised there five or six times, and nearly every time have seen either it or the Great Shearwater, but I find that no one I have come across in that county seems to know either bird; in fact very few people seem to know the Common Shearwater.”

## REVIEWS.

### THE LIFE OF AN INSECT.

**The Structure and Life-History of the Harlequin Fly (*Chironomus*),** by L. C. MIALL, F.R.S., and A. R. HAMMOND, F.L.S. Pp. viii. and 196; plate and 129 figures in text. Oxford: Clarendon Press, 1900.

It has been known for some time past that Prof. Miall was engaged on a thorough study of *Chironomus plumosus*, one of our commonest and most familiar insects, whether in its winged adult form as a midge or in its larval form as a "blood-worm." The results of Prof. Miall's researches, conducted with the able collaboration of Mr. A. R. Hammond, and the gracefully acknowledged help of Miss D. Phillips and Mr. T. H. Taylor, are now published in the well-printed and attractive volume before us.

After an introductory chapter sketching the life-history of *Chironomus* in outline, briefly describing its near allies and discussing its relationship to other Diptera, we find a very full and excellently illustrated account of the larva. A somewhat brief description of the midge comes next, as the intermediate pupal form depends so much on the structure of the adult. Then follows a description of the growth of pupa and midge within the larva, and an account of the fully-formed pupa. In a type like *Chironomus*, which has a comparatively highly-developed larva and lowly-developed imago, the metamorphosis is simpler and much more easily followed than in such intensely specialised Diptera as the Blowfly and its allies, whose maggots are correspondingly degraded. Consequently, the "Harlequin" fly serves as an excellent introduction to the study of metamorphosis among the higher insects. The concluding chapter deals with the growth of the embryo of *Chironomus* within the egg up to the time of hatching. Thus the whole life-cycle of the insect is worked through in detail, and although the order in which the various stages are taken is not that in which they occur in the life-history, few students can doubt that it is the best that could be chosen from an educational standpoint.

Like all Prof. Miall's work, this book is at once thorough, exact, interesting, and stimulating. Details of structure are everywhere made alive by the light which they are shown to shed on the function of the insect, or on some fascinating question of morphology or affinity. The organs of *Chironomus* are constantly compared with those of other Diptera, so that the study of this single type becomes a means of obtaining general knowledge of the group to which it belongs, and this is surely the true end of the "type-system" in zoological teaching. In the Preface we find a wish that we are glad to echo—that "members of Naturalists' Clubs, and other non-academic biologists, should take up the study of life-histories." Biologists, whether academic or otherwise, could find no better guide to their study than this excellent book.

G. H. C.



## A SCIENTIFIC ANNUAL.

### “Knowledge” Diary and Scientific Handbook for 1901.

Pp. 408 and 120. London: Knowledge Office. Price, 3s. net.

The publishers of our contemporary, *Knowledge*, have started the new century with an “Annual,” which, though primarily intended for the use of students of astronomy, will be found of value to scientific readers generally. The diary gives the whole of a large page to each day, and may be made a storehouse of MS. notes. There is a comprehensive history of the past century science, in which biology and geology find their full share of recognition, illustrated by portraits of Darwin, Lyell, and Huxley. The star-maps for each month, and the other astronomical information will enlarge the outlook of the naturalist by inducing him to take an interest in the heavens above as well as in the earth and sea and all that in them is. We note that a total solar eclipse is to be visible in eastern Ireland in 1927! We hope that we ourselves, *Knowledge*, and the new Annual may be here to see it.

## IRISH MAMMALS.

- I. On Geographical and Individual Variation in *Mus sylvaticus* and its allies.** By G. E. H. BARRETT-HAMILTON, F.Z.S. **2. On the Variable Hare (*Lepus timidus*).** By G. E. H. BARRETT-HAMILTON, F.Z.S. (*Proc. Zool. Soc.*, 1900.)

In an able paper on the geographical variation of the Long-tailed Field Mouse, Mr. Barrett-Hamilton distinguishes nineteen forms or races of that widely-distributed species. Five of these (besides an extinct form, *Mus Lewisii*, known only in a fossil state from Ightham fissure) occur in the British Isles; but in Ireland only two have been found, to which Mr. Barrett-Hamilton applies sub-specific names as *Mus sylvaticus intermedius* and *M. s. celticus*. The former is the generally dominant race throughout the British Isles and Western Europe, and probably prevails throughout all the eastern and midland counties of Ireland. In parts of Kerry and Galway, however, it is replaced by a small dark mouse, which was first noticed by Jenyns in 1841; and on this little animal Mr. Barrett-Hamilton bestows the appropriate name of *Mus sylvaticus celticus*.

It is of great interest to find from the paper before us that this mouse of the western parts of Ireland has been ascertained to occur also in the islands of Lewis and Skye. Thus its distribution would appear to be in some sense analogous with that of our Irish Black Rat (*Mus hibernicus*, Thompson), which is met with outside this country in several of the Outer Hebrides. As a tendency towards melanism has been traced in other animals, both in Ireland and the Hebrides, the probability of a positive climatic stimulus in this direction is at first sight considerably strengthened by the addition of *Mus celticus* to the Hebridean fauna. Mr. Barrett-Hamilton himself inclines to the opinion that this dark

form has been independently evolved in its Irish and Scottish habitats, and possibly also in Portugal, where a specimen, *apparently* referable to the same variety, has been obtained.

On the other hand, the island of Lewis possesses another sub-species, *Mus s. hebridensis*, found as yet only in that island and Barra, which varies from the prevailing British form (*Mus s. intermedius*) in an opposite direction to *Mus celticus*:—for *M. hebridensis* is a larger animal than *M. intermedius*, with relatively smaller ears, and has the colours of its upper and lower surfaces less contrasted; whereas *M. celticus* is smaller than *M. intermedius*, has relatively larger ears, and is even more strongly contrasted in the hues of its upper and lower surface.

The co-existence of two such unlike varieties in a small area like that of the island of Lewis, throws difficulties in the way of imagining a direct climatic stimulus towards the *M. celticus* type in the Outer Hebrides. Moreover, the Field Mouse of St. Kilda (*Mus. hirtensis*, Barrett-Hamilton) closely approaches *M. hebridensis*, and is, therefore, widely divergent from *M. celticus*. These facts undoubtedly possess a high zoological value, and Mr. Barrett-Hamilton deserves much credit for having worked them out in so painstaking a manner; but we think it would be premature, in the present state of our knowledge, to draw conclusions as to their interpretation, since the influence of the Hebridean climate can hardly be held answerable for two sets of variations running in diametrically opposite directions, and without the exertion of some such influence it is difficult to conceive of the same variation being independently evolved in several scattered localities.

In a shorter paper Mr. Barrett-Hamilton treats of the various forms of *Lepus timidus*, the Variable or Mountain Hare. He maintains that there are two very distinctly-coloured groups of this species. The form to which the Scottish and South Scandinavian hares belong he distinguishes as *Lepus timidus typicus*, and the Irish hare as *L. t. hibernicus*. It is curious that the latter should find its nearest ally (*L. t. altaicus*) in the distant regions of the Altai mountains. Its reddish-brown (rather than dark brown) colour, slightly larger size, and general absence of a complete white winter coat, are the principal characteristics of the Irish Hare as distinct from that of Scotland. The point of interest for Irish naturalists is the question how these differences may have originated; whether by evolution within the limits of this island since its severance from Britain, or otherwise—as from two different races having immigrated into the British area at different periods. As the points of distinction are not very decisively marked, the former solution seems the more probable; but, as in the case of the Field-Mouse, the materials do not warrant a positive conclusion.

Naturalists who shrink from excessive "splitting" will be shocked to learn that Mr. Barrett-Hamilton bestows a third or quasi-subspecific name (*Lepus timidus lutescens*) on the Hare of the Malahide district, Co. Dublin—which, he thinks, "may perhaps be best regarded as a very conspicuous aberration on the verge of becoming subspecific."

## OBITUARY.

### FREDERICK WILLIAM EGAN, B.A.

Frederick William Egan, B.A., L.C.E., T.C.D., of the Geological Survey of Ireland died on the 6th January, 1901, after a severe illness, which by his medical attendants was attributed to internal injuries received in a car accident during his official duties some eighteen months ago. Mr. Egan was born in Dublin in 1836, and was educated at Trinity College in that city. Having taken out his degree of B.A. and diploma in Engineering, he commenced his professional career as civil engineer in connection with the Irish railways then in course of construction. This work, however, he relinquished when, in 1868, he was appointed Assistant Geologist on the staff of the Geological Survey of Ireland, on the nomination of the late Prof. Jukes, F.R.S. In 1890 he was promoted to the grade of Geologist by the present Director-General, Sir A. Geikie, D.C.L., F.R.S. Although Mr. Egan did not contribute independent papers on geological subjects, he nevertheless rendered considerable service to that science by the great care he bestowed on the work entrusted to him, as is evidenced by his maps and official memoirs. Uniting his knowledge as an engineer to the experience gained on the Survey, he was an excellent authority on many economic questions, *e.g.*, water supply, while no deposits of any useful material escaped his observation. During early years on the Survey his work lay chiefly in Counties Down and Antrim, among Silurian, Mesozoic, and Tertiary formations, and he afterwards took part in the survey of the interesting volcanic district of Slieve Gullion in County Armagh. In Tyrone and Derry he surveyed the complicated area comprising Slieve Gallion and Cookstown, devoting special attention to the remarkable iron-ore deposits near that town, the industrial development of which was then being attempted by the Barrow Mining Company. Northwards, Mr. Egan mapped the Calciferous Sandstone, Triassic, Cretaceous, and basaltic rocks east of Dungiven and Limavady, and, ultimately, joining his colleagues in Donegal, he mapped the districts about Killygordon, in the Finn Valley to the south, and Horn Head and the coast to the Bloody Foreland in the north.

The primary work of the Survey being now accomplished, Mr. Egan was one of the staff retained to carry out revisions, and, with his colleague Mr. M'Henry, he re-surveyed for this purpose the Silurian tracts in the north-east and east of Ireland, and was indeed engaged in this work when he met with the accident which resulted in his lamented death. Mr. Egan was of a singularly affable, obliging, and kindly disposition, which won the affection of all who knew him, and in an especial degree of his fellow-workers on the Geological Survey, who much regret the removal from among them, after an intimate association of over thirty years, of so genial and agreeable a friend and companion.

JOSEPH NOLAN.

## CURRENT LITERATURE.

### Violets.

The *Journal of Botany* for January contains a paper on "Some British Violets," by E. G. Baker, F.L.S., of the British Museum, which tends to the elucidation of some difficult plants. Brief reference is made to one (Co. Sligo) Irish form.

### Irish Fossil Cephalopods.

The 1900 volume of the Palæontographical Society (vol. liv.), lately issued, contains an important instalment—the third part—of Dr. Foord's "Carboniferous Cephalopoda of Ireland."

### Marine Insects.

In the January number of *Knowledge* G. H. Carpenter publishes the first of a series of articles on "Insects of the Sea." He commences with the Bristle-tails, or Thysanura.

### The Co. Down Railway Guide.

The County Down Railway Company's "Guide to County Down," written by Mr. Praeger, has reached a second edition. The scientific and other portions have been revised to date.

## NEWS GLEANINGS.

### Honour to an Irish Geologist.

The Council of the Geological Society of London have awarded the balance of the proceeds of the "Lyell Geological Fund" to Alex. M'Henry, M.R.I.A., of the Geological Survey of Ireland, in recognition of the very valuable work which he has done on behalf of Irish geology. Mr. M'Henry is to be congratulated on the honour which the Society has conferred on him, and we need not remark that a more worthy recipient would be difficult to find.

### Robert Smith.

With much regret we note the untimely death of Robert Smith, the pioneer in these countries of the study of botany in its widest aspect of vegetations as a whole, and the plant associations which compose them. Inspired by the teaching of Prof. Flahault, of Montpellier, he commenced mapping the botanical topography of Scotland, and had the great advantage of the warm support of Prof. Patrick Geddes, whose demonstrator he was. His death, at twenty-seven, will be widely deplored.

## NOTES.

### BOTANY.

#### *Elymus arenarius* in Co. Dublin.

The valuable note contributed by Mr. Joseph Meade to last month's issue of this journal has conclusively shown the worthlessness of my recent record for *Elymus arenarius* in Co. Dublin. Though fully alive to the many possibilities of an accidental introduction of the grass, the thought of a wilful sowing in stiff clay soil of the seeds of a plant having a well-known predilection for loose sands never once entered my mind. So far as our present knowledge goes, Mr. Meade is quite justified in saying that the claims of this grass to be considered native in Co. Dublin seem to be slender. Such a statement would be true of a large number of plants which are yet fully entitled to a place in the county flora; and it seems not unlikely that further research may strengthen the claims of this particular species. Smith, in the 2nd edition of his *English Flora*, 1828 (vol. i., p. 177), says of this grass that it rarely flowers on the British coasts and is often overlooked for *Arundo* (*Psamma*) *arenaria*; and I suspect that barren plants of what appeared to be a robust form of *Psamma* observed by me last year in wild stations near Portrane and Portmarnock may really belong to *Elymus*. Mr. Meade's note, while it expunges my recent County Dublin record, at the same time raises the whole question of the standing of *Elymus arenarius* in Ireland. May it not have been sown as a binder of shifting sands in some of its stations on the coasts of Wexford, Sligo, and Donegal, and may not some reader of this journal be in possession of evidence on this interesting point.

NATHANIEL COLGAN.

Sandycove.

#### *Carex aquatilis*, Wahlb. in County Dublin.

In June, 1896, while botanizing in Glenasmole I gathered by the shore of the Rathmines waterworks reservoir a peculiar-looking sedge, which after a hasty examination was laid aside as an abnormal form of *Carex vulgaris*. Four years later, in June, 1900, I visited this locality again and found the sedge still there in no great quantity, but much more luxuriant in growth. Specimens gathered on this last occasion, some of them up to 4 feet in height with lower bracts fully 17 inches long, were sent to Mr. Arthur Bennett for examination, and were pronounced by him to be *Carex aquatilis*, Wahlb. This boreal species, first added to the Irish flora by Mr. S. A. Stewart in 1884, is now on record for no less than nine of our counties, Donegal, Antrim, Tyrone, Cavan, Roscommon, Galway, Kerry, Meath, and Dublin, and judging from its wide dissemination in Ireland may be expected to occur in a majority of its thirty-two counties.

NATHANIEL COLGAN.

Sandycove.

**ZOOLOGY.****Snowy Owl in Co. Donegal.**

A female Snowy Owl (*Nyctea scandiaca*, L.) was shot on 15th December, 1900, by Mr. John Olphert's keeper at Ballyconnell House, Falcarragh. It was on the grassy sheep-downs beside the sea, and the keeper thought it was an enormous sea-gull! It measured 4 feet 10 inches from tip to tip of wings, and 24 inches from tip of tail to top of the head, and the remains of a rabbit were in its stomach. It was in perfect plumage, and is being preserved by Mr. Rohu, of Great Brunswick-street, Dublin, to whom I am indebted for some of the above particulars.

ROBERT PATTERSON.

Belfast.

**King-Eider Duck in Co. Down.**

On November 10th, 1897, a mature male King-Eider (*Somateria spectabilis*, L.) was shot in the Foreland Bay, off Donaghadee, by Mr. Wm. H. Shaw. It was accompanied by another bird which, from Mr. Shaw's description, must have been a male Long-tailed Duck. Although fired at several times the latter bird managed to escape by its splendid diving powers. Mr. Shaw had the King-Eider preserved, and very kindly sent it to me last month for my inspection. It agreed in every particular with the coloured plate in Morris, except that the white patch on the flank was nearer the tail and larger than in the drawing. I exhibited this bird at a meeting of the Belfast Naturalists' Field Club on 19th December last, and Mr. Welch kindly photographed it.

ROBERT PATTERSON.

Belfast.

**A Young Cuckoo on Migration.**

Early in December I received from Skulmartin lightship, Co. Down, the leg and wing of a young Cuckoo, which was killed striking the lantern on November 26th. The bird was quite dead when picked up, and Mr. Charles H. McCabe, the master of the light-vessel, states that he would have sent the bird entire had not he thought it was a young hawk. It was labelled "Sparrow Hawk"—a bird, by the way, which has never yet been sent from an Irish light-station.

The occurrence is very remarkable, and a further instance of the absolute necessity for producing specimens when very unlikely events are chronicled by unskilled observers or beginners.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

### Winter Flight of Bats.

Not only as marking the extreme mildness of the season, but also as a curious incident in itself, it may be worth notice that yesterday evening (January 2nd), about six o'clock, a bat (of what species I cannot say) flew close overhead and directly between me and the moon, which was shining brightly at the time.

W. E. HART.

Kilderry, Co. Donegal.

Is it unusual for bats to fly at this season? I was out walking on 1st December, at 4.40 p.m. I observed a bat fly over my head; it returned several times, passing over my head almost within reach, but I failed to catch it. I tried to attract it by throwing up my white handkerchief. It was too dark to make an attempt at identification. While in sight it covered a distance of about thirty yards, and during its course would make several short turns to right and left—perhaps to secure flies. A manure heap was convenient, and flies were likely to be on the wing. The evening was dry and very mild.

HUGH L. ORR.

Belfast.

### The Vision of Whales.

Some years ago, while yachting on the west coast of Scotland, we noticed one of the whales which the crew called a Finner, coming towards us. It seemed to be about fifteen feet long, and when a few yards off it came up to the surface, then dived, and we all watched it sink down, go under the keel and come up on the other side. It was so close to us before it dived that I could see the blow-hole quite distinctly—it was the shape of a fleur-de-lys. I think this animal must have seen us, for if it had not, it would scarcely have had time to clear us at the pace it was going. We have seen this happen more than once; small whales coming up, having a look at the boat, then diving under her and going away. The one I have described dived twice under, no doubt thinking the yacht was some strange monster of the deep.

When steaming through the Straits of Gibraltar, one nearly always sees the Dolphins playing about the bows of the ship. When I was there in 1895, about eight of them came up and played about the bow of the steamer, shooting out of the water within three feet of her stem; she was going about twelve knots an hour, they seemed to spend at least quite as much time above water as under it. Now I do not know how these animals could get along if they did not see pretty well above water, their lives would be in great danger of the ship's bow cutting them, and I have never heard of such a thing happening. I think this goes some way, at any rate, to prove that whales see pretty well above water.

W. H. WORKMAN.

Belfast.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a number of Golden Orfe from Mr. J. N. Lentaigne, a Chacina Baboon from Constable J. M'Cormack, a pair of Ichneumons from the Hon. G. W. Hely-Hutchinson, a Heron from Mr. P. G. D. Warren, a Pheasant from Mr. Norman Sloane, a Barn Owl from Mr. Barnet, and a pair of Cockateel from Miss Perry. Three lion cubs were born in the Gardens on December 12th.

5,764 persons visited the Gardens in December.

### BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

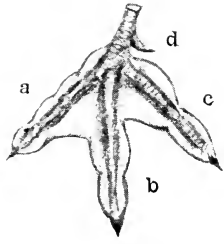
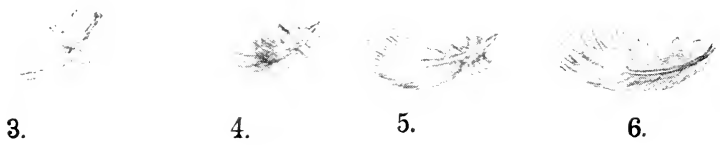
DECEMBER 11.—Mr. J. BROWN (President), occupied the chair, and there was a fair attendance. Mr. J. H. Davies read a paper on the botany on the shores of Lough Neagh, and illustrated his subject by specimens. Mr. Davies is to be congratulated upon the amount of careful study he manifested in his paper. An extract from the paper, dealing with the best plant found by him, will appear in our next issue. Mr. W. H. Patterson, M.R.I.A., gave an account of some of the objects comprised in Lord Deramore's recent donation, principally antiquarian. Mr. W. Swanston, F.G.S., read a note on some clay concretions from Connecticut Valley, U.S.A., which were exhibited. Mr. Swanston and Mr. S. A. Stewart joined in the discussions, at the conclusion of which the usual votes of thanks were passed. The receipt of the following donations was announced by the secretary:—Snake from West Africa, presented by Miss Perry, Wellington-place; marine shells, Island of Herm, Channel Islands, presented by Miss Macaulay, Charnwood-terrace. A vote of thanks to the donors was passed, on the motion of Mr. W. Swanston, F.A.S., seconded by Mr. W. H. Patterson, M.R.I.A.

DECEMBER 20.—A meeting was held in the Museum. A paper was read by Rev. A. R. Crawford, M.A., Kirin, Manchuria, on "Some Side Lights on the China Question," illustrated by special limelight slides, maps, &c.

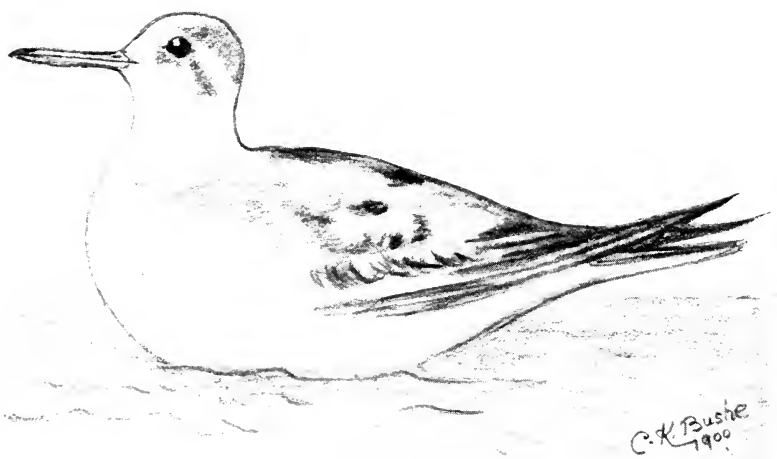
JANUARY 8.—A meeting was held in the Museum. The following papers were read:—John Brown (President), "Report as Delegate of the Society to British Association Meeting, Bradford." Lynden Macassey, C.E., B.A., LL.B., "Irish Railways and the State."







2.



1.

THE GREY PHALAROPE.

THE NATURAL HISTORY  
OF THE GREY PHALAROPE  
(*PHALAROPUS FULICARIUS*.)

BY CHARLES J. PATTEN, B.A., M.D.

(Read before the Dublin Naturalists' Field Club, March 13, 1900.)

(PLATE 3.)

THIS beautiful little bird attracts the attention of the observer for many reasons. Its elegant movements both on land and in the water meet with the highest admiration, in addition to which, its many structural peculiarities afford no small amount of interest to the student of morphology.

The Grey Phalarope has been classified as a wading bird. Systematists have, during more recent times, placed it in the order *Limicolæ*, and have further considered its affinities sufficiently close to the Plovers, Godwits, Curlews and others so as to include it in the large family of *Charadriidæ*. But the Phalarope is not a type of this family. In many ways, in its habits of life, in its movements and general demeanour, and in its structural characters, it is quite aberrant, and it seems to represent a species which, speaking generally, may be said to link together wading birds with the aquatic or web-footed forms. Its low and somewhat undulating form of flight, its rapid movement of the wings, its great speed and activity displayed when on foot, are all features common to the typical wading birds, but unlike these the Phalarope is a most capable swimmer, and may be seen, perhaps far out at sea, resting on the surface of the water as buoyant as a cork. In this situation this little bird appears almost more at home than is a sea-gull or a tern.

*External structural characters* :—Correlated with its aquatic habits the Phalarope has acquired a very dense covering of feathers. These are particularly well seen about the breast and abdomen. The latter regions are also thickly coated with *down*. In shape the breast greatly resembles that of the gulls. It is full and rounded, and owes this contour, not to any modification in the form of the pectoral muscles or sternum, as compared with the same in a typical wading bird, but to the great curvature of the feathers, which in most wading birds

are straighter in shape. (Plate 3, figs. 4, 5, 6.) The foot, which is partially webbed, is rather peculiar. The entire space between the adjacent toes is not occupied by a membrane as it is in gulls, ducks, and others. The web only stretches between the toes near their roots (*i.e.*, proximal phalanges), the lower ends being free and edged with a series of membranous lobes. The number of these differ according to the toes to which they belong. Thus the outer edge of the outer toe is fringed with four lobes (*a.* Fig. 2), whereas on its inner side only one lobe at the lower end is visible. There are two lobes on either side of the lower end of the middle toe (*b.* Fig. 2.) On the outer side of the lower end of the inner toe there are two lobes, the upper of which passes outwards, forming the lower border of the web between the adjacent toes. Only two large lobes fringe the inner edge of the inner toe (*c.* Fig. 2.) The hallux (*d.*) is not united by a membrane to the other digits. The adjacent web between the outer and middle is more extensive than that between the middle and inner proximal phalanges. Like the sea-gulls the Grey Phalarope is light in weight for its size.

*Habits* :—The Grey Phalarope frequents the Irish coast as an occasional visitant, principally in autumn and early winter, and it is generally found in localities which abound in mud-flats and sandy beaches. It may also be sought for in shallow pools (to which it is very partial) formed in flooded fields, after a heavy rainfall, especially if these be near the coast. Less frequently it occurs on inland waters. As before-mentioned it may be seen on the deeper waters of the open sea. It is, as a rule, a tame, confiding little creature,<sup>1</sup> and allows of the near approach of man. It is for this reason that many writers have had opportunities of making close observations on its habits. It may be said with truth that there is not a more interesting bird to watch. Its movements are most engaging. On the 19th November, 1899, I watched a Phalarope for a considerable time on the North Bull, Dublin Bay. I came across it quite unexpectedly. I first saw it

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<sup>1</sup> Exceptional cases, showing the shyness of the Phalarope, are recorded by Thompson. Two examples, seen *late* in the autumn prior to 1837 in the north-west of Donegal, were so difficult to approach that only one could be obtained. ("Nat. Hist. of Ireland," vol., ii., page 338.)

away in the distance, when I did not identify it. I knew, however, that it was something out of the common. Approaching cautiously, I brought to my aid a binocular, which I invariably take with me when out observing. Presently I recognised what the bird was, and knowing its tameness to be proverbial, I advanced closer and closer until I halted at about fifteen yards' distance from it. I was so near that there was no further occasion for the use of my field-glass. The Phalarope took no notice of me, never minded me, or even looked at me. It appeared quite unconcerned at my intrusion. It was really a great treat to watch its movements. Bright and lively the little creature appeared to be as it pattered about on the grass bank at a rapid rate in a zig-zag course, now and again retracing its steps. Close by was a shallow pool of clear water, the result of a recent heavy rainfall. To this the Phalarope often resorted. The area of the pool was but a few square yards, nevertheless I was able to form some notion of the habits of the bird as it swam about. The agility with which it quitted the bank and rushed into the water was truly amazing, and when swimming it displayed a greater buoyancy and grace than many other kinds of web-footed birds. It hardly seemed to touch the water, its breast showing full and round above the surface. The day was breezy, and so the water was agitated into ripples or wavelets. These the Phalarope *crested* with the lightness of a cork. Food was procured chiefly from the surface of the water, from which objects were picked up with great rapidity. The nodding movements of the head were very apparent. Many observers have on other occasions noted this rapid motion of the head as the bird seeks for food. Twice I saw it snapping at flies. To try and capture the insects it rose, on each occasion vertically, for about twelve inches from the water, and having gained its end, it flopped back again on to the surface of the pool.

Once I saw the Phalarope turning sharply round, apparently in pursuit of some aquatic insect. Mr. Ussher<sup>1</sup> describes this movement graphically. He says "It sometimes sweeps round like a feather whirled by the wind." I continued to watch this interesting bird until darkness set in, and with the last

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<sup>1</sup> "Birds of Ireland," p. 267. (1900.)

glimmer of daylight I left it peacefully swimming about in the centre of its favourite little pond. I must have been a good half hour making observations, during which time the bird at irregular intervals quitted the water, but it never wandered far from the edge of the pool.

The confidence of the Grey Phalarope in allowing man to approach closely to it is remarkable. Some authorities endeavour to explain the reason straight away by saying it results from the bird being bred in the arctic wilds. But there are many other wading birds which have been bred in a similar locality, *e.g.*, Sanderling, Knots, Curlew, Sandpipers, &c. These are often very tame in the early part of the season when the southern migration is going on (August and September), especially if the birds are immature, but they become more difficult to approach later on. According to most observers the Phalarope remains tame at all times of the year, with few exceptions. Why this should be so is hard to say. To look at it, as it runs or swims about, one would say without hesitation that it is a much less nervous bird than, say, an immature Sanderling or Dunlin. You may practically approach to within a few feet of a Phalarope, and it takes no notice. It goes on feeding as though you were not there at all. If you observe a tame Sanderling or Dunlin from the same distance it will look at you with astonishment, and will often stop picking until you retreat a bit. If your gaze becomes too scrutinizing it will run away from you, or perhaps rise and fly. Thus the Phalarope differs from many of the more typical waders in that it possesses a less neurotic temperament. Another thing about the Phalarope is this, it is very fond of settling on a *small pool of water*, preferably near the coast, as already mentioned. This it appears to become partial to, disliking at the same time to change its quarters, especially if another pond is not at hand; and so as it paddles about in the little pool it can be closely approached.

The question of its tameness is more difficult to explain in the case of the Phalarope frequenting the open sea. It is also worth noting that many of the Phalaropes touching on our coasts arrive in a *semi-exhausted state*. Several specimens examined in the flesh appear to have been in a poor and very thin condition.

Many accounts have been given by Irish ornithologists of the habits of the Grey Phalarope, and much interesting information is to be found in the late Mr. Thompson's "Natural History of Ireland." From the pages of his book I derive the following extracts as being of special interest:—"A Phalarope shot near Belfast as long ago as 1818 was wounded in the wing and came into the possession of Mr. John Sinclaire. He kept it on his pond for some months. It was fed on worms, was very tame, and its buoyancy on the water met with the highest admiration."

In 1831 the late Mr. Montgomery wrote "The first one I saw close by the edge of a river, and knew it to be a stranger by its graceful movements; it dipped its head often and seemed to be feeding, was very tame, and showed no fear when we came within twenty yards." The same writer afterwards observed a pair of these birds, and said "I was amused with their liveliness in sipping the water and playing round each other in a circling and graceful manner." About the same time Mr. T. W. Warren obtained a Phalarope from Kingstown Pier, Dublin Bay. We learn that "Its beauty, together with the animation and gracefulness of its motions attracted his admiration." Thompson mentions an instance of a Phalarope observed in a river near Belfast. "The bird beat very quickly with its feet in swimming, and nodded its head very much." A fowler, in 1844, describes two Phalaropes, which he saw on the Connswater, as "proud-looking little birds, light as corks on the water. Their movements were extraordinary quick as they wheeled about from one side to the other to pick up objects, quicker than an eddy of wind would waft a feather."

The late Mr. Watters<sup>1</sup> drew attention to the fact that in America the Phalarope is *gregarious* in winter. He states that the American ornithologist, Audobon,<sup>2</sup> observed large flocks frequenting the neighbourhood of the Ohio and Arkansas rivers. Hundreds were also to be seen far out at sea, assembling on the banks of seaweed.

*Summary on the occurrences of the Grey Phalarope in Ireland.*

—In no sense can this bird be considered as a really rare species in Ireland. It is an occasional visitor in autumn and winter. When it occurs it often comes in small flocks, and

<sup>1</sup> "Birds of Ireland," 1850, p. 170. <sup>2</sup> Ornithological Biography, iii., p. 404.

considerable irruptions have taken place from time to time.<sup>1</sup> According to Mr. Ussher there are one hundred and six records from Ireland. They are distributed as follows :—

Kerry, 6.	Wexford, 3.	Fermanagh, 1.
Cork, 6.	Wicklow, 1.	Monaghan, 2.
Waterford, 5.	Dublin, 20.	Down, 20.
Tipperary, 4	Westmeath, 1.	Antrim, 11.
Kilkenny, 1.	Galway, 6.	Londonderry, 4.
Carlow, 2.	Mayo, 5.	Donegal, 8.

Most records have been made from Down and Dublin. The latter locality is the scene of my own observations. Dublin Bay has been visited by the Grey Phalarope on several occasions. My friend, Mr. A. Williams, writes to me as follows :—“I as yet have only met with the Grey Phalarope on one occasion in the Bay of Dublin. I was out boating early on a foggy morning in the month of September, 1877. As I reached the end of Clontarf Island I was surprised at the appearance of what I first took to be a very small sea-gull, swimming actively about and picking in the water all round. The bird appeared very buoyant on the water, with head erect, and tail and wings very much pointed up behind. The movements resembled those of a Black-headed Gull. It was quite silent, and allowed me to approach within a few yards of it. I then knew it to be a Grey Phalarope. Finally it took wing, and disappeared in the fog.”

The late Dr. Cox shot one on the North Bull, Dollymount, on the 9th September, 1879. He considered it the only one obtained in the neighbourhood for many years.<sup>2</sup> The details of most of the other records of the occurrence of the Phalarope from Dublin coast and its vicinities are to be found in the late Mr. Thompson's work on the birds of Ireland. The whole may be briefly tabulated as follows :—

<sup>1</sup> Vide—Thompson: “Nat. Hist. of Ireland,” vol. ii., p. 336-343; also Ussher: “Birds of Ireland,” p. 267, and Barrington: “Migration of Birds, Analysis of Reports,” p. 203.

<sup>2</sup> *Zoologist*, 1879, p. 480.



TABLE showing occurrences reported of the Grey Phalarope on the Dublin coast and its vicinity during the nineteenth century.

Number.	Exact Locality.	Month.	Year	By whom recorded
1	Clontarf, . . .	Nov., .	1827	Thompson.
2	„ . . .	? Spring,	1828	„
2	Pigeon House, . . .	? Autumn,	1831	„
Several	Dublin Bay, . . .	? Autumn,	1831	Sinclair.
1	Kingstown Pier, . . .	? Autumn,	1831	T. W. Warren.
1	Portmarnock, . . .	Dec., .	1835	Thompson.
1	Malahide, . . .	Sept., .	1836	Ball and Farran.
1	Dublin Bay, . . .	Dec., .	1837	Thompson.
3	Malahide, . . .	Nov., .	1838	„
1	Pigeon House, . . .	Sept., .	1846	„
1	Raheny, . . .	October,	1846	„
1	Dublin Coast ?, . . .	Dec., .	1862	Blake-Knox.
5	Dublin Bay, . . .	Sept., .	1866	„
1	Kingstown Harbour, . . .	October,	1870	„
1	North Bull, . . .	Sept., .	1877	A. Williams.
1	North Bull, . . .	Sept., .	1879	Cox.
2	Kingstown Harbour, . . .	October,	1886	?
2	Dublin Bay, . . .	October,	1889	?
1	Dollymount, . . .	October,	1891	Rohu.
1	Rockabill I., . . .	Nov., .	1892	Barrington.
1	North Bull, . . .	Nov., .	1899	Patten.

In addition to this list of twenty-one occurrences from the Dublin coast, three other records may be added from a foot-note by Thompson in his book "Nat. Hist. of Ireland," vol. ii., p. 342. He states "December, 1849, I saw in the collection of Mr. J. Watters, jun., Dublin, three Phalaropes, one of which was shot in the bay there on the 13th September, 1847. The others were sent in a recent state to a bird preserver in that city on the 28th February and 20th June, 1849, but whence I could not learn. The last specimen is the only one I have known to be procured in the summer."

On 20th November, 1899, a fowler brought me a Grey Phalarope. He shot it on the North Bull, Dollymount. It was probably the same bird which I had observed the day before. The specimen, a male bird, was in extremely poor condition. It only weighed  $7\frac{1}{4}$  drachms—less than an ounce.

The following were its measurements :—

	Length from tip of beak to tip of tail, . . . . .	$8\frac{1}{2}$ inches.
	Expanse of wings, . . . . .	$16\frac{1}{2}$ "
	Length of beak, . . . . .	$1\frac{1}{8}$ "
	Tibio-tarsus, . . . . .	$1\frac{1}{2}$ "
	Tarso-metatarsus, . . . . .	1 inch.
Foot	{ Hind toe (hallux), . . . . .	$\frac{1}{4}$ "
	{ Inner toe, . . . . .	$\frac{3}{4}$ "
	{ Middle toe, . . . . .	$\frac{7}{8}$ "
	{ Outer toe, . . . . .	$\frac{3}{4}$ "
	Sternum to cloaca, . . . . .	$2\frac{1}{2}$ inches.
	Mid-back to mid-breast, . . . . .	$1\frac{3}{8}$ "
	Breadth of breast, . . . . .	$\frac{7}{8}$ inch.

The fat in the region of the breast was extremely scanty, but the little that was present differed from the soft creamy oleaginous fat of the typical *Limicolæ*. In the Phalarope the fat is of a firmer consistency (more like suet), dark yellow in colour, and closely resembles the fatty tissue of sea-gulls.

*Migration.*—The recent researches of Mr. Barrington<sup>1</sup> indicate that the Phalarope is an irregular visitant which, since 1881 to 1897, has struck the lanterns of the Irish light-ships or lighthouses on four occasions, viz. :—

- 1889. November 1. Slyne Head.
- 1892. August 22. Arklow S. Lightship.
- „ November 4. Rockabill Island.
- 1893. October 17. Slyne Head.

Of late years it occurred in the autumns of 1886, 1889, 1891, 1892, 1893, and probably in 1896 and 1897, in addition to the occurrence recorded by myself in 1899. An analysis of fifteen occurrences made by Mr. Barrington during these years shows that nine were in October, four in November, one in August, and one in December. The bird has occurred more often on the west coast than elsewhere in Ireland, and it is noteworthy that of the four examples which actually struck the lanterns, two were obtained from Slyne Head, a western lighthouse.

<sup>1</sup> "Migration of Birds": Analysis of Reports, 1881-1897, p. 203, 1900.

Several Phalaropes visited the west coast in 1891. In October of that year seven specimens were received from stations between Rathlin O'Birne and Slyne Head. Curiously enough none of these visitants struck the lanterns.

According to Mr. Barrington also the Grey Phalarope has not occurred at any light-station on the north coast, and only twice on the east coast, in 1892, viz. : August 22, at Arklow Lightship, and November 4, at Rockabill, off the Dublin coast. Only one occurrence is known from the south coast, viz., a bird shot at Dungarvan in 1886.

On the migration of the Phalarope to Ireland, I may add that I have little doubt that the number of birds mentioned by Mr. Barrington as having occurred at lighthouses and lightships afford a rather full record of the *total number* of this species visiting these districts since the migration reports of 1881 to 1897. Some examples, no doubt, have escaped the notice of lightkeepers, but owing to the confiding nature of the Phalarope as it swims on the open sea, together with its attractive movements and pretty plumage, the tendency that it should be overlooked is minimised.

*In captivity.*—Many years ago the late Mr. R. Ball<sup>1</sup> remarked that “as a general rule the wildest birds become soonest tame, and that the tamest, such as the Robin and House Sparrow, bear confinement with the greatest impatience.” The Grey Phalarope is an interesting exception. In a state of nature it permits of familiar approach, and is soon reconciled to captivity. In the year 1835 the same writer saw a Phalarope which got entangled in fishing nets spread out to dry. A few hours after capture it fed upon fragments of fish from the hands of its owner.

If not too severely wounded by gunshot the Phalarope will often live in captivity for months and even years. It will be quite contented and happy if carefully attended to and given a little pond to swim about in.

I have already referred to an instance of a Phalarope which was wounded in the wing and which came into the possession of Mr. John Sinclair in the year 1818 (see p. 59). On the other hand there are times when this species has died shortly after being made a captive, even when quite uninjured by

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<sup>1</sup> Thompson: “Nat. Hist. of Ireland,” vol. ii., p. 339.

gunshot or other form of violence. The emaciated condition which the bird is often found in when taken would tend to shorten its days if it were subjected to captivity. A case in point is that recorded by Mr. R. Davis.<sup>1</sup> A servant of his brought him a live Phalarope caught in his yard in the centre of the town of Clonmel. It fed freely on worms placed in water but "pined away after three or four days." The writer states:—"It was much emaciated when taken. The weather had been extremely wet and stormy for some days previously."

*Food.*—Like many other birds the Phalarope partakes of a mixed diet. Marine animals of various kinds are eaten, such as Mollusca, Arthropoda, and Insecta. This bird will also pick the parasites off the back of whales and other cetaceans (Saunders).

The late Mr. Thompson examined the stomachs of several specimens. One shot on 20th September, 1839, near Portaferry, contained in its stomach principally larvæ and perfect insects together with a few seeds of plants. Two shot on 6th December, 1844, on Conswater, Belfast Bay, were examined and in their stomachs were found small crustacea (*Idoteæ*), univalve mollusca (*Paludina muriatica*, Lam.), and one insect larva.

Dr. Scharff has kindly favoured me with the following report on the contents of the stomach of the Grey Phalarope which I recently obtained (November 20, 1899), from the North Bull, Dublin Bay:—"The gizzard of this bird contained mostly sand with small sharp stones, the largest measuring  $\frac{1}{8}$ th of an inch in length. As for the food it consisted entirely of two species of Invertebrates. The last meal was about a dozen 'maggots' or *larvæ* of a fly such as might be found along river banks. They were very slender and nearly half an inch long. A previous meal consisted of about the same quantity of a small gasteropod shell, probably *Hydrobia ulvæ*, which occurs abundantly round the coast of Ireland in brackish water. The surfaces of the shells were much worn, and must have been in the gizzard for some time, while the maggots were quite fresh."

It is interesting to note that no remains of the perfect fly (*imago*) were detected by Dr. Scharff although the larvæ were

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<sup>1</sup> Thompson: "Birds of Ireland," vol. ii., p. 341.

present. Assuming that the gizzard of the bird which he examined belonged to the same individual which I saw the day before, one might have expected on examination to find flies present in the gizzard, inasmuch as I saw the bird snapping at them. Perhaps the insects were not captured, or if they were they may not have been swallowed, or again they may have been swallowed and have undergone digestion?

*Geographical distribution.*—According to Mr. Saunders the breeding-range of the Grey Phalarope is circumpolar. He states:—"It is common on the Liakoff Islands and at the Lena delta; while its eggs have been taken by Middendorf in the Taimyr district, by Mr. Popham at the mouth of the Yenesei, and by Col. Feilden on Spitsbergen, and many have been sent from the districts of Upernavik and Egedesminde in Greenland. Westward, Arctic explorers have noted the bird as far North as  $82^{\circ} 30'$ , and it is abundant in summer on the shores of Alaska, as well as on the Asiatic side of Bering Sea. In winter its migrations extend to Chili and New Zealand, and China seems to be visited regularly, but there is much to be learned respecting the lines of passage in Asia, for the bird is rare on the Pamirs, and has only once been obtained in India (Calcutta, May, 1846). In Europe though seeming to miss the Volga valley, it is found on many inland waters and on the coasts down to the Mediterranean; it also visits North Africa."

*Sexual difference in size and plumage.*—With one exception, namely the Ruff (*Machetes pugnax*) sexual dimorphism cannot be said to exist to any great degree among the *Charadriidæ* which frequent the Irish coastlands. The general rule is that the female is slightly the larger of the two.

In many species the adult male and female plumages are alike (Sanderling, Dunlin, Stints, &c.). In others, such as the Godwits, although the plumage markings are alike in *pattern*, yet the females are duller than the males. The summer plumage of the male Turnstone is much brighter and more varied than that of the female, and of a somewhat different pattern.

In the case of the Grey Phalarope the female bird is not only larger than the male but she is more gaily attired in her

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<sup>1</sup> Saunders: "Manual of British Birds," latest edition (1899), p. 566.

summer dress. She is more active, carries on the major part of the courtship, and omits to take on herself the task of incubation.

It is often difficult to explain adequately the reasons why some birds differ sexually in size and colour. The following is a short paragraph which I take the liberty to quote from J. T. Cunningham's recent work on "Sexual Dimorphism."<sup>1</sup> With reference to the Grey Phalarope he writes:—"The females are larger and in their summer plumage more gaily attired than the males, and according to Professor Steenstrup the male of *Phalaropus fulicarius* alone incubates. The females do not appear to fight, and their greater size must be attributed to their greater activity, for the sex which incubates is necessarily the more sedentary. The more intense colouring of the female is probably merely due to its greater sexual excitement, as it is difficult to perceive anything in the external influences, such as light or food which could affect the sexes differently" (p. 155-156).

To sum up: from the preceding remarks we find that the sexual features of the female Grey Phalarope as contrasted with the male are these:—

1. Larger.
2. Brighter in colour.
3. More active in habits.
4. Displays greater sexual excitability.
5. Female never incubates.

Taken together, these five characters belong to the vast majority of *male* birds. With the Phalarope for some unknown reason, the males seem to have become effeminated, leaving the active part of the courtship to be conducted by the females. Relative to this subject Darwin<sup>2</sup> stated, when treating of the subject of sexual dimorphism in general in birds, that here "*sexual* selection would do its work, steadily adding to the attractions<sup>3</sup> of the female; the males, and the young birds being left not at all or but little modified."

*Sexual Dimorphism of the Grey Phalarope with reference to protective colouration.*—I do not think that the male is more

<sup>1</sup> London, 1900.

<sup>2</sup> "Descent of Man," p. 480.

<sup>3</sup> *Greater size, strength, activity, superior colour, vocal power, &c.*

protected when hatching than the female would be were she to take on the duties of incubation. The difference in the plumage is not distinct enough. In both sexes the pattern of the plumage (*i.e.*, the markings) is the same; it is simply more intensified in the female. Again, the parts of the hatching bird which catch its enemies' eye are the back and head, for the breast is for the most part hidden from view. Now in both the male and female Grey Phalarope the upper parts of the breeding plumage (feathers of the forehead, crown, and back), are brownish black, the back feathers bordered with buff. These in themselves are most protective colours, harmonising with the natural surroundings of "spongy peat and moss" where the eggs are laid. Indeed with the exception of a white patch on the cheek, the female Phalarope in nuptial plumage is anything but a conspicuous bird. The under parts (feathers of the breast, side of neck, and abdomen) are reddish chestnut in the nuptial plumage and duller in the male, but even if they were brighter they would not be noticed if the bird were hatching. To complete the description of the nuptial plumage I should mention that the wings and tail are blackish, the lesser wing coverts being margined with white. The bill is yellow with a black tip. The legs, toes, and lobed webs are also yellow.

*Winter plumage.*—In winter the breast and abdomen have become white; the top of the head and forehead also white. Behind each eye is a black streak and another at the back of the head. The back of the neck, the back, and most of the wings a beautiful pearl grey resembling the back of an adult Common Gull. The smaller wing coverts are grey edged with white. The flight feathers of the wings are black, the large tail feathers (rectrices) brownish grey margined with white. The bill is very dark brown.

Any specimens of Grey Phalaropes which have been obtained on the Irish coast that I have seen displayed the transition plumage from autumn to winter or the full winter plumage. Through the kindness of Dr. Scharff I have had the opportunity of looking over the entire collection of skins and stuffed specimens in the National Museum, Dublin. Space will not permit me to describe each specimen as fully as I should like to have done, but the following brief and tabulated account

of the dates of capture of some specimens, with a note on their plumage<sup>1</sup>, may be given :—

Number.	Date of Capture.	Locality.	Plumage.
1	October 20, 1870,	Aughnamullen Lake, County Monaghan.	Full winter.
1	September, 1878,	Portrush,	Almost full summer.
1	October 10, 1885,	Cashel Bog, Connemara.	Transition (mature) from autumn to win- ter, showing remains of chestnut feathers on the breast.
1	October 5, 1891,	Dollymount, Dublin Bay.	Transition (immature) from autumn to winter, showing many autumn feathers.
5	October 5, 1891,	Dunkineely Lighthouse, Co. Donegal.	Four in transition plumage from autumn to winter. One of these showing only very few autumn feathers on back. The fifth bird in full winter plumage.

With reference to these data the points of most interest are :—Firstly :—Most of the birds were obtained in October, in which month transition and full winter plumages occur. Secondly :—A specimen was obtained in September in *almost full summer plumage*, a great rarity on the Irish coast. Thirdly :—Most of the birds in transition plumage appeared to be immature, only one specimen showing the remains of the chestnut feathers (summer or nuptial dress) about the breast. This is an adult bird.

I have examined the plumage of two other immature Grey Phalaropes both obtained on the North Bull, Clontarf. Number 1 :—Shot by the late Dr. Cox in September, 1879. This bird is in the possession of Mr. Williams of Dublin. The plumage is in the transition stage from autumn to winter

<sup>1</sup> The immature birds resemble the adults in autumn plumage. In the former however the upper parts and breasts show some *tawny* feathers.



about half way on. Number 2:—My own specimen, shot November 19, 1899. The plumage is in the transition stage, but showing some more winter feathers. I have not had the opportunity of examining any other specimens shot as late in November as the last-mentioned one, but I should think that the majority of Phalaropes would have assumed their full winter plumage by that date.

References to the occurrences of the Grey Phalarope in Ireland recorded in the *Irish Naturalist* :—

Time of Year.	Locality.	By whom recorded	Reference.
November, 1893, .	Lough Ennell, Mullingar.	J. Taylor, . .	ii., 25.
October 26, 1894, .	Inch, Lough Swilly,	D. C. Campbell, .	iii., 262.
September 28, 1899,	Near Lurgan, .	W. Keatley and H. W. Marsden.	viii., 251.

#### EXPLANATION OF PLATE 3.

Figure 1 represents a Grey Phalarope resting on the water. The original drawing has been executed by Dr. C. K. Bushe (for which I am much indebted to him) from a rough sketch which the author made from nature as he watched the bird at the North Bull, Dublin Bay, on 19th November, 1899. The attitude of the bird is as described in the text, resting buoyantly with head erect, and breast, wings, and tail well raised out of the water. The plumage is transitional, the dark spots on the back are a few of the summer feathers.

Fig. 2 is a drawing of the right foot of the Phalarope (natural size), viewed from the dorsal aspect. The four lobes on the free edge of the outer toe (*a*) are seen. On either side of the middle and inner toes are two lobes (*b* and *c*). Note also the connecting membrane between the toes. (*d*) is the hind toe unconnected to the others by a web. The drawing has been made from a tracing by the author taken from the foot of a *recently* killed Phalarope. (Note.—After death the foot soon shrivels up and dries so much that its proper form is very much obscured).

Fig. 3. Breast feather of the Grey Phalarope.

Fig. 4. Breast feather of the Dunlin.

Fig. 5. Breast feather of the Sanderling.

Fig. 6. Breast feather of the Knot.

} Natural size.

Observe how the curvature varies in these feathers.

Trinity College, Dublin.

## POLYGONUM MITE AT LOUGH NEAGH.

BY J. H. DAVIES.

(Extract from a paper "On the Botany of the Shores of Lough Neagh," read before the Belfast Nat. Hist. and Phil. Society, December 11th, 1900).

THE interest belonging to the occurrence of *Polygonum Mite*, Schrank, at Lough Neagh—where it was my good fortune to meet with it this year (1900) on both the County Antrim and County Armagh margins—consists in its being a very rare plant in Ireland. When the second edition of *Cybele Hibernica* was published there was only one station, Lough Ramor, Co. Cavan, where, in 1897, it was discovered by Mr. Praeger; but the same botanist has since met with it in Co. Leitrim (*Ir. Nat.*, vol. ix., p. 144). It is also a scarce plant in England, being recorded in *Topographical Botany* for only sixteen<sup>1</sup> of the one hundred and twelve counties and vice-counties of *Cybele Britannica*; and it is not known in Scotland nor in Wales. Between the mouth of the Sixmilewater and Shane's Castle, on the Co. Antrim shore, there is an extent of sandy and gravelly ground, on which, in August last, I noticed a plant which I suspected to be this species; but it was so stunted in growth, by reason of being half-buried in sand thrown up by the waves, as to make identification uncertain. Revisiting the place about three weeks later, when the water that had been raised to an unusually high level by recent floods had subsided, sufficient specimens were obtained to satisfy me that it was the plant at first supposed. Later, in the month of October, when rambling round Raughlan Point, on the Co. Armagh side of the lake, I was further rejoiced to meet with it in soil having much the same character as that on which it was first seen; the plant, in the present instance, being very plentiful and well developed. The nature of the ground there seems conducive to the growth of *Polygona*. In a very small area there were no

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<sup>1</sup> The latest census (London Cat., 9th ed.) says twenty vice-counties.—  
EDS.

fewer than seven species, one of them being *P. minus*, also a scarce plant. *P. Mite*, unless sufficiently studied, is a plant that may very easily be passed over. As has been said by Watson, it is "an ill-understood plant, quite distinct from *minus*, with which it has been confused, but very near to *Persicaria*." In order to show that some care has been taken to avoid mistake in the identification of so critical a plant, it may be stated that examples have been most kindly examined, and the name confirmed, by Mr. S. A. Stewart, F.B.S.E., Mr. Nathaniel Colgan, M.R.I.A., and Mr. Arthur Bennett, F.L.S.

Lisburn.

#### THE ROYAL IRISH ACADEMY.

Some important changes have recently been made in the bye-laws of the Royal Irish Academy, which, considering the eminence of that learned society, should prove of general interest to scientific students. Hitherto, candidates for membership have been balloted for at any meeting of the Academy, the names of the candidates duly proposed and seconded having been exposed in the Academy rooms for a month previously. Now, however, new members will be chosen only at one meeting in the year—in March—when not more than twelve names out of those nominated during the year will be proposed by the Council for election into the Academy.

Another noteworthy change concerns the selection of the Council. Hitherto, the senior member of each of the two Committees of twelve (Science, and Literature and Antiquities) into which the Council is divided, has retired annually. In future the two senior members of each Committee will retire, and the circulation of eligible members through the Council will thus be accelerated.

We congratulate the Royal Irish Academy on the adoption of these changes which will, we have no doubt, tend to maintain and, indeed, to strengthen the high standing of that body—the leading home of Irish philosophy and science.

## VARIATION IN MOLLUSCA.

A COMMITTEE, consisting of Messrs. J. R. B. Masefield, F. Taylor, R. J. Welch, and A. E. Boycott, has been appointed by the Council of the Conchological Society of Great Britain and Ireland for the purpose of conducting a collective investigation of phenomena connected with the variation and life-history of British Land and Freshwater Mollusca. The object of the investigation is to enquire into points liable to general uncertainty, and to local or other variation, and into the diffusion and dispersal of species, by collecting the results of the individual experience of many naturalists. A certain small number of subjects for investigation will be published each year, and it is hoped that an abundance of replies will be received, so that the results may be thoroughly representative. The following five subjects have been selected for 1901:—

(1.) How far is the smell of "garlic" constantly associated with *Hyalinia alliaria*? Under what circumstances, and at what seasons of the year, is it most noticeable? Does *H. alliaria* seem to escape destruction by other organisms more than the rest of the genus? Is the smell of "garlic" found in other species, and under what circumstances?

(2.) Have you in any case found any species or variety of land snail constantly associated with any particular plant?

(3.) Is any preference shown by (1) *H. aspersa*, (2) *H. rufescens*, for the neighbourhood of human habitations and buildings? If so, what explanation do you consider probable?

(4.) What localities produce the largest specimens of *Anodonta*? Describe the nature of the water, soil, geological formation, &c., and give dimensions, if possible, weight.

(5.) In the genus *Helix*, where not indigenous, when and how were any of the species introduced? It is desired to put on record, as far as possible, the date of introduction of any species into any given locality, both from abroad into the British Isles and from one part of the country to another.

The locality for which each answer is recorded should be carefully given, with any details of geological formation, altitude, vegetation, &c., &c., which may seem desirable. All returns should reach the Secretary (A. E. BOYCOTT, The Grange, Hereford), by September 1st, 1901.

## CURRENT LITERATURE.

### Dogs from the Crannoges of Ireland.

Under the above title Prof. Studer gave an interesting lecture before the Natural History Society of Berne, in Switzerland, which has now appeared in print (*Mitth. d. Naturforsch. Gesellsch. Bern*, 1900). Prof. Studer's researches were made partly in Dublin and also on dogs' skulls contained in the Dublin Museum, casts of which were forwarded to him. It is interesting and worthy of note that as far as the skull is compared the ancient Irish Wolfhound agrees, according to Prof. Studer, with a modern breed now in the possession of Mr. Walker, of St. Moritz, in Switzerland. Although closely related to the Scottish Deerhound the ancient Irish variety has a shorter snout and appears to have been a more muscular dog. Both of these forms belong to a large race of dog, remains of which have been discovered in the lake-dwellings on the Ueberlingersee in Switzerland. This race has been described by Studer under the name of *Canis Leineri*, and it evidently lived in Switzerland during the latter part of the Stone age.

But this is not the only race of dog known from the Stone age. Sir William Wilde discovered a skull of a small dog at a crannoge at Dunshaughlin, Co. Meath, which according to Prof. Studer agrees with *Canis palustris* of the Swiss lake-dwellings. This seems to have been a dog of the type of the Pomeranian breed.

Another dog's skull examined by Prof. Studer was one which was found in the lake deposits of Lough Gur, near Limerick. It somewhat resembles a type of dog from the Bronze age first described by Prof. Waldrich, of Vienna, under the name of *Canis intermedius*, which was a dog of middle size like the shepherd's dog.

We possess therefore in Ireland the same three old races of dogs as on the continent, viz., *C. Leineri*, *C. palustris*, and *C. intermedius*, from which all later varieties appear to have been evolved.

R. F. S.

### Trinity College Herbarium.

We have received No. 4 of *Notes from the Botanical School of Trinity College, Dublin*. The part contains five papers by Dr. Henry Dixon, two of them reprinted from the *Proceedings* of the Royal Irish Academy, three brief papers by Dr. E. P. Wright, various short notes, and an obituary notice of the late Dr. G. J. Allman.

### Plant Architecture.

To the February number of *Knowledge* Mr. Praeger contributes the first of a series of botanical papers, the subject of the present article being the architecture of plants as seen in roots and stems.

### To Professor Haddon.

Our warm congratulations to Prof. A. C. Haddon, F.R.S., on his election to a Junior Fellowship of Christ's College, Cambridge.

## NOTES.

### ZOOLOGY.

#### *Vanessa io* in the West.

I see in the January number reference made to *Vanessa io*. I have seen it on Slieve Anierin, in Co. Leitrim, and also numbers of the caterpillars in the crag land in Co. Clare, one of which changed into the chrysalis on 12th July, 1900, and into the butterfly on 27th July, 1900.

P. H. GRIERSON.

Lehinch. Co. Clare.

#### *Clausilia bidentata* with two mouths.

In the *Journal of Conchology* for October, Mr. Hugh L. Orr records the above curious case of shell-repairing in a specimen found by him on Cave Hill, Belfast. He suspects that the injury was inflicted by Cole Tits or Blue Tits.

#### Tawny Owls in Co. Down.

Towards the end of January I was informed by a gentleman who takes some interest in ornithology that in June last year he procured from the New Forest nine living Tawny Owls which he liberated in Co. Down. This satisfactorily explains the appearance of the one I recorded in the *Irish Naturalist* for January, but it is anything but satisfactory to think that these nine birds were introduced six months before and no intimation was sent to local ornithologists, local papers, or the *Irish Naturalist*. Any interference with the natural fauna of a country should be always recorded in the proper journals, so that other workers may not be misled. I examined and dissected a second female Tawny Owl shot near Holywood on December 31st, 1900, and a third was shot at Saintfield on February 13. Therefore there are still six Tawny Owls at large in the neighbourhood of Belfast. I wish also to place on record the fact that the same gentleman liberated twelve Jays in Co. Down last June, though I have not heard of any having been shot. They were likewise procured from the New Forest.

ROBERT PATTERSON.

Belfast.

[Mr. Patterson mildly censures the anonymous gentleman to whom he refers for introducing these birds into Co. Down without informing naturalists of what he had done. In our view this omission only heightens the far worse offence of deliberately "falsifying the geographical record." Any occurrence of these two species in the north of Ireland henceforth will be suspect, on account of this utterly needless interference with the native fauna of our island. Our views on this question of introduction are well known to our readers, and we can only repeat what we said several years ago in connection with a similar case—the introducer is almost as great an enemy to science as the exterminator.—EDS.]

### The Migration of Birds.

My friend, Mr. Ussher, has said so many kind words about the volume on the Migration of Birds, which I published with the assistance of Mr. Moffat, that I scarcely like to find fault with anything in his review. He has, however, I think, over-estimated the value of classification in the study of migration. The book is not intended to teach, and never will be looked to as any guide whatever in classification. The standard work of Yarrell, fourth edition, began with the birds of prey; the early migratory reports followed this now disused system, and the later migration reports were written for the sake of uniformity on the same lines. To Copernicus and Galileo we are much indebted in astronomy for a system which supplanted that of Ptolemy. There is a great gulf between the two; but in ornithology we have no such widely different systems which naturalists can clearly recognize as right and wrong. An interesting summary of the various methods of arrangement is given in Newton's "Dictionary of Birds." During the past century almost every great writer had a theory of his own, and at present widely different views are held as to the affinities of genera and species. Each generation explodes the ideas of the previous one. Classification is therefore in a condition of unstable equilibrium, and to say that any system is final or essential in the study of migration is, with every respect to my old and valued friend, going a step too far.

Fassaroe, Bray.

RICHARD M. BARRINGTON.

[An author can hardly expect a reviewer to agree with him absolutely on every point, and in this particular instance we think the author has been treated by the reviewer with an appreciation that is seldom attained, and which shows how thoroughly in sympathy Mr. Ussher is with the work of Mr. Barrington. There is no suggestion of misrepresentation on the part of the reviewer; it is merely a difference of opinion. The question appears to us to be not whether classification is of importance in migration, but whether classification is of importance in a book of reference; and we have little doubt as to which way most of our readers would answer it.—EDS.]

### Irish Hare entering a Burrow.

The fact that the Irish Hare (*Lepus timidus hibernicus*, Bell), occasionally "goes to ground" (to use a sporting expression) is well known to those who are familiar with the ways of the animal. Yet the existence of such a habit in a hare seems to excite so much interest in those who are acquainted only with the Brown Hare, *Lepus europæus*, Pallas, that I think it worth while to place on record the most conspicuous instance of the kind which has come to my notice. This occurred on the 15th of January of the present year, during the meeting of the Kilmanock Coursing Club. On this occasion a hare when hard pressed by a brace of greyhounds deliberately entered a rabbit burrow in the presence of the whole field, and thus saved her life.

G. E. H. BARRETT-HAMILTON.

Kilmanock, Arthurstown.

### Common Dolphin in Belfast Lough.

On the 18th and 19th inst. there was hanging up at Messrs. Sawers, Fishmongers, Belfast, a specimen of the Common Dolphin, *Delphinus delphis*, 5½ feet long and stated to have been captured off Trooper's-lane, that is between Greenisland and Carrickfergus on the Co. Antrim shore of Belfast Lough. I have not seen this species here before nor have I any record of its capture in this lough.

R. LLOYD PATTERSON.

Holywood, Co. Down.

### Probable occurrence of the Lesser Rorqual on the coast of Co. Wexford.

Through the kindness of Mr. Thomas Gould, Station Officer, Coast-guard Station, Ballymoney, Co. Wexford, I am enabled to record the stranding of a cetacean, almost certainly *Balenoptera rostrata*, on the coast south of Duffcarrick, Co. Wexford, on October 8th, 1900. The length of the animal is said to have been thirty, its circumference twenty feet. The colour was dark above, but the stomach and underside of the tail were white. Although I have not seen this specimen or any portion of it, Mr. Gould's description is so clear that there can hardly be any doubt as to the species to which he alludes. As may be learned by a reference to Dr. Scharff's paper in the *Irish Naturalist* of April, 1900, p. 86, the Lesser Rorqual is "probably common all round the Irish coast." I have myself recorded the stranding of specimens on Kerry (*I. Nat.*, October, 1891), and Cork (May, 1898) coasts.

G. E. H. BARRETT-HAMILTON.

Kilmanock, Arthurstown.

## BOTANY.

### Irish Hawkweeds.

Among some recently collected Hawkweeds kindly named for me by Mr. F. J. Hanbury, F.L.S., is *H. proximum*, F. J. Hanb., which is on record from Donegal only (Hart's *Flor. Don.*) I gathered it last June at Poulaphouca on both banks of the Liffey (Wicklow and Kildare) and traced it down the stream to the falls above Ballymore Eustace (Kildare), The plant grows plentifully in these stations. Another rare form is *H. sciaphilum*, Uechtritz, hitherto recorded from only one Irish station (Saintfield, Down). I have it from Cahir, S. Tipperary, 1900, and railway bank at the Curragh, Kildare, 1897. Additional district-records for *Cybele* are given by the following:—*H. iricum*, Fr.—V. Carlingford Mountain, Louth, 1893. *H. lasiophyllum*, Koch.—VI. Menlo, N.E. Galway, 1899; VIII. Lough Corrib near Bleanoran, West Galway, 1899; the previous records of this plant were confined to Ulster. *H. murorum*, L. pt.—III. Maryborough, Queen's Co., 1896. *H. stenolepis*, Lindb.—IX. Lough Gill, Co. Leitrim; and (apparently this) from Carrowkee Hill, Sligo, 1897. *H. vulgatum*, Fr., Maryborough, Queen's Co., 1896—the var. *inaculeatum*.

R. LLOYD PRAEGER.

Dublin.



### Influence of Latitude on Plant-Life.

In the December number of the Geographical Society's *Journal* is the following notice of experiments made in Germany on the influence of latitude on plant-life:—

“Prof. Ihne, of Darmstadt sets forth, in the seventh number of the *Geographische Zeitschrift*, the results obtained as regards the influence of latitude on the dates at which spring is announced by the bursting into flower of various typical trees and shrubs. By the method adopted, which is described at the outset of the paper, the first appearance of the leaf (though recorded in the observations) has not been taken into consideration, owing to the greater difficulty of obtaining a trustworthy record of this than of the dates of flowering, while, given careful observation, the results arrived at may be taken to be the same. Mathematical accuracy is, of course, not to be expected, and the results as a whole are not invalidated by the impossibility of selecting stations at which observations for a sufficient number of years have been carried out, and where other factors besides latitude—longitude, altitude, exposure, soil, &c.—are the same. In his present investigation Prof. Ihne has chosen localities differing as little as possible in these respects. All lie more or less in a line from north to south, the average difference of longitude being only 46 kilometres (28½ miles); and from his previous researches into the influence of longitude on the phenomena in question, which showed that for stations of moderate elevation in Central Europe, the advent of spring is retarded by 0.95 day for every 111 kilometres (60 geographical miles) in an easterly direction, Prof. Ihne shows that such a difference may well be left out of consideration. From the differences observed in the case of eight pairs of stations, which, when reduced to the unit of 1° of latitude (111 kilometres), show intervals of time for that distance varying from 3.4 to 4.6 days, Prof. Ihne arrives at the conclusion that for every additional degree of latitude the advent of spring is retarded by about four days.”

There can be no doubt that a repetition of these German experiments in other places would be of considerable value, and though Ireland is not so well adapted for the purpose as countries which extend over many more degrees of latitude, it seems to me that we should at least make a trial, and that in our Field Clubs we have an excellent organisation for carrying out this work. By means of our members and their friends scattered throughout the country we should be able to get the results of observations at a large number of places on parallels of latitude at every degree or half degree, for instance, those on a line from Clifden through Tuam, Newtown-Bellew, Auburn, Mullingar, and Dunshaughlin to Lusk, would give statistics for latitude 53° 30', and from these observations we should also perhaps be able to formulate the effects on vegetation of distance from the eastern or western coast line of Ireland. Of course, the observations must be made very systematically, and continued for several seasons, that fair average dates may be obtained, and I hope the Field Clubs will consider this matter worthy of serious consideration.

G. T. PLUNKETT.

Science and Art Museum, Dublin.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

The annual meeting of the Society was held at the Royal College of Physicians, Dublin, on February 5th, when a highly satisfactory report of the past year's working was presented by Prof. D. J. Cunningham, F.R.S., the honorary secretary. During 1900, 156,012 persons visited the Gardens, paying £2,365 1s. 8d. for admission, an increase of 8,500 visitors and £225 receipts as compared with 1899; while the amount received from members and subscribers was £673, an increase of £76. Consequently despite the allocation of £1,000 towards the erection of a new house for the Carnivora, a balance of over £300 remains to the credit of the Society after allowing for all outstanding liabilities.

Very special attention has been paid to the preparation of plans for the new Carnivora ("Lord Roberts") House, in the design of which help has been obtained from the directors of the London as well as the leading European and American Zoological Gardens. The new house, which will be connected with the old Lion House, and showing its principal elevation opposite the Haughton House, will contain ten new dens and three or four large open-air dens, roofed over, floored with wood, and with a southern aspect. The cost of the new house will be considerable, but in addition to the £1,000 already allocated by the Society, £1,000 has been collected, and a further sum will, it is thought, be raised with little difficulty.

A fresh impetus to the "Irish Lion industry," which is dealt with at length in this report, may confidently be looked for. For the four years 1895-98, only eighteen cubs were born in the Gardens and only six of these were reared. But in the last sixteen months fifteen cubs have been born whereof eleven are still in the Gardens. There is no fear therefore of a decline in the famous Dublin lion-breeding as a whole, though there has been a curious falling off in the average number of cubs in a litter—two or three now as against four prior to 1886. Among the cubs now in the Gardens are two—a male and a female by Cæsar, the only Dublin-bred adult lion still in the collection. There is every hope therefore that the old Dublin strain may be preserved.

After the completion of the "Roberts House" the Council hope to erect a new Bear House and pit where all the bears may be gathered in proximity to one another, and so make comparison easy to visitors.

The various acquisitions to the Gardens through the year have been duly chronicled in the pages of this Journal. Several unfortunate deaths of animals are mentioned in this Report—the Sea Lion, two Cheetahs, the male Ostrich, the male Bactrian Camel, and a Chimpanzee, the last named loss depriving the Gardens for the present of any representative of the man-like Apes. Appropriate reference is made to the great interest of the Horse and Zebra hybrids lent in the summer by Prof. Ewart of Edinburgh. The Society's photographic medal has been awarded to Mr. Greenwood Pim.

## DUBLIN MICROSCOPICAL CLUB.

DECEMBER 6.—The Club met at Leinster House.

Mr. GREENWOOD PIM showed Beech leaves from Straffan, thickly covered with *Phyllostictia guttata* (Wallroth) (= *P. suffulta* of Tubeuf). It forms white patches on which are dotted the conceptacles which contain the asci and spores. As in all the other *Erysiphææ* the conceptacles are furnished with appendages in this genus; these form long and sharp needles with swollen bases. It is common on Hornbeam, Hazel, Ash, &c.

Mr. A. J. BECKETT exhibited, under a magnification of 275 diameters, a specimen of muscle from a case of "equine hæmoglobinuria"—showing the peculiar waxy degeneration of the muscle fibre. Individual fibres were to be observed in which the normal striation was altogether lost and the sarcous substance was split up into homogenous masses or clumps. Other fibres showed plainly an intermediate stage.

Dr. PETHYBRIDGE exhibited pure cultures of a pink yeast (*Torula*) on sterilised potato and on nutrient gelatine. These yeasts, of which several species are known, are strictly aerobic and do not produce spores. The colour of the colonies varies slightly according to age and according to the substratum on which they grow. The colouring matter is soluble in water and is probably extracellular, no trace of a pink colour being visible in the cells themselves, when observed in a hanging drop at a magnification of 1,000 diameters.

Mr. G. H. CARPENTER showed the paired structures attached to the base of the tongue in *Machilis maritima*. These organs, present in most of the Thysanura and Collembola, are believed by Hansen to be a pair of jaws homologous with the first maxillæ of Crustacea. If this view, which has much evidence in its favour, be accepted, four pairs of jaws in the primitive insect head must be recognised.

Mr. M'ARDLE exhibited *Mastigophora Woodsii*, Hook., which he collected last June on Mount Brandon, Co. Kerry. It is a rare hepatic not found in any other county in Ireland, and there very local; difficult to detect on account of its moss-like appearance, as it grows flat on the ground or on the shelving rocks. Dr. D. Moore, in his work on *Irish Hepaticæ*, p. 635, writes concerning it:—"This fine species grows in large patches lying flat on the ground and appears at first sight to resemble patches of *Thuidium tamariscinum*." Mr. M'Ardle showed a dried specimen mounted on card-board, and a microscopic slide showing portion of the stem with the curious unequally two-lobed leaves, the segments of which are ciliato-dentate, the large stipules cleft into two, which are spinosely dentate, the round cells, distantly placed in the leaves, which are of a dull purplish brown colour, and becoming duller near the base of the stem. The fructification is unknown. The plant was first found on Mangerton mountain by Mr. Joseph Woods in 1809, and he sent specimens of it to Hooker who figured it in *British Hepaticæ* (p. 66).

Mr. F. M. SELLENS exhibited portion of a frond of *Athyrium F.f. unco-glomeratum* mounted in a preparation of glycerine.

**DUBLIN NATURALISTS' FIELD CLUB.**

DECEMBER 18, 1900.—The chair was taken by Mr. PRAEGER, in the absence of the President. Forty members and visitors were present. Mr. A. L. OTWAY read a paper entitled "Notes on Irish Red Deer," illustrating his remarks by diagrams which he drew on the blackboard. Photographs of the head and antlers of the Red Deer were exhibited, and handed to the members for inspection. The paper will be published in full in an early number of the *Irish Naturalist*.

Mr. SHACKELTON remarked that the term "Elk" is not a correct one to apply to the ancient Giant Deer of Ireland. This animal had affinities with the modern forms of true deer (Fallow deer, &c.), whilst its relationship to the Elk proper were very remote.

Mr. EDWARD WILLIAMS described the boglands in the Dublin Hills where he had excavated the remains of the Irish "Elk." He also gave an account of the way in which these great animals lost their lives, and became immersed in the mud. Mr. Williams brought down to the meeting many bones of the fossil "Elk," which he described one by one, and demonstrated to the members the differences between these bones and those of the Red Deer.

Mr. PRAEGER described the deposits underlying Belfast, where "Elk" and Red Deer remains were found.

Dr. C. J. PATTEN (Hon. Sec.) suggested that, owing to the depth at which the Red Deer remains were placed, it might be difficult to obtain them. These bones have seldom been obtained by excavation, whereas those of the "Elk" have been frequently secured. Still the Red Deer in past times was probably as common an animal as the Irish Elk. Dr. Patten asked Mr. Otway if he thought that lime salts or other chemicals present in the soil ever split the bones from which apparently the marrow had disappeared?

Colonel PLUNKETT, and Messrs. SEYMOUR, NICHOLSON, and HINCH also spoke on the paper.

Mr. EDWARD WILLIAMS regretted he could not exhibit his, Pectoral Sandpiper, as on the agenda paper, as the specimen had not arrived from London, where it had been sent to Mr. H. Saunders for identification. He promised to exhibit the bird at a subsequent meeting.

Colonel PLUNKETT read a short communication relative to the influence of latitude on the time of flowering of plants, which will be found on p. 75.

Mr. PRAEGER and Miss BERNARD spoke on this subject.

The following members were elected;—Caryl T. W. Fiennes, Alex. Williams. Three nominations for membership of the Club, and the Committee's suggestions as to nominations for officers, &c., for 1901, were announced.

### LIMERICK FIELD CLUB.

JANUARY 8.—ANNUAL MEETING AND CONVERSAZIONE.—The eighth annual meeting and conversazione of the members of the Limerick Field Club was held in their rooms, Glentworth-street. A large and interesting variety of exhibits was on view. A good exhibit was that in the Microscopic section, in the living examples of *Volvox globator*, *Melicerta ringens*, *Hydra viridis*, and *H. fusca*, salmon ova, circulation of protoplasm in leaf cells of pondweed (*Anacharis alsinastrum*). A collection of stone implements was exhibited by Dr. George Fogerty, R.N., and others. These clearly demonstrated the existence of prehistoric man in the district of West Clare. There were also flint implements from the North of Ireland. In the Entomological Section there was a fine display of cave spiders (*Meta Menardii*) and the Convolvulus Hawk-moth (*Sphinx Convolvuli*). The botanical specimens were numerous and well arranged, These included some recent plant finds in the County Limerick, and some hitherto unknown in the country itself; a fine collection of mosses, and a display of alpine plants. A specially noticeable feature was the large series of sketches of wild flowers exhibited by Miss Laird. These were the work of Miss Shackleton, of Dublin, and were deservedly admired. In the Geological Section were specimens of ores and minerals, and a series of examples of rocks, while the majority of the work of the members of the Photographic Section was valuable from a historic point of view. In the bank room a series of lantern slides was shown by Mr. B. Barrington, explanations of the slides being given by the members who took the photographs. Specially interesting were the three short illustrated lectures given by the President, who dealt with plant structure; Dr. G. Fogerty, who showed some photographic slides of the Lisdoonvarna district, and Mr. P. J. Lynch, C.E., who dealt with the historic ruins of Cashel and district. The business portion of the meeting was brief. The President, Dr. W. A. FOGERTY, M.A., called on the Secretary, Mr. FRANCIS NEALE, to read the annual report, of which the following is an abstract:—

The time covered by this report is only nine months, as the last annual meeting decided that the commencement of the Club year should harmonise with the opening of the winter session in October. Your Committee are glad to say that the interest in the Club seems unabated, and that the change of the amount of the annual subscriptions payable by members is working really well. A considerable number have as was expected fallen away, the net loss amounting to 118, but the working power of the Club has not suffered in any way, nor has its revenue diminished. There were 152 names on the list of members at the end of the year, as compared with 270 in 1899, and yet there is a largesum to the credit of the Club in the Treasurer's hands than on any similar previous occasion. In addition to the publication of the Club Journal during the year, the following meetings have taken place:—January 2nd, 1900, photographic lecture on 'Plates and Printing Papers'; January 9th, seventh annual meeting; January 23rd, 'Irish Geological Notes';

February 6th, illustrated lecture on 'Photographic Portraiture'; March 6th, 'Outdoor Photography,' illustrated by lantern transparencies; April 3rd, exhibition of prize lantern slides; April 26th, excursion to Linfield, Pallasgrean; June 28th, excursion to Paradise, Kildysart; July 10th, excursion to Lough Gur; July 19th, excursion to the Rock of Cashel. With one exception all the winter evening meetings on the programme were carried out, but three of the summer excursions did not take place owing to unfavourable weather. The various sections of the Club—Scientific, Photographic, and Archæological—have each done some share of work during the period now under review, the botanical members having been specially fortunate in adding quite a number of fresh records to the plants of County Limerick, several examples of which are now on view here this evening. Your Committee keep on hoping for an increase in the working members of the Club as a natural result of its operations.

In moving the adoption of this, Mr. H. SAMS congratulated the Club on the successful year it had enjoyed. The Rev. T. F. ABBOTT briefly seconded the adoption of the report, which was carried with acclamation.

Mr. JOSEPH STEWART (Hon. Treasurer) presented his balance sheet, which showed that while at the end of last year there was only a balance in hand of 5s. 4d. that had increased to £9 7s. 9d. (applause). This also was adopted.

The Chairman congratulated the members on the present condition of the Club, both financially and otherwise.

Mr. Wm. M. Beauchamp having been called to preside, the election of officers and committee for the ensuing year was proceeded with. The following is the list:—President—Dr. W. Fogerty; Vice-Presidents—Mr. J. Grene Barry, J.P., D.L., and Rev. Timothy Lee, Adm.; Hon. Treasurer—Mr. Jos. Stewart; Hon. Secretary—Mr. F. Neale; Committee—Miss Rennis, Miss A. Doyle, Miss Ebrill, Mr. B. Barrington, Mr. P. J. Lynch, C.E., Mr. P. E. O'Donnell, Mr. C. Scott; Hon. Secretary of Natural Science Section—Mr. J. F. Windle, C.E.; Hon. Sec. of Photographic Section—Mr. G. F. Fogerty, R.N.; Hon. Sec. of the Archæological Section—Rev. James Dowd, B.A.

### BELFAST NATURALISTS' FIELD CLUB.

DECEMBER 19.—W. F. FENNELL, M.R.I.A.I., contributed a paper on "Where the Masters Wrote," with lantern illustrations, which was followed by a paper on "Symbolic Ideas of the Ancients concerning Trees and Plants," by JOHN VINYCOMB, M.R.I.A.

BOTANICAL SECTION.—NOVEMBER 2.—The first meeting for the winter was well attended. "Fungi" was the subject for study, and the members brought in a large number of species for examination.

BOTANICAL SECTION.—DECEMBER 7.—Rev. C. H. WADDELL gave a lecture on British Ferns.

## RECENT OBSERVATIONS ON OLDHAMIA AND HISTIODERMA.

BY PROF. GRENVILLE A. J. COLE, M.R.I.A., F.G.S.

THE most elaborate and beautifully illustrated paper ever devoted to *Oldhamia* is undoubtedly that by Prof. W. J. Sollas, F.R.S., published in the Quarterly Journal of the Geological Society of London, volume lvi., 1900.<sup>1</sup> If, in summarising it, I add one or two comments of my own, it is merely to show that the subject is still under discussion, and that we may agree with the author (p. 284) that "the nature of *Oldhamia* cannot yet be regarded as definitely ascertained. That it is of organic origin seems . . . scarcely to admit of doubt; whether the organism were animal or plant, and in what manner it imprinted its traces on the rocks, are questions that still await a definite solution."

*Ichnium Wattsii*, described in the same paper, is "a radiate system of continuous, undulating, bifurcating furrows," occurring in a red shale, half a mile south of Bray Head. The photograph given shows it to have a general resemblance to *Oldhamia radiata*. Prof. Sollas compares it with Nathorst's figure of the radiating impressions made by a living worm, *Glycera alba*, and shows (p. 277) that it "does not present a single feature by which it can be distinguished from the track of a recent worm."

*Oldhamia*, however, is not near enough to *Ichnium* to warrant the same conclusion. The author describes, more completely than has been before attempted, the two well-known species from Bray, and illustrates them with photographs, which are fortunately printed as separate plates, and which are veritable works of art. Prof. J. Joly<sup>2</sup> pointed out, in 1886, that, on the upper surface of any bed, *Oldhamia radiata* appears as a depression, while *O. antiqua* is in relief. Prof. Sollas, with characteristic ingenuity (p. 282), explains this by supposing that the upper surface of *O. antiqua* was more resisting than the lower; that the lower part decomposed,

<sup>1</sup> "Fossils in the Oxford University Museum. III. *Ichnium Wattsii*, a Worm-track from the Slates of Bray Head: with observations on the Genus *Oldhamia*." *Q.J.G.S.*, vol. lvi., pp. 273-286.

<sup>2</sup> "On a peculiarity in the nature of the impressions of *Oldhamia antiqua* and *O. radiata*." *Journ. R. Geol. Soc. Ireland*, vol. vii., p. 176.

therefore, while the upper part formed an arch or tunnel into which the mud flowed up from below, remaining as a mould of each filament or rod; while *O. radiata* simply decayed away, leaving a depression, into which the next mud-layer sank from above.

The impressions, however, are often continuous through several layers. There is no difficulty in accounting for this in the case of *Oldhamia antiqua*. The author suggests that, in the case of *O. radiata* the lowest impression is the original dimple formed by the filament resting on the mud; the overlying and now sunken layers were deposited before the filament decayed; and, when it did so, they all bent down into the hollow as it was vacated by the organic matter.

The facts certainly seem at first opposed to any annelid-theory of *Oldhamia*. If the markings were produced by movements of tentacles, or of the body of a worm, round about its burrow, these traces would probably not be identical in successive layers. But may we not accept Prof. Sollas's suggestions gratefully, and yet see in the markings of *O. radiata* a record of the ultimate positions of extended crowns of tentacles, which at first resisted, and then decayed away as he has supposed? Were it not for the remarkable observation of Prof. Joly, it would be tempting to see in *O. antiqua* similar crowns of tentacles swept over sideways and killed off by a rush of water bearing the mud that formed the succeeding layer. The fan-like or tassel-like form would thus be explicable, as anyone may realise by experiments on the appendages of an ordinary window-blind; and the fact that *O. radiata* occurs in one stratum, which would be, on this theory, a quiet-water stratum, and *O. antiqua* in another, would then seem natural enough. Prof. Joly's discovery, however, points to a genuine specific difference between the two; and the regularity of arrangement in many specimens of *O. antiqua* also opposes the above suggestion.

The annelid-theory, however, deserves closer attention, owing to modern researches in America. Mr. G. F. Matthew<sup>1</sup> has described from the Cambrian of St. John, New Brunswick, a number of tracks and markings, which he attributes to

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<sup>1</sup> "Illustrations of the Fauna of the St. John Group, No. V." *Trans. Roy. Soc. Canada*, Section iv., 1890, pp. 123-166.



annelids, and which seem to illustrate, at any rate, the structure of our own *Oldhamia*. His *Fræna ramosa* (p. 159) is described as "clustered passages running mostly in one direction, and spreading as if branched, some raised for a distance of 5 to 10 mm. above the level of the layer on which they occur, others mining the layer . . . . The passages have a dark skin or coating." The genus *Fræna* is due to Linnarsson; but Matthew's species, despite its large size, reminds one of the more disjointed specimens of *Oldhamia radiata*, such as that figured by Dr. J. R. Kinahan<sup>1</sup> in 1858. The most striking traces of annelids that are discussed by Mr. Matthew are, however, those placed under Torrell's genus, *Monocraterion*. The tentacles of *Monocraterion tentaculatum*, from the Cambrian of Lagnas in Sweden, have a maximum length of 34 millimetres; those of Matthew's *M. magnificum* (p. 160), are "from 8 inches to a foot in length" (200 to 300 mm.). Matthew's description is significant, as bearing on what has been said with regard to the constancy of the Oldhamian ridges in successive layers. "In the lapse of time the sand accumulated around the funnel in which the animal lived, making the depressed, trumpet-shaped opening, for which old burrows are remarkable. Their disinclination to change their location is also shown by the constancy with which the tracks of the tentacles maintained their course; for they scarcely deviated from a certain direction through the different layers of half an inch or more in thickness. It would appear that they did not often turn in their burrows." On p. 161, Mr. Matthew says that the tracks are traceable on successive layers for a thickness of an inch or more. Does not this suggest a magnified example of the phenomena observed in *Oldhamia radiata*? The explanation of the persistence of the markings may, at any rate, be the same in both, whether we accept the reading of Mr. Matthew in 1890, or of Prof. Sollas in 1900. Of course, the burrow is a conspicuous feature in *Monocraterion*, while, as Sollas shows, it is obscure, to say the least, in *Oldhamia*; but the relative dimensions of the various parts may have differed in genera none the less allied.

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<sup>1</sup> *Trans. Roy. Irish Acad.*, vol. xxiii., p. 557.

Mr. Matthew discusses the relation between *Monocraterion* and *Histioderma* (p. 162), the type-specimens of which are now among the collections of the Geological Survey in the Dublin Museum.<sup>1</sup> On this point, I may quote from an interesting letter that I received from Mr. Matthew, dated 8th March, 1900. At that time we had not the advantage of discussing more than the preliminary abstract of Prof. Sollas's paper, and our correspondence had arisen over *Histioderma*. Mr. Matthew wrote, "I have not noticed anything in the nature of a reticulation within the burrow of *Monocraterion*. The impressions of the supposed tentacles can however be traced for some distance down the slope of the burrow along its sides, evidently continuous with the furrows outside . . . . I have seen areas of surfaces of the flags, so pitted with these burrows that the tentacles would have come in contact at their extremities."

It would now be highly interesting to hear from Mr. Matthew whether the internal tentacular markings run up to the top of any given series of lateral and radial markings, and thus across successive layers of the rock in which these radial markings occur. If they do so, Prof. Sollas's ingenious suggestion would not apply in their case, while the case of *Oldhamia* might again deserve consideration.

Prof. Sollas has accidentally passed over American work, since he merely quotes Barrois for the statement that "a form of *Oldhamia* is said to occur plentifully in the Potsdam Sandstone (Upper Cambrian) of Wisconsin," while no American references occur in his otherwise admirable bibliography. A short but stratigraphically important paper by Mr. C. D. Walcott<sup>2</sup> formed the subject of a notice in the *Irish Naturalist* for 1896 (p. 254). In that paper, Walcott discussed James Hall's species *Oldhamia fruticosa*, from the Trenton Limestone of Wisconsin, which was described in 1865. He also pointed out that Lapworth<sup>3</sup> mentions a form of *Oldhamia* in Upper Cambrian slates at Farnham, Province of Quebec. Lapworth,

<sup>1</sup> See G. A. J. Cole and J. W. Evans, letter in *Geol. Mag.*, 1900, p. 48.

<sup>2</sup> "Discovery of the genus *Oldhamia* in America," *Proc. U.S. National Museum*, vol. xvii., 1894, p. 313.

<sup>3</sup> *Trans. R. Soc. Canada*, vol. iv., 1887, section iv., pp. 180 and 183. (Walcott quotes the date as 1877.)

it may be remarked, thought that the object might prove to be *Dictyonema*; but Walcott, who has examined a poorly preserved specimen, agrees that it is an *Oldhamia*, though of doubtful species. At the same time, he is inclined to reject Hall's *Oldhamia fruticosa*.

Walcott then describes a new species, *Oldhamia (Murchisonites) occidens*, an ally of *O. antiqua*, from beds of Upper Cambrian or Lower Ordovician age. The locality of these is not clear to the outsider, as they occur in the "Troy Sheet" of the Survey, and there are some ten towns called Troy, not to speak of villages, in the United States. Nor can we quite overlook the extraordinary references to previous authors that disfigure Mr. Walcott's paper. Not only is Dr. J. R. Kinahan called "Kinnehan" and "Kinnahan" at pleasure but it is stated that "Prof. Brady" discussed *Oldhamia* in 1865, and proposed the new genus *Murchisonites*. The reference given is to the "*Geological Magazine*, 1865, p. 6." Brady, however, is represented in that volume only by an abstract on p. 223, in which *Oldhamia* is not mentioned. H. R. Göppert,<sup>1</sup> as Prof. Sollas knows, was the real author of the proposal to rename *O. antiqua* as *Murchisonites Forbesi*; this proposal was combated by Salter, to whom Walcott actually refers, without noting his full discussion of the subject. After this, we may pass over minor slips that occur in this series of references, which seem to have been got together by someone other than the author of the paper. If Mr. Walcott's *Oldhamia occidens* is to stand as a species, some forms from Bray will have to be included in it, such as one figured by Mr. W. H. Baily in 1865.

So far as I am aware, Sollas<sup>3</sup> was the first, in 1893, to observe that *Oldhamia* was "strikingly similar to the radiate branching markings which may sometimes be seen on muddy flats extending from the mouth of the tubes of burrowing worms." In proportion as the view of the sertularian or algal affinities of *Oldhamia* declines in favour, I think we must seek more

<sup>1</sup> *Acad. Caes. Leop. Nova acta*, Bd. xxvii., 1860, p. 441.

<sup>2</sup> "Cambrian Rocks of the British Islands." *Geol. Mag.*, 1865, p. 394, fig. 4c

<sup>3</sup> "Geology of Dublin and its neighbourhood." *Proc. Geol. Assoc.*, vol. xiii., 1893-5, p. 94

and more in the direction of the worms. The field may now be safely left to Prof. Sollas and Mr. Matthew, two distinguished observers in opposite hemispheres, whose work, forming the basis of the present paper, is here gratefully acknowledged.<sup>1</sup>

Royal College of Science, Dublin.

## NOTES ON THE ALGÆ OF LOUGH NEAGH.

BY WM. WEST, F.L.S., AND G. S. WEST, B.A., A.R.C.S.

(Provisional Report to the R.I.A. Fauna and Flora Committee).

LAST spring Mr. Praeger wrote to us on behalf of the Fauna and Flora Committee of the Royal Irish Academy, inviting us to undertake an examination of the aquatic flora of Lough Neagh, and offering assistance in the shape of a grant of money, and also the use of a steam launch, kindly placed at the disposal of the Committee by the River Bann Fisheries Commission. We availed ourselves of this excellent opportunity of studying the algæ of the largest fresh-water area in the British Isles, and in June Wm. West spent twelve days on and around the lough, being much assisted in the work by several members of the Belfast Naturalists' Field Club.

The algæ collected in Lough Neagh have turned out to be very interesting. A large number of species were obtained, some of them being very uncommon. Many species occurred in countless profusion miles away from the shores, floating in what seemed to be perfectly limpid water; these were obtained by tow-netting, the result by this method being much greater than was anticipated.

The tow-nets were of a conical form with somewhat rounded apices; they varied in size, being from 5 to 12 inches internal diameter at the base and from 18 to nearly 30 inches in length. Stout rings of copper were covered with broad bands of

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<sup>1</sup> Waagen (*Mem. Geol. Surv. India, Pal. indica*, ser. xiii., 1887, p. 403), has described a genus of brachiopods under the name of *Oldhamia*. It is unfortunate, but almost inevitable, that this has been quoted, both in Zittel's "Grundzüge der Paläontologie" and in its American paraphrase, as *Oldhamia*. The point is worth noting, since *Oldhamia* thus appears in the indexes of these works, while the genus is not in reality discussed in them.

sailcloth, and to these were sewn the nets made of the best miller's silk. These nets were attached to the sides of the launch towards and at the stern by ropes several yards in length. The speed used varied from a half to two or even three miles an hour. After about an hour's towing the nets were taken in and the water allowed to drain out naturally. By this means, on turning the nets inside out, a fine greenish sediment was obtained which was scraped off and transferred to small wide-mouthed bottles. The nets were then washed in water contained in a large vessel, and this water was then transferred to large bottles and allowed to stand so that the material desired should be concentrated by subsidence. Total subsidence did not always take place, and the bulk of the material had then to be killed, various means being adopted, chromic acid, trinitrophenol and phenol generally being used for the purpose. Some of the material was kept alive for examination.

The chief rivers flowing into the lake were also tow-netted, boats having to be used in most cases. The various islands were visited and the algæ bordering upon them were collected. Many parts on the borders of the lake were also visited on foot, a boat being sometimes also brought into requisition. Some of the small lakes adjoining were also visited.

The weather was favourable, and the twelve days spent there were in consequence fully utilised. Nevertheless the time available was insufficient for the completion of the investigation. It is, therefore, arranged that the examination of the lough shall be resumed next summer at a different period—or at different periods—of the year, in order to obtain a more efficient result, as well as to visit those parts of the lake—especially the shores—not yet examined.

Much time has been given to the examination of the material, and about two hundred species have so far been determined; a number of these might be termed pseudo-pelagic, occurring in great profusion about the centre of the lake. The investigation shows that there is no lack of minute organisms in *all parts* of the lake; these serve as food to larger animals and these to still larger ones, so that eventually there is an ample supply of food for the fish.

## RISSO'S DOLPHIN :

## A CETACEAN NEW TO THE IRISH FAUNA.

BY PROF. D'ARCY W. THOMPSON, C.B.

IN the beginning of September, 1900, I heard in Galway that a "porpoise" had been cast ashore some little while before at the bathing place of Blackrock, close by the town. I had not time then to go and look for the animal, but at Christmas time I did so and found it. It turned out to be a young specimen, a little over five feet six inches in length, of *Grampus griseus*, Cuv., Risso's Dolphin or Grampus, the form known as *Grampus rissoanus* being now generally conjoined with it as one and the same species. This Dolphin is very easily recognised by the entire absence of teeth in the upper jaw, and by the presence of a small number of large ones at the extremity of the lower jaw, which is much swollen to contain them. It is also remarkable for certain very curious striæ or scratches that are very generally present on its skin, and which M. Chaves of Ponte Delgada and M. Jules Richard have lately shown to be in all probability the traces of encounters with very large Cuttle-fishes. I looked for but failed to find these markings on this small and by this time much decomposed specimen. The largest specimen of which I have found a record is a male captured in the Mediterranean by the Prince of Monaco, which measured 3.40 metres, or about eleven feet four inches. A cetacean of about this size came ashore near Galway last summer, in July or August, but its carcase was immediately towed out to sea and sunk; it is very likely indeed that this was a parent of the young Grampus.

The species is a rare one, though it appears to have an enormously wide distribution throughout the warm and temperate oceans. It has been taken several times in the South of England; a shoal of six was captured in Shetland in 1889, two were got in the Solway Firth in 1893, and a skull was brought up in a trawl-net off the Isle of Man in 1899, but it is new to Ireland.

The skull and the somewhat imperfect skeleton of the Galway specimen are now in the Museum of University College,

Dundee. Some teeth are missing, but there seem to have been four on each side, or perhaps three on the left and four on the right. The dentition of the species is very variable. M. Richard describes, in the two specimens taken by the Prince of Monaco, five teeth on the right side and four on the left of a female from the Azores, and four teeth on the right side and two on the left of the large male from the Mediterranean. Every intermediate number from two teeth to six appears to have been recorded, the individuals with the larger number of teeth having been generally ascribed to *G. rissoanus*.

I may mention also, in parenthesis to this note, the fact that we have in this Museum a skeleton of *Lagenorhynchus albirostris*, Gray, the White-beaked Dolphin, which I obtained some twelve years ago near the same spot where I found the *Grampus griseus*. Dr. Scharff in his "List of Irish Cetacea" published last year, is able, I see, to record only one certain and one somewhat doubtful instance of the occurrence of this species in Ireland.

University College, Dundee.

## ABNORMAL DENTITION IN THE DOG.

BY PROF. RICHARD J. ANDERSON, M.D.

A SMALL three-year-old terrier was shown to me some time ago, because of the peculiarity of the dentition. It was of a wire-haired, short-legged breed, and presented for examination the following variety. Whilst the incisors of the upper jaw were in range, and three on each side, those in the lower jaw show only two on each side in range in front. Two additional teeth appear behind the four, one on each side, so as to suggest to a casual observer the existence of a double row of teeth. The two posterior teeth appear to be intermediate incisors, although the presence of additional teeth in some animals in this region results from persistence of the milk teeth. Several bears and their allies show receding intermediate lower incisors, and this peculiarity is not confined to modern types. Several carnivores (*e.g.*, seals) show a fewer number than the normal. It is quite evident the

narrowing of the jaw would be advantageous in many cases, but besides this it may be assumed that the double row would also serve certain breeds. If the lower jaw were undershot, as occurs sometimes in man, the enamel of the upper incisors might produce a groove in the dentine of the lower incisors. The accessory incisors in the upper jaw of certain rodents are familiar; and Owen called attention to the condition of the crowns in the upper intermediate incisors of the hyæna. There is in each of the latter a transversely cleft crown, and a division of the posterior prism vertically, so that the crown has a trefoil appearance, and the hollow between the three parts of the trefoil receives the pointed cusp of the tooth below. The second and third incisors of the lower jaw are indented externally, but "have not the posterior notched ridge like the upper small incisors" (*Odontography*, p. 483.) Bateson mentions the absence of the lower incisors in a dog, with the presence of eight incisors (four on each side) in the upper jaw. He notices also a *C. vulpes pennsylvannica* (B.M.) with I.2—2 in lower jaw, a *C. vulpes* with five incisors in the mandible with no socket for a sixth (Schæff.) In tame dogs he records one incisor tooth absent on each side in the upper jaw. It is much rarer to find an increase in the number of the lower incisors than in the upper (Nehring quoted by Bateson). The case of a bulldog with a wide-crowned second incisor is mentioned. The main cusp was partially bifid. An incisor is rarely absent in the dog; a case is given by Hensel (Bateson), in which there were two on each side as in seals. It would be interesting to know whether the variety above recorded occurs more frequently in certain breeds of dogs.

Queen's College, Galway.

## CURRENT LITERATURE.

### Lepidoptera of Co. Westmeath.

A note by Mr. B. L. Middleton in the current number of the *Entomologist* (vol. xxxiv., p. 102) shows that there is still work to be done in Irish Lepidoptera even in so comparatively familiar a field as Co. Westmeath. Among various interesting species recorded, we note with especial satisfaction *Leucoma salicis* and *Eurymene dolobraria*, whose known range in Ireland had been hitherto confined to Clonbrock, Co. Galway.



### Malarial Mosquitoes in Ireland.

Everyone who has scanned with any care recent scientific or even general literature, knows that researches during the last few years by Ross, Grassi, and others have established the fact that the protozoan parasites whose presence within human red blood-corpuscles causes the various forms of ague and malaria, are passed into the system by the bite of the female gnats or mosquitoes of the genus *Anopheles*. The asexual development of the parasite is carried on in the human body, the sexual generation within the body of the insect. It is highly probable that malarial infection is only conveyed by the bite of *Anopheles*, and could this genus of gnats be exterminated, malarial disease would be completely stamped out. In the first number of the newly-issued *Journal of Hygiene* are two papers illustrated with maps and plates on this very interesting subject. Drs. Nuttall and Cobbett and Mr. Strange-ways-Pigg write on the distribution of *Anopheles* in the British Isles in relation to the former distribution of ague, while Dr. Nuttall and Mr. A. E. Shipley describe in much detail the structure and habits of the larva of *A. maculipennis*. The species of *Anopheles* are shown to occur in all those parts of the country which were formerly malarious, but they also inhabit other parts where there is no record of the former prevalence of the disease. It seems therefore that Grassi's suggestion that the distribution of *Anopheles* and of malarial disease would be found to correspond throughout the world cannot be sustained. Still there is a very general agreement between the English counties where ague was formerly prevalent and those which *Anopheles* still inhabits. Dr. Nuttall and his companions believe that the disappearance of ague from these countries is due to a reduction in the number of *Anopheles* together with a reduction in the human population of those low-lying, marshy districts which were the centres of malarial infection in former times. The distribution of *Anopheles* has been tabulated with great care, and except for Haliday's Co. Down record of the three British species, in 1833, the only Irish entry is a recent capture at Harold's Cross of a female *A. nigripes*, which is now in the Dublin Museum.

### Underground Crustacea.

In the Linnean Society's *Journal (Zoology)* vol. xxviii., 1900, pp. 140-162, pls. 16-18, Dr. C. Chilton gives an interesting account of the subterranean Amphipoda of the British Isles. There are four species—three of *Niphargus* and one of *Crangonyx*, found in deep wells and other underground waters. It is remarkable that all seem restricted to the southern counties of England except *Niphargus kochianus*, Spence Bate, specimens of which, recently collected by Mr. Farran in wells near Dublin, were examined by Dr. Chilton. This species occurs also in Hampshire and Wiltshire in southern England, and at Munich, Bavaria.

## NOTES.

## ZOOLOGY.

## Entomological Notes from Abbeyleix.

During the past few months I have made in spare intervals some acquaintance with the beetles of this neighbourhood. The district is rather flat and very well wooded, the large demesne belonging to Lord De Vesci being thickly and widely timbered, and containing many ancient oaks and hawthorns said to be remnants of the primeval forests of Ireland.

In such a locality the wood-boring beetles might be expected to be very prominent, and notable amongst these are four of the Longicornia:—*Grammoptera ruficornis*, *G. tabacicolor*, *Rhagium inquisitor*, and *Leioptus nebulosus*. The two species of *Grammoptera* abound upon the Cow-parsley in the wood-openings, but *tabacicolor* is much rarer. *Rhagium inquisitor* appears to be common, as I swept three specimens from the hawthorn blossoms in the month of May. *Leioptus nebulosus* is represented by one specimen taken upon the person of a youthful friend who had been pulling flowers in the demesne. By far the most prominent insects in the hot summer months were various species of *Telephoridae*—the rarest and most interesting of these being *Telephorus nigricans* v. *discoideus*. I took a couple of specimens of *Podabrus alpinus* in my garden, but did not notice this species anywhere else. *Rhagonychia limbata* occurred in great numbers on the Umbelliferæ in the woods. Sweeping the hawthorn blossoms afforded abundance of *Malthodes bipustulatus*; this insect however seemed restricted to one spot in the woods, as any amount of searching in other places proved quite disappointing.

*Corymbites cupreus* cannot be uncommon, as two specimens were taken here, but a more striking find was made in *Elatер pomorum* which I dug out of a damp rotting tree-trunk.

I have taken but two species of *Silpha*—*rugosa* and *atrata* v. *subrotundata*. The variety of the latter is most abundant, but of the type I have not seen a specimen. Of the Lamellicornia two examples are prominent. *Melolontha vulgaris* simply abounded in May and early June, and the grubs might be dug out of the ground in quantities. *Serica brunnea* might be taken commonly after rain under the elm trees or in vessels of water left in the open.

The most remarkable finds amongst the *Rhynchophora* were *Barynotus Schonerii* under a stone at Ballyroan; *Cionus hortulanus*, one specimen by sweeping; *Hylobius abietis*, several specimens and apparently very far from uncommon.

Out of some half-dozen species of *Coccinella* I notice *Halysia xiv.-guttata* as the most remarkable. I found one specimen in an oak opening in the demesne.

J. MONTGOMERY BROWNE.

Abbeyleix.

### Corn-Crake in January.

On the 8th January, 1901, a Corn-Crake (*Crex pratensis*, Bech.) was caught alive, not far from the sea at Sydenham, Co. Down. It was turned out of a hedge by a dog, and only captured after a long chase. It was in excellent condition when caught, but was so injured by the dog that it only lived a few days. I examined it in the flesh. It was the cause of a somewhat humorous correspondence in one of the local papers.

ROBERT PATTERSON.

Belfast.

### Black-tailed Godwit in Co. Wexford.

In Wexford the Black-tailed Godwit seems to deserve the reputation, as given to it by Mr. R. J. Ussher ("Birds of Ireland," pp. 306-7), of being an "occasional visitant"—"a scarce and uncertain bird, much rarer than the Bar-tailed Godwit." Thus it does not seem to be at all well known in this county, although Thompson wrote ("Natural History of Ireland," i., p. 226) that "in the first week of November, and at other times, a few have been met with on the coast of Wexford." Of late years the only record which I can lay hands on of the occurrence of this bird in the county is that of my friend Mr. E. A. Gibbon, who (*Irish Naturalist*, 1895, p. 319) reported one shot on August 24, and another on September 17, 1895, both near Rosslare, the former on the same day as an Avocet. The last two occurrences accord well with Mr. Ussher's statement that "August and September are the months in which Black-tailed Godwits chiefly find their way to Ireland." "In winter," he adds, "these birds are very rare, and there is no record for February." It will, therefore, be of some interest to Irish ornithologists to know that during the past winter Black-tailed Godwits had been quite numerous in certain parts of the south-east of Wexford. On December 10th the Rev. Paul F. Kehoe sent me a specimen with the information that it was "shot in Kilmore last week. They are very plentiful there at present, and they feed with the Teal and Widgeon. The men around have not seen it previously, and sent the specimen to me for identification." These birds seem to have found congenial quarters in this country, for so late as the 24th January my correspondent wrote me that having been at Kilmore on the previous day he had seen "a flock of Godwits, numbering perhaps three hundred, flying around with Plover in all directions."

This visitation of Black-tailed Godwits seems to have terminated at about the end of January, for my correspondent wrote me under date of February 14th that they had "not been seen during the past fortnight."

Enniskillen.

G. E. H. BARRETT-HAMILTON.

### Smew on Lough Neagh.

Captain Bruce, of the Lodge, Toomebridge, Co. Antrim, has sent me a female Smew which had been shot on Lough Neagh near that place in the last week of February.

Holywood.

R. LLOYD PATTERSON.

## OBITUARY.

### GEORGE FRANCIS FITZGERALD, Sc.D., F.R.S.

George Francis Fitzgerald was born in 1851, and was educated privately at home along with his two brothers until he entered Trinity College, Dublin, at the early age of sixteen, where he soon showed that he possessed remarkable ability. Although his name does not appear high on the earlier honour lists of his class, before the close of his undergraduate career he had outstripped all competitors, taking his degree as first Senior Moderator in Mathematics and Mathematical Physics, and also in Experimental Science. In 1877 he was elected a Fellow, and three years later was appointed Professor of Natural and Experimental Philosophy, having been assistant to his predecessor in the chair for some years. His reputation as one of the rising mathematical physicists of the day had been by this time fully established in the scientific world by a paper read before the Royal Society on the "Electro-magnetic Theory of Reflection and Refraction." Of the many papers he published afterwards the most important were of a similar description—namely, developing and extending Maxwell's theory of electricity, especially in connection with electrical radiation. It was more particularly in recognition of the value of his researches in this class of work in the field of optics and electricity, that one of the Royal Medals in the gift of the Royal Society was awarded to him little more than a year ago.

By Prof. Fitzgerald's death the cause of education in this country has been deprived of one of its warmest supporters. For many years he strenuously urged and exerted himself to bring about that reformation in its primary education, the necessity for which is now generally acknowledged, and a serious endeavour made to carry out. But nowhere will his loss be more keenly felt than in Trinity College with which he was so closely identified for the greater part of his life. In addition to occupying the chair of Experimental Physics he was Registrar of the Engineering School—offices which brought him into close contact with a large number both of the graduates and undergraduates, to whom he gave every encouragement and facility in his power in their work. His vast knowledge and rare power of suggestion were just as freely at their disposal as at that of the most eminent scientist. Much of the important work which has been done of late years by members of the Trinity School of Physics owes a great deal to his encouragement and the valuable advice and assistance which he at all times delighted to give.

Few men have done so much for the advancement and promotion of science during the past twenty years as Prof. Fitzgerald. His published papers, valuable as they are, are but a small portion of his work. He was intimately acquainted with all the work which was done in physical science, and was in constant communication with many of the scientific pioneers of the day. His opinion and advice were constantly asked for and ungrudgingly given. When questions of difficulty arose, "ask Fitzgerald" was a common expression. It was a

labour of love with him, and he seemed absolutely indifferent to personal fame; to enrich science was his object independently of any consideration of self. He practised to the fullest extent what he preached when he wrote condemning the competitive character of certain examinations that it "encouraged the motive, already too prevalent, the desire for glory and gain, and thereby discouraged the more important, because universally applicable, motive of the ambition to work as well as one can from a sense of duty, regard for others and love of work."

J. P. J.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include two Indian Antelopes from Lord Ardilaun, a number of Pigeons from Mr. G. Patterson, a Badger from Mr. H. Anderson, and an Oyster-catcher from Mr. R. Warren. Four striped Hyenas, a Sea Lion, six Monkeys, a pair of Ocelots, and a pair of Squirrels have been purchased.

### DUBLIN MICROSCOPICAL CLUB.

JANUARY 3.—The Club met at Leinster House. The President (Mr. GREENWOOD PIM) showed a specimen of White Rust (*Cystopus candidus*) on leaves of *Cardamine* sent to him by Mr. Praeger. The peculiarity was the great number and very small size of the pustules, which seldom exceeded  $\frac{1}{10}$ -inch in length. They usually form on cabbage, &c., the spots being comparatively few and large.

Mr. W. N. ALLEN exhibited drawings of *Scapania nimbose* and *S. ornithopodioides*, which were done by him for Mr. M'Ardle's Report on the Hepaticæ of the Dingle peninsula. Specimens of the plants were shown by Mr. M'Ardle under a low power of the dissecting microscope. Cell structure, leaf cilia, and budding cells at apex of shoot, under a high power, to compare with the drawings, were also shown.

Mr. F. M. SELLENS exhibited living specimens of *Hydra viridis* and *Hydra fusca* obtained from a pond at Sutton, Co. Dublin.

Mr. CHAS. JUMEAUX (Visitor) exhibited two slides—(1.) *Scapania purpurea*, mounted in glycerine jelly, under dark field illumination, with a view to illustrate the advantages of this form of illumination in bringing out the natural colours of the objects under examination. (2.) A preparation of "Euo's Fruit Salt" crystallized and mounted in Canada balsam, and viewed with polarized light.

FEBRUARY 7.—The Club met at Leinster House. Mr. F. M. SELLENS exhibited portion of a leaf of *Deutzia scabra* which had been bleached in order to show the stellate hairs by polarized light, and portion of the back of the leaf of *Anchusa Milleri* showing peculiar spiked hairs.

MARCH 7.—The Club met at Leinster House. Mr. SELLENS exhibited the Sting of a Hornet with poison duct stained.

Mr. M'ARDLE exhibited *Lejeunea microscopica*, Taylor, the minutest of the British Lejeuneæ, which he found in June last, on Mount Brandon, Co. Kerry, where it was growing on *Diplophyllum albicans*. He also showed Dr. Taylor's excellent figure of the plant, which was published in Hooker's *Journal of Botany*, p. 97, tab. 20, when he first recorded the plant as Irish, having collected it near Kenmare, Co. Kerry, growing on the leaves of *Hypnum loreum*, 29th January, 1835.

### BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

FEBRUARY 5.—A meeting was held in the Museum, when a lecture was given by Professor W. B. Morton, M.A., on the subject of "Colour," with experimental illustrations.

MARCH 5.—A meeting was held in the Museum, when a lecture was given by Mr. Seaton F. Milligan, M.R.I.A., F.R.S.A., on the subject "Scenery and Antiquities of Sligo, Connemara, and Clare."

### BELFAST NATURALISTS' FIELD CLUB.

JANUARY 21.—Mr. R. Patterson exhibited a specimen of the Common Dolphin, taken off Trooper's Lane last week, and the first recorded specimen from Belfast Lough. Its length was 5 feet 10 inches. The chair was taken by the Vice-President (Mr. W. H. PHILLIPS). The Hon. Secretary (Mr. Gray) submitted his report as delegate to the British Association at Bradford. The report gave a detailed description of the origin, development, and the present modes of procedure of the British Association.

Mr. FENNELL, submitted some notes on the work done by the British Association, and placed on the screen some views of Bradford, and called attention to the Technical School, its cost and equipment, as forming a favourable model for the Belfast Institute in many ways. The election of new members brought the meeting to a close.

FEBRUARY 19.—The President (F. J. BIGGER, M.R.I.A.), in the chair, Mr. HENRY J. SEYMOUR, B.A., F.G.S., read a paper on "The microscopic minerals occurring in sands." The paper was confined chiefly to the examination of sands for mineral constituents, which still possess their original crystalline outlines, and hence may be recognisable to a beginner with little or no knowledge of the science of mineralogy. The classes recommended for study were sea sands, river gravels, and decomposed rock material occurring in joints in rock masses. By means of lantern slides the best types of localities for collecting were indicated. On the sea-shore it was pointed out that the most suitable material for research was the "black sands," which occur in patches on shores of the Velvet Strand type, and while consisting chiefly of magnetite, often contained other heavy minerals, many of them of considerable interest. Mr. Seymour described the best method of collecting the material for examination and the various precautions to be observed so as to ensure that the sample is as concentrated as possible. He also described the apparatus needed, and the treatment of the samples with a view to the isolation and determination of the various crystals composing it. A list

of some of the rare minerals which had been isolated by the writer of the paper was given, and photo-micrographs of the actual specimens were thrown on the screen. Some of the crystals were almost ideally perfect, and much more so than is usually the case with larger specimens visible to the naked eye. Amongst other rare minerals found by Mr. Seymour in the sea sands of County Wicklow was gold. Some of the sands were so rich in this metal that at least one speck could be isolated from every handful. Though he stated that it did not now occur in paying quantities, he saw no reason to doubt that it was capable of profitable extraction by our early predecessors. Mr. Seymour pointed out the bearing which its proved wide distribution in Irish sands would have on the vexed question as to the origin of the gold from which our famous ancient ornaments were made, and urged the members of the B.N.F.C. to take up the study of sands on the lines indicated, which might lead to some interesting and unexpected results. Samples of the sands before and after treatment were exhibited, the apparatus necessary for research, and mounted specimens of the minerals obtained in the form of perfect crystals.

The President exhibited and described some old sun dials, and suggested that all that is known of the existing old sun dials in the North of Ireland should be collected and recorded. With this view he invited descriptive particulars from the members and friends of the Club who may have, or can procure information about sun-dials of any form still existing throughout the country.

After a discussion on the two papers submitted, the election of new members closed the meeting.

### DUBLIN NATURALISTS' FIELD CLUB.

JANUARY 15.—ANNUAL MEETING.—The annual general meeting was held in the Royal Irish Academy House, Mr. GREENWOOD PIM (President) in the chair. Forty-six members and visitors were present. The minutes of the previous meeting were read and signed. The Committee's report for 1900 was read; the following is an abstract:—

Your Committee beg to submit herewith the Fifteenth Annual Report. At the beginning of the year the Club numbered 177; at the beginning of 1901 the membership stands at 175, 27 new members having been elected, and 29 removed from the list. The Winter Business Meetings, seven in number, have been well attended, the average attendance being much as in previous years. As usual the papers were fully illustrated by specimens, microscopic preparations, and lantern slides. The Winter Session opened with a *Conversazione* held on November 6th, attended by 202 members and visitors, including representatives of the Belfast Club. Of the Summer Excursions arranged for, the attempt to land at Lambay Island was not successful on account of the roughness of the sea, and the excursion to Clogher Head was abandoned. The reports of the Winter meetings and excursions have appeared from time to time in the pages of the *Irish Naturalist*. It is a matter of regret that the work done on the excursions of the year has not been as great as in many previous seasons, and that those members with leisure do not take

a more active part in the prosecution of some special branch of natural history. Your Committee acted during the year 1900 on their powers under Rule XIII., and offered prizes for competitions for collections of scientific objects. They are glad to report that the response, as regards the number of candidates, was satisfactory; but members competing in future should bear in mind that a stricter adherence to rules is necessary, and a higher quality of work desirable. The proceedings at both the Summer and Winter meetings of the Club continue to be reported in the pages of the *Irish Naturalist*, and a number of the papers read have appeared *in extenso* in that journal. The Committee would again urge on members the necessity of supporting this Irish Natural History magazine, by subscribing to it regularly. The Committee regret that the state of the Club's finances does not allow of a grant being at present made towards defraying the expenses of publication during 1900, but they trust that they may be in a position to do this before the end of the year. The best thanks of the Committee are due, and are hereby tendered, to the Council of the Royal Irish Academy for again granting the Club the privilege of meeting in their House during the year.

The Treasurer's Report showed that all the Club debts for 1900 have been paid, and that the balance to the credit of the Club at the beginning of 1901 amounts to £8 14s. 11d., being a decrease of £6 14s. 3d. upon the year.

In moving the adoption of these reports Professor HADDON urged on the members the importance of subscribing regularly to the *Irish Naturalist*, as a firmer financial basis would be established by increasing the circulation of this magazine. Professor Haddon hoped that the excursions would be better attended during the coming year, and that members would avail themselves of the opportunity of doing good and useful work in the field. Mr. HINCH seconded the adoption of these reports. The PRESIDENT remarked that on the whole the Reports were satisfactory. The evening meetings during the year were well attended and much good natural history work was done.

The officers and Committee for 1901 were elected as follows, no further nominations having been received:—

President—Greenwood Pim, M.A., M.R.I.A.; Vice-President—W. F. De V. Kane, D.L., M.A., M.R.I.A.; Hon. Secretaries—C. J. Patten, B.A., M.D.; A. L. Otway, B.A.; Hon. Treasurer—H. K. G. Cuthbert; Committee—N. H. Alcock, M.D.; G. H. Carpenter, B.Sc.; G. P. Farran, B.A.; A. H. Foord, Ph.D.; Miss Hensman, Miss Massy, Miss Mahaffy, Miss M'Intosh, R. Ll. Praeger, B.A., B.E.; J. E. Palmer, H. J. Seymour, B.A., F.G.S.; W. J. de C. Wheeler, B.A.

Mr. SEYMOUR proposed a vote of thanks to the outgoing officers, Dr. Foord (Vice-President), and Dr. Alcock (Hon. Secretary), for the services they had rendered to the Club during the past year. Mr. CUNNINGTON seconded this motion which was adopted.

Dr. C. J. PATTEN (Hon. Sec.) moved that the best thanks of the Club be given to the Council of the Royal Irish Academy for so kindly permitting the Club to hold their winter meetings in its House. The motion was carried unanimously.



Mr. PRAEGER referred to the triennial conference of the Irish Field Club Union which would take place next June in Dublin.

At the close of the formal business lantern demonstrations were given as follows:—Mr. SEYMOUR—Three photographs of sea-gulls taken from nature during the severe snowy weather of February, 1900. Mr. PRAEGER—A series of botanical photographs executed (from nature) by Mr. Welch of Belfast. Professor HADDON—Two series of lantern slides (a) a series of photographs showing the various positions the wings of birds assume during flight; (b) a larger series of photographs of coral reefs and corals including the peat “barrier reef” of Australia, 1,200 miles long and 30 miles broad. The following members were elected:—Lady Shaw, Miss Annie Shaw. R. J. Ussher, J.P.

JANUARY 29.—The chair was taken by Professor A. C. HADDON in the absence of the President. Sixty-one members and visitors were present. Short papers were communicated by Professor HADDON and Messrs. SEYMOUR, PRAEGER, and HALBERT, the subject being “Derc Ferna, the Cave of Dunmore.” Mr. Seymour commenced by giving an account of the structure and formation of caves in general, including those formed by marine erosion, by wind action, and other agencies. Lantern slides illustrating the different kinds of caves were thrown on the screen. Mr. Praeger dealt mainly with the literature of the Dunmore Cave. He also gave an account of an excursion to Dunmore Cave by Messrs. Haddon, Seymour, Halbert, and himself last December. Mr. Halbert described the fauna of the cave, chiefly corresponding to the species which inhabit Mitchelstown Cave, including spring tails, myriopods, and spiders; Professor Haddon spoke on the human remains for which the cave is celebrated.

These papers will appear *in extenso* in the *Irish Naturalist*.

The papers were discussed by Professor COLE, Dr. PATTEN, Mr. CUNNINGTON, and Dr. PETHYBRIDGE. The following exhibits were shown:—Mr. Edward Williams—A Pectoral Sandpiper; Dr. G. H. Pethybridge—(a) Pink Yeast; (b) Fluorescent Bacterium; Mr. A. L. Otway—Eggs of *Testuck Marginata*; Dr. C. J. Patten—Grey and Golden Plover.

Three candidates were nominated for membership.

MARCH 5.—Mr. J. DE W. HINCH read a paper on the High-level Shelly Drift of the Dublin mountains, which will appear in our pages.

Dr. C. J. PATTEN contributed some observations on the habits of the Knot, *Tringa canutus*. The papers were discussed by Messrs. E. WILLIAMS, A. L. OTWAY, and R. LL. PRAEGER.

The following exhibits were shown and discussed:—

Mr. H. R. NELSON—Various minerals; Mr. A. WILLIAMS—(a.) Specimen of *Spirula peronii* from Achill Island; (b.) Specimens of *Scaphander lignarius* from Portmarnock Strand and Dollymount; Mr. E. WILLIAMS—Specimen of House Sparrow (female), showing abnormal development of the beak; Dr. C. J. PATTEN—Magpie with supernumerary hallux.

Mr. J. H. O'Connell and Miss C. L. Adams were duly elected into the Club,

## REVIEW.

### ZOOLOGY OF THE INVERTEBRATES.

**Text-book of Zoology**, treated from a Biological Standpoint. By Dr. OTTO SCHMEIL. Translated from the German by Rudolph Rosenstock, M.A. Edited by J. T. Cunningham, M.A. Part III. Invertebrates. Pp. viii. and 188, with numerous illustrations. London: A. and C. Black, 1900. Price 3s. 6d.

Dr. Schmeil's Text-book in its English dress has been brought to a commendably prompt conclusion with the issue of the present part, in which the whole of the invertebrate animals are dealt with. Of course in the space allotted, only the outlines of so vast a subject can be sketched, but the descriptions of the animals selected as typical—the White Butterfly, the Crayfish, the Snail, and the Starfish for example—are fully up to the standard of the vertebrate sections of the book, the structural details being brought out with great clearness, and special stress being laid on the uses of the various parts in the living animal.

From the systematic point of view this part seems to be more satisfactory than Part 2. The invertebrate Phyla of the animal kingdom so generally reviewed, are dealt with in turn from the Arthropoda to the Protozoa, the Sponges being rightly regarded as a Phylum independent both of the latter and of the Cœlenterates. Certain details of arrangement, such as the juxtaposition of the Lepidoptera and Coleoptera at the head of the insects and the intercalation of the Hydrozoa between the Scyphozoa and Anthozoa among the Cœlenterates might reasonably be objected to. Perhaps the weakest chapter is that on the "Worms," only the Annelids, Threadworms, Tapeworms, and Flukes being mentioned without a hint that there are large and important classes altogether neglected.

It is unfortunate that several of the insects chosen for detailed description are scarce or unknown in our islands. This is unavoidable in such a translation, and as far as the moths and beetles are concerned the student is warned not to expect to meet these particular species in his insular rambles. Unhappily the other orders have been less carefully edited in this respect, and the statement that "on sandy soil . . . we often come across" ant-lion pits (!) will not commend the trustworthiness of the book to those who, ignorant of British entomology, begin to use it practically. Neither will the information that "the most familiar species [of Hemiptera] is undoubtedly *Pyrrhocoris apterus*!"

These, however, are minor defects, and the book as a whole, both on account of its thoroughly "live" treatment of the subject and the excellence of its illustrations may be warmly commended to students of animals.





ANTLERS OF RED DEER, FROM ALLUVIUM NEAR WEXFORD.

## IRISH RED DEER.

BY A. LOFTUS OTWAY, B.A.

[Read before the Dublin Naturalists' Field Club, 18th December, 1900.]

At the present day, though Red Deer exist in the British Islands in their native haunts, they only do so under strict preservation, and the race tends to be modified by the influence of man in some respects. Where shootings are let by the year, as they often are in Scotland, the lessee naturally desires to get the best value for his money, or, in other words, to secure the finest heads, and accordingly he endeavours to kill the largest stags. A gentleman, who had taken a shooting in Scotland for a year, proceeded to kill off the animals with the finest antlers, without caring for the future state of the preserve. The following year, on his inquiring for a shooting of a London agent, the very estate which he had taken the year before was offered to him, and was highly recommended by the agent; but the client immediately declined to take what he had shot over the previous season, saying that he was tolerably certain that no heads worth having were left there. Such a practice upsets the natural rule of "the survival of the fittest," according to which those members of a herd that were most formidably armed had the best chance of holding their own and of perpetuating their kind; the race thus tended to become finer and better equipped. Under the present artificial conditions the reverse is the case, as it is the inferior individuals which are spared; and it is only by introducing new blood that the race is saved from deterioration. Owners of deer-forests and parks are bringing in Wapiti and other allies of the Red Deer in the hope of improving the native breed, and, it is said, in some cases, with considerable success.

This leads to the consideration of the importance of the antlers in determining the character of the race. The fights between Red Deer are of a very determined and sanguinary character. Combatant stags retire to a distance of twenty or thirty yards, and then with lowered heads charge each other with intense fury, their antlers meeting with a crash. They then proceed to wrestle, each endeavouring to assail his adversary

with his many-pointed horns, while warding off the attack of the latter. After a time the charge is renewed; and it has occasionally happened that their antlers have got so interlocked that the exhausted animals could not disengage them, and they died thus united. Two pairs of antlers have been found so entangled suggesting this fate.

The combats of the stags have been immortalized by great painters, as in Landseer's masterpiece, "The Challenge," where a magnificent Red Deer stands on the water's brink in the clear night, awaiting the onset of his foe, who is shown in the distance swimming to encounter him.

The Red Deer delights in great solitudes and wild rocky fastnesses, where it can not only see no human form, but where the breeze is untainted by the scent of man. In Scotland deer-forests exist, as large as whole counties of Ireland, where many miles may be traversed without meeting with a human habitation; but though Ireland possesses great tracts of mountain and other unreclaimed land, there are hardly any districts at the present day that do not boast of some peasants' cottages, however few and scattered these may be. Accordingly, the descendants of the Irish Red Deer only survive among the wooded mountains that adjoin the Killarney lakes, which are strictly preserved, and on the estate of Lord Maurice Fitzgerald in Wexford. These animals existed in Co. Mayo up to the time of the famine, but in 1847 the survivors of this splendid species were killed for food by the famine-stricken people.

There are records of Red Deer among the papers in Lismore Castle which show that it was hunted on the Knockmealdown Mountains in the eighteenth century, both on the Tipperary and Waterford slopes of the range. There is a tradition that a lady who owned estates in the latter county used to be entertained by each of her tenants in turn, when a Red Deer had to be provided for her from the adjoining Comeragh Mountains. The former abundance of this species in Ireland is shown by the presence of its remains in nearly every kitchen-midden (or ash-pit) of the ancient inhabitants, and in the alluvial deposits of estuaries, rivers, and bogs.

Mr. R. J. Ussher has found bones and portions of antlers among the remains of domestic animals and objects of daily

use in many raths in the Counties of Waterford and Cork, in the Ardmore crannoge, a lake-dwelling now swept by the inroads of the sea, and among the sand-hills of Tramore Bay. The rath-dwellers made much use of deer's horn to form pins, knife-handles, spindle-whorls, and other objects, in the manufacture of which they were so industrious that antlers are only to be found in raths in a fragmentary state. Special cooking-places are scattered over the country which are called by an Irish name signifying "the roasting of the deer." These are marked by a blackened patch where the soil, on being turned by the plough, is found full of charcoal; and an oven dug in the ground and lined with sandstone slabs was found at Cappagh. In such ovens the venison was baked, swathed in rushes, as is done by savage nations at the present day.

Cooking-places of another type, which are always near spring-water, are marked by large heaps of burned stones used as pot-boilers, while the hearth on which the fire was lighted, and the oak trough in which the venison was boiled, have been discovered in Co. Waterford.<sup>1</sup>

The antlers found in the muds and sands of rivers and in bogs appear to have become embedded entire, and many beautiful examples are preserved in different parts of Ireland; but in some cases the tynes and branches have been worn off, as though they had been exposed longer than the other portions.

In the Ballynamintra bone-cave a considerable number of Red Deers' bones were found in the grey earth of the second stratum that contained the remains of the Irish Elk, associated with human relics<sup>2</sup>; but the few cervine remains from the stalagmite which formed the fourth stratum in the above cave, appear to belong to Reindeer, and in that stratum were also found bones and teeth of Grizzly Bear.

In the Shandon bone-cave the principal finds of Red Deers' remains were in Cullen's chamber, where the bones were less infiltrated with calcareous matter, were lighter in weight, and had a more recent aspect than those of Mammoth and Reindeer from the breccia.<sup>3</sup>

<sup>1</sup> *Journal Rl. Hist. and Archeol. Assoc.*, 1886, p. 390.

<sup>2</sup> *Sci. Trans. Royal Dublin Soc.* (2) vol. i., part xiv., 1880, p. 199.

<sup>3</sup> *Trans. R. Irish Academy*, vol. xxvi., 1876, pp. 223, 224.

Professor A. Leith Adams, who reported on them, remarks that though remains of Red Deer have been found in the shell-marl and other sub-turbary deposits in Ireland, they are far more abundant in the peat, which indicates that this species became numerous during the deposition of the latter. The same writer observes that he had not seen Irish antlers of the size attained by horns from English cave and river deposits<sup>1</sup> though many of the former are very symmetrically shaped.

During the making of excavations in 1900 in the reclaimed alluvium south of Wexford Harbour, a remarkable pair of antlers were discovered about a mile and a half from the sea, three feet below the surface of the ground, in a bed of peat containing oak-stumps. Upon this lay sea-mud of a depth of twelve inches, and above that again nine inches of surface-soil. Though these antlers (Plate 4) were alone, several bones and a separate antler were found at another neighbouring spot; while not far from the latter a third find was made of a pair of antlers and a number of bones. The average depth where the several remains occurred was four feet, and in each case they were in the layer of peat with logs of oak in it. The special feature of the first pair of horns (Plate 4), found in Co. Wexford as mentioned, consists in the exceptional thickness of beam, which is two and a half inches in diameter. That of a head in the Science and Art Museum, measured by Dr. Scharff, is only one inch and a half, while a very fine pair of antlers with nineteen points, in the possession of Messrs. Williams and Sons, have a beam of but two inches wide. The Wexford specimen even exceeds antlers of Wapiti in this respect, which have beams two and a quarter inches in diameter.

It rarely happens that when fossil remains are found, a record is kept of their position and of the nature of the deposit in which they are embedded, and thus their place in the history of the past is left unascertained. Moreover, the smaller bones, such as those of the carpus and tarsus, and loose teeth, which are so valuable for determination, are almost always overlooked or rejected.

Trinity College, Dublin.

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<sup>1</sup> *Proc. R. I. A.* (2) *Science*, vol. iii., 1877, p. 93.



## IS THE HOLLY DICECIOUS?

BY THOMAS COOKE-TRENCH.

IN his charming "Memories of the Months" Sir Herbert Maxwell makes the somewhat startling statement that "the Holly is, as everybody knows, dicecious," or words to that effect. As I happened not to be one of the everybody who know, I laid down the book when I came to the passage and resorted to such authorities as were at hand. As, however, I found in these no confirmation of Sir Herbert's view, I ventured to write to him, and to ask him the authority for his statement. In reply he referred me to Darwin's "Forms of Flowers," p. 297. As the passage contains several noteworthy statements I transcribe all of it that refers to the Holly:—

In the several works which I have consulted, one author alone (Vaucher) says that the Holly is dicecious. During several years I have examined many plants, but have never found one that was really hermaphrodite. I mention this genus because the stamens in the female flowers, although quite destitute of pollen, are but slightly, and sometimes not at all, shorter than the perfect stamens in the male flowers. In the latter the ovary is small and the pistil is almost aborted. The filaments of the perfect stamens adhere for a greater length to the petals than in the female flowers. The corolla of the latter is rather smaller than that of the male. The male trees produce a greater number of flowers than the females. Asa Gray informs me that *Ilex opaca*, which represents in the United States our Common Holly, appears (judging from dried flowers) to be in a similar state; and so it is, according to Vaucher, with several other but not with all the species of the genus."

It is not quite clear what Darwin means to convey by introducing the word "really" before "hermaphrodite." I take it, however, to be intended to contrast the latter word with "pseudo-hermaphrodite," which is what the Holly is according to his description.

With so cautious and practised an observer, the fact that Darwin found the authorities all but unanimously opposed to him only makes it the more probable that he is right, for it would certainly tend to make him very cautious and exhaustive in his experiments. At the same time it makes one anxious to know the result of subsequent investigations carried out with a full knowledge of the conclusion at which Darwin had arrived.

Another point to which I wish to draw attention is the statement that the stamens in the female flowers are "quite destitute of pollen." This greatly simplifies the primary question, for it might have been necessary to prove by very careful and delicate experiments not only that the stamens produce pollen-grains, but that these are fertile. Now, if it can be shown that a tree which has borne a single perfect berry has also produced a single pollen-bearing stamen, the plant may be monœcious or it may be polygamous, or any of the modifications of these, but it is not truly diœcious.

It is, perhaps, hypercritical to remark that though Darwin certainly implies that the Holly is diœcious, speaking, as he does, of male and female trees, he nowhere states that such is the case, his only positive statement being that he had never found one that was really hermaphrodite.

It is notable, too, that the paragraph immediately following that which I have transcribed begins with the words—"The plants hitherto described either show a tendency to become diœcious, or apparently have become so, within a recent period." May it not well be that the Holly belongs to the former rather than to the latter category? In the preface (p. xvi.) Darwin quotes Mr. Hibberd to the effect that hermaphrodite plants do occur amongst cultivated varieties of Holly.

The following are the dicta on the subject of such authorities as I have at hand:—

Sowerby (vol. ii., p. 221), says of the *Ilex* "flowers generally perfect," and of *Ilex Aquifolium* (the Holly) "flowers frequently imperfectly diœcious."

Asa Gray, in his "Structural and Systematic Botany," under the heading, "Suppression or abortion of parts" (p. 261), does not mention the Holly, but this goes for very little.

In Smith's "English Flora", vol. i., p. 227, the Holly is stated to belong to the Linnæan order *Tetrandia Tetragynia*, which is, of course, a hermaphrodite one; but he modifies this by adding—"sometimes the flowers are 5-cleft, and the germen is often wanting in some that are 4-cleft. The earlier flowers least perfect."

Gillet and Magne, "Nouvelle Flore Française," p. 95, "Ilex, Fl. reguliere, herm."

Hooker and Arnott, "The British Flora," p. 272, "Some flowers destitute of pistil." This agrees with Smith's statement, and would be what Darwin calls andro-dioecious, of which he says, speaking generally at p. 299, that such plants are extremely rare or hardly exist. In the preface (p. xviii.) he gives three exceptions to this rule, but the Holly is not one of them.

Perhaps the most valuable addition of late years to works on systematic botany has been Kerner's "Natural History of Plants." He wrote subsequently to Darwin, and therefore, with a full knowledge of his researches and consequent theories, he devotes no less than thirteen pages to an inquiry into the distribution of sexes. It will, by the way, be a surprise to some to learn that hermaphrodite flowers, which many of us have been accustomed to look upon as the rule, really comprise little more than a third of all the species of phanerogamous plants. The remainder, being more or less unisexual, he divides into no less than fifteen groups, giving numerous examples of each, but in none of them does he mention the Holly (half-vol. iii., pp. 288 to 300.) He twice mentions the Holly in the course of the book, but both times in relation to its leaves, not to its flowers.

I wonder whether any of the readers of the *Irish Naturalist* would join with me in making, during the present season, a careful search amongst trees that have borne berries for flowers with pollen-bearing stamens? It would be well that the grains should be examined under the microscope, in order to ascertain that they had at least the appearance of being perfect grains.

Darwin's conclusion that the Holly is dioecious is, as I have pointed out, founded on his experience that the stamens on a berry-bearing tree are "quite destitute of pollen." If, therefore, it can be shown that this is not always the case, his foundations are destroyed, the superstructure comes to the ground, and we are free to consider the question discharged of the great authority that attaches to his name. But it does not therefore follow that he was wrong. Writing of pseudo-hermaphrodite flowers, Kerner mentions a number of such, and adds, "they have plain well-developed ovaries, and stamens in whose anthers pollen-grains are found in greater or

less numbers ; but experiments with this pollen have shown that when deposited on the stigma it emits no pollen-tubes, and consequently the flowers are not truly hermaphrodite, but only apparently so . . . their stigmas are not capable of exciting the emission of pollen-tubes in the ripe pollen deposited on them." In order to *prove* that the Holly is not diœcious, it is necessary to show that pollen-grains from a berry-bearing tree are capable of emitting pollen-tubes. This can only be ascertained by experiment, but to this the Holly lends itself in a singular manner. The blossoms are near the ends of the twigs—they are axillary and almost, if not altogether, sessile. Nothing could be easier than to cover a number of these terminal twigs with gauze bags ; the leaves would keep these at a sufficient distance from the blossoms to make the visits of insects impossible. The bags should be put on before the flowers open. It will then be impossible for these to become fertilized, except by the pollen of blossoms from the same twig, or by pollen artificially conveyed to them. When the flowers are fully expanded, the bags should be removed for the purpose of applying with a camel's-hair brush the pollen from another berry-bearing tree, and the bags immediately replaced. After an interval of a day or two the applied grains should be carefully examined under the microscope, and if they are found to have emitted pollen-tubes ; or, better still, if in the autumn any of these flowers are found to form berries, we may safely assert that the Holly is not diœcious.

We must, however, be careful not to found too much upon negative results. The Holly is, from some cause of which I am ignorant, often a very shy fruiter. This is very noticeable in the New Forest, where thousands of acres are covered with Holly, forming as it does the natural underwood of the Forest. Here occasional trees are laden with berries, showing that from some source they must have received an abundant supply of pollen, while their neighbours, for many yards around, are but sparsely sprinkled with fruit.

The statement of Smith that the earlier flowers are the least perfect should be borne in mind by experimenters, the later blooms being selected where practicable. I hope that careful experiments may throw more light upon the subject.

Millicent, Co. Kildare.

## ARMADILLIDIUM PULCHELLUM, BRANDT.

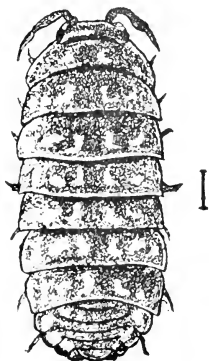
A WOODLOUSE NEW TO THE BRITISH ISLANDS.

BY R. F. SCHARFF, PH.D., B.SC.

(Collected for the R.I.A. Flora and Fauna Committee).

THIS species belongs to the group sometimes called the Pill-woodlice, owing to their being able to roll themselves into a perfect little pill-like ball. The ordinary Irish Pill-woodlouse (*Armadillidium vulgare*) was figured and described in my paper on the Irish Woodlice (*Irish Naturalist*, vol. iii., 1894) Since that date two other species of the same genus, viz., *A. nasatum* and *A. depressum*, have been discovered in England, but not in Ireland. I now add a fourth to those already found in the British Isles.

*A. pulchellum* in the first instance differs considerably in size from those mentioned above, being less than half as long as any of the other species. Then it is very prettily marked, the colour being brown with a series of light yellow spots on the back, while the other species are more or less uniformly grey. In order to show some of the minor characters by means of which this species may be distinguished from others, I herewith give an illustration.



I discovered this species in April close to the village of Ballymote (Co. Sligo) when visiting the district for the Royal Irish Academy Fauna and Flora Committee. I found about a dozen specimens, all full grown—about 5 mm. in length—under stones on the top of a mud-wall. It was there in

company with the very common Grey Woodlouse, *Porcellio scaber*. The next day we kept a good look out for the species in the neighbourhood, but only met with some of the common kinds.

*A. pulchellum* is a distinctly northern species, having been taken in Scandinavia, Northern Germany, and Belgium.

Science and Art Museum, Dublin.

## NOTES ON THE MOLLUSCA OF CO. LEITRIM.

BY P. H. GRIERSON.

WHEN I began work in April, 1899, I knew nothing about the subject, and sent all my specimens to Dr. Scharff for identification, but these few notes may be of interest.

Co. Leitrim is a long rather narrow county with a low rocky coast-line of nearly three miles between counties Sligo and Donegal, and extending in a south-easterly direction for about fifty miles. It is chiefly limestone, covered in most places with deposits of drift. There are some Coal-measures, which proved very unproductive from a conchological point of view. The northern part is very mountainous, and so is the south-eastern shore of Lough Allen, where Slieve Anierin rises to over 1,900 feet; the rest of the county is undulating with low hills. Lakes and rivers are very numerous, especially in the southern part. The River Shannon bounds it for perhaps twenty miles on the south-western side. A very considerable portion of the county is covered with bog.

During a ramble one afternoon between Mohill and Feenagh I found the following slugs—most of them were in Feenagh Churchyard:—*Arion ater*, *A. subfuscus*, *A. hortensis*, *A. circumscriptus*, *Limax maximus*, and *Agriolimax agrestis*; later on near Cloone I found *Arion minimus*. *Vitrina pellucida* was common in the districts of Manorhamilton and Cloone. Of the *Hyalinæ* I found *H. draparnaldi* and *H. crystallina* at Manorhamilton, *H. alliaria* and *H. nitidula* at Dromahaire, *H. pura* at Glencar, *H. fulva* at Mohill, *H. nitida* near Dromod, at the Shannon; *H. cellaria* is common in many places. Of the

*Helicidæ*, *H. rotundata* is common in most damp places under stones and leaves, *H. rupestris* on nearly all the limestone walls in the southern part of the county, *H. pygmaea* under withered leaves at Mohill and other places. Under a stone near Cloone I came across two specimens of *H. aculeata*. *H. aspersa* I found at Mohill, Dromahaire, and Carrigallen. *H. nemoralis* is common everywhere; a variety with white lip is common at Glencar. I found several broken shells of *H. arbustorum* at Glencar, but could not find a live specimen. *H. rufescens* at The Alt, near Dromahaire. *H. hispida* common everywhere.

*Buliminus obscurus* is to be found in a wall at Lough Gill; the only other places I have taken this shell are Ballysadare, Co. Sligo, and Ballynalacken, Co. Clare, on limestone in each case. *Pupa anglica* I found at Manorhamilton and other places in wet moss; *P. cylindracea* is common everywhere. I found the following species of *Vertigo* near Mohill:—*V. pygmaea*, *V. edentata*, and *V. substriata*. *Balca perversa* occurred near Feenagh in a limestone wall; *Clausilia bidentata* is common on walls and trees. *Cochlicopa lubrica* and *Carychium minimum* in wet situations, the latter on the roots of grass. *Succinea putris* and *S. elegans* I found near Mohill, but there is an uncertainty in distinguishing between them. I found good specimens of *Physa fontinalis* at Lough Rinn. The following species of *Planorbis* were taken between Mohill and the Shannon:—*P. albus*, *P. spirorbis*, *P. vortex*, *P. carinatus*, *P. umbilicatus* and *P. contortus*; *P. parvus* was found in a limestone quarry near Mohill. In most of the lakes and rivers are to be found *Limnæa peregra*, *L. ovata*, *L. stagnalis*, *L. palustris*, *L. truncatula*, *Ancylus fluviatilis* and *Sphærium corneum*. *Velletia lacustris* I found in the stream at Glencar and other places. In the Shannon I took *Neritina fluviatilis*, *Bythinia tentaculata*, *Valvata piscinalis*, and *V. cristata*. The species of *Pisidium* which occurred comprise *P. fontinale*, *P. milium*, and *P. pusillum*. *Anodonta cygnea* is common in the lakes and canals in the southern part of the county; the finest specimens I got were from a pond at Mohill Rectory.

## NOTES ON IRISH CLADOCERA.

BY W. F. DE V. KANE, M.A.

THE publication of that most valuable work "Cladocera Suecica" by Wilhelm Lilljeborg will give a great stimulus to the study of this group of the Entomostraca, illustrated as it is by 87 plates of large and beautifully-executed figures. No less than 21 plates are devoted to the most perplexing genus *Bosmina*. A cursory examination of the text and plates induces me to send a short memorandum relating to certain Irish species, which during the past two years, I have met with. Prof. Lilljeborg has sunk the specific name of *Bosmina Lilljeborgii* G.O.S., and made it a varietal name of *B. mixta* (nov. nom.) of which he describes another variety *humilis*; and by re-examination of a number of the specimens collected in Lough Erne it would seem that the Irish form offers some characters of specialization, and on the whole approaches more nearly to the new variety *humilis* than to that named by Sars after Lilljeborg. The distinctive characteristics of the latter are set down as having the shell as high as it is broad; a concavity in the contour behind and above the head; and the rostra as long or scarcely shorter than the length of the shell. The Lough Erne *Bosmina* rarely shows the concavity, and is frequently of greater breadth than height, and the rostra usually are not of the prescribed length. On the other hand it differs from both varieties, especially *humilis*, in having the postero-ventral shell-spines almost absent, thus approaching the species *B. coregoni* Baird.

Another Lough Erne cladoceran, *Bythotrephes Lilljeborgii* (now *B. Cederstroemii* Schoedler), is most exhaustively illustrated, and there can be no doubt of the identity of our species. Similarly, Lilljeborg throws further light upon the two species of *Diaphanosoma*, hitherto named with some hesitation; and it would appear that both have been correctly recorded from Ireland, *D. brandtianum* now being referred to *D. leuchtenbergianum* Fisch. A notable feature of the book is the careful distinction made between the varying forms of the *Bosminidæ* and other genera at different seasons of the year. If these seasonal variations prove to be relatively



constant, the study of certain members of the group may become more hopeful of results. It is therefore most satisfactory to find a long series of illustrations of *Bosmina longispina* and *B. longirostris*, so that we may henceforth hope to get some firm footing when trying to differentiate these unstable forms. The same may be said of the *Ceriodaphniæ*, a genus which much required elucidation. The *vexata quæstio* of the helmeted forms of *Daphnia* has also received careful study; *D. lacustris* G.O.S., *Jardinii* Baird, *galcata* G.O.S., and *kahlbergensis* Brady, being grouped as sub-species or varieties of *D. hyalina*, an arrangement as to which much may be said and written; and probably only the careful comparison of a large number of the various forms from various countries may bring about any general consensus of opinion. In Lough Erne a well-marked race of *D. lacustris* var. *galcata* swims in company with shoals of equally characteristic specimens of *D. kahlbergensis*, the former being always at least double the size of the latter.

Drumreask, Monaghan.

## NEWS GLEANINGS.

### Royal Irish Academicians.

In the first batch of members elected into the Royal Irish Academy under the new rules, natural science is well represented, zoology by Mr. Robert Patterson, of Belfast, and botany by Dr. E. J. M'Weeney, of Dublin. The other new members are the Right Hon. Justice Madden and two well-known Fellows of Trinity College, Mr. M. W. J. Fry and the Rev. W. K. Westropp Roberts.

### Mr. F. Neale and the Limerick Field Club.

Mr. Francis Neale, so well-known to Irish naturalists as the Hon. Secretary from its foundation of the Limerick Field Club, is leaving the south-western city for Belfast. He has been presented with a substantial and well-deserved testimonial by the members of the Club, whose success has owed so much to his untiring energy. We wish him all prosperity in his new sphere of work in the North, and we hope that the Limerick Club will secure the services of as energetic an officer as he has proved himself to be.

## NOTES.

### GEOLOGY.

#### Erosion at Newcastle, Co. Down.

Eight years ago I drew attention to the encroachment of the sea on the north-west coast of County Down, as shown by the position of an old windmill pump, near Cultra (*Irish Nat.*, vol. ii., Nos. 1 and 2, 1893). It was then surrounded by the sea at high tide, but in 1825 it marked the centre of a quarry of Triassic sandstone. The greater part of this old landmark was blown down in the great storm of December, 1894, and only seven feet of the old shaft now remains. The same county furnishes on its south-eastern coast another very small but interesting landmark bearing testimony to considerable erosion.

As the tide recedes at Newcastle a band of wrack-covered stones about a hundred feet wide, locally known as the Black Island, comes into view. It is about four hundred feet long, and extends from opposite the Constabulary Barracks to within three hundred feet of the ruined harbour. This band of stones, I have been assured by more than one of the oldest inhabitants of Newcastle, marks the position of land on which houses and gardens stood a century ago, with a sea-embankment in front. The stump of a thorn tree, two feet high, and nearly a foot in diameter, still remains, a solitary landmark, to recall for us the gardens of the past. Its distance from the present sea-wall is 350 feet. Fairly clear when seen more than a year ago, it is at present so covered with sea-wrack as to be barely distinguishable from the surrounding boulders. The first inroad of the sea is said to have been so sudden that a child was washed away in his cradle, but was afterwards happily recovered uninjured. The site of a house 120 feet from the present sea-wall has also been pointed out to me, and its position is confirmed by an old map of Newcastle, dated 1814, which shows houses on the sea side of the road, near the Black Island, but not so far out. I am indebted to Mr. Moore Garrett for above information regarding the map.

At low tide two semicircles of stones can be traced on either side of the projecting point of contorted Ordovician, known as Black Rock, but these are connected with former fisheries, and are quite distinct from Black Island. Round the north and north-west coasts of Dundrum Bay, the terrace of raised sea-beach shows evidence that the land has been upraised in recent geological time, but the sea is again asserting its power, and before it levels the old thorn stump I thought a note of its position in Dundrum Bay might prove of geological interest.

MARY K. ANDREWS.

## ZOOLOGY.

### Vanessa io in Co. Sligo.

In reference to the note on *V. io* in the March *Irish Naturalist*, let me say that in last September I saw this insect in greater numbers in the district about Rosses Point (Co. Sligo) than I have yet seen in any part of Ireland. Beneath the inland slopes of Ben Bulbin, in particular, it simply swarmed, and I have counted as many as six within a distance of a few feet.

JAMES S. STARKEY.

Rathmines.

### Black-tailed Godwit in Co. Wexford.

On reading in the *Irish Naturalist* for April (p. 93) Captain Barrett-Hamilton's notes on the occurrence of the Black-tailed Godwit in Co. Wexford, I was surprised at the large numbers supposed to have been seen, and for many reasons am inclined to think that his informant has been mistaken, and thought the large flocks flying about were Black-tailed Godwits instead of the commoner and more numerous Bar-tailed; firstly, from the fact that we have no record of the Black-tailed Godwit visiting Ireland in large numbers, only small parties being met with, or solitary individuals seen amongst the Bar-tailed flocks; and secondly, from the difficulty, or rather the impossibility, of distinguishing them when associating with the Bar-tailed, unless sufficiently near for the white base of the tail feathers to be seen or the black band across their ends. When in flight the white bar of the secundarius across the wing is also a mark of distinction, but still is not easily seen on a bird flying in the middle of a large flock of the other species. Thompson does not mention any large flocks being met with in his time. In this district the Bar-tailed Godwit is a very rare and irregular visitor, and, although I have been shore-shooting and punt-shooting for many years past, I have very few notes of its visits. In March, 1859, when in my punt near the Island of Banuros, near Bartragh, I saw a bird in company of some Bar-tailed Godwits, and my attention was attracted by the white base of the tail feathers. In May, 1863, a specimen in full summer plumage was shot by Mr. Hanly near Belleek, on the tidal part of the river, and on the 6th of November, 1876, I got a shot at some Lapwings and Redshanks, picking up a Bar-tailed Godwit, a Black-tailed Godwit in winter plumage, and thirteen Lapwings and thirteen Redshanks. I did not recognise the Black-tailed until picking up the dead birds after the shot.

On the 29th June, 1878, when down near Bartragh in my punt, I observed a lovely pair of these birds in full summer plumage; they were among a lot of Bar-tailed Godwits.

The last occasion of a visit of this species was on the 3rd of September, 1881, when a fine specimen was shot near Rosserk Abbey by the late Mr. Wm. Jackson, of Kelanly. Since that date I have neither seen nor heard of any visiting this district, although Mr. A. C. Kirkwood is also keeping a keen look-out for any visitors to the bay or estuary.

Moyview, Ballina.

ROBERT WARREN.

**The Grey Phalarope.**

I read with interest Dr. Patten's excellent article on this bird in the March number of the *Irish Naturalist*; and looking up my own notes I find five records of it within the last twenty years, viz. :—

On 26th October, 1881, Mr. Frank Griffin brought me one which had been shot on the foreshore of the lough that day. It was one of two together.

On 6th October, 1883, my nephews, Robert Patterson and W. E. Praeger, brought me one which had been shot on the lough near Grey-point that day.

On 18th October, 1891, Captain Bruce, of Toomebridge, sent me one which had been shot on Lough Neagh a day or two previously; and he mentioned that he had got a similar bird about five years before.

On the 20th October, 1891, Mr. D. C. Campbell, of Derry, wrote me that he had seen two Grey Phalaropes, one shot on the shore of Lough Foyle near Greencastle, Co. Donegal, on 10th October; and the other caught alive "up the road" near the same place a few days later. It will be noticed that all these occurrences took place in October, and the three at within a week; one in Co. Down, one in Co. Antrim, and three in Co. Donegal; one in fresh and four in salt water.

R. LLOYD PATTERSON.

Holywood.

**IRISH SOCIETIES.****ROYAL ZOOLOGICAL SOCIETY.**

Recent gifts include a Godwit and a Knot from Mr. R. Warren, and three White Swans from Sir J. F. Dillon.

**BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.**

APRIL 2.—A meeting was held in the Museum, when a lecture was delivered by GEORGE COFFEY, M.R.I.A., on the "Antiquity of Man and the Dawn of Art."

**BELFAST NATURALISTS' FIELD CLUB.**

MARCH 19.—The Vice-President, Mr. W. H. PHILLIPS, read a paper entitled "My Hobby about Ferns, and its Results; Personal Reminiscences."

APRIL 16.—Mr. A. M'I. CLELAND read a paper on "A Recent Tour of the Roman Wall," illustrated by lantern slides.

A NOTE ON A BEAKED WHALE,  
MESOPLODON HECTORI, GRAY.

BY PROFESSOR R. J. ANDERSON, M.D.

THERE is in the Museum of the Queen's College, Galway, a skeleton of a Beaked Whale. The flippers are, however, wanting. The vertebræ are C. 7 (3 fused), D. 10, L. 11, C. 17 + ? Seven ribs have two heads; there are seven hypaxial (chevron bones) remaining, and four holes in the sternum. The length is twelve feet four inches, the head being two feet six and a half inches long (the entire length before cleaning was fourteen feet). One conical slightly-edged tooth remains in the right mandibular socket, which is one inch long from before back, and three-eighth inch wide; the tooth fills the socket anteriorly, and projects forwards. There are no other teeth in the mandible behind this tooth, but a marked seam-like groove runs back from the large socket for the distance of one foot, that is for nearly half the length of the lower jaw, which is twenty-five inches long. The premaxilla would count twenty-four inches, allowing for a portion which is wanting. The lower jaw-symphysis is five inches long. The eburnated premaxillæ reaching upwards enclose at the sides, and partially above, the rostral groove or canal, in which the vomer and mesethmoid cartilage appear. The roof of the groove is incomplete above for the breadth of a quarter—one inch. The vertical measurement of the groove or antrum is two inches at a distance of two inches in front of nares, one inch at eight inches in front of nares, and a quarter inch at a distance of fourteen inches. Transverse measurement is one and a quarter inches near the nares, and a half inch at a point fifteen inches further forwards. The opening is one quarter of an inch wide at fourteen inches in front of the nares. Premaxillæ are directed upwards, backwards, upwards, and then forwards. The nasals are deeply grooved or hollowed in front. The distance from the anterior end of the frontal to the tip of the tooth is twenty inches. It is eleven and a half inches from the outer edge of one maxilla to the outer edge of the other. The nasal bones, which are *not* united, differ in size; the right is somewhat larger (longer,

wider, and higher) than the left, and rises about one quarter of an inch above the level of the premaxilla of its own side. These bones are behind the premaxillæ, which curl round the

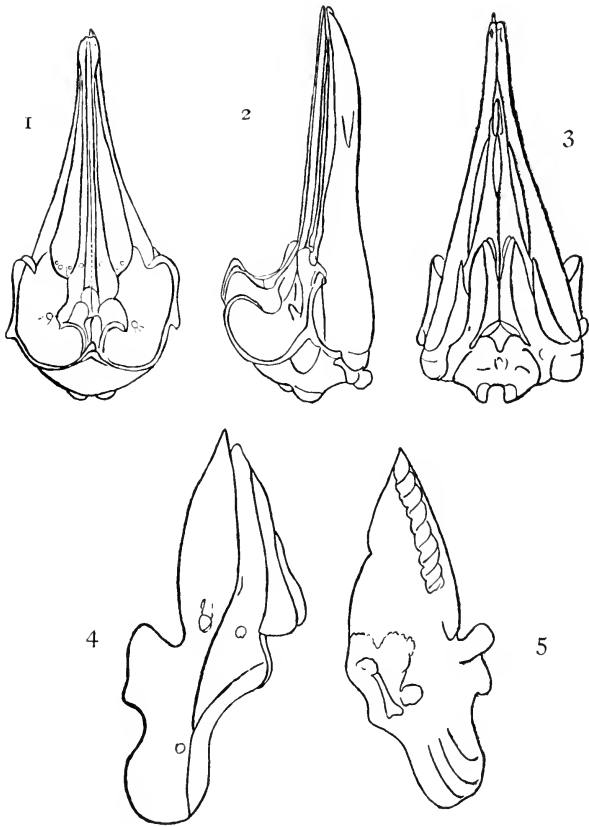


FIG. 1. Cranium of *Mersoplon Hectori* from above. FIG. 2. Lateral view. FIG. 3. From beneath. (The anterior fifth of the rostrum should have been drawn with broken lines, to show the part that is wanting.) FIG. 4. Cranium of *Orca gladiator* from above. FIG. 5. From beneath.

convex anterior inner surface of the maxillæ. The pterygoids unite in the middle line and have the palates appearing in front and internal to them, so that the anterior ends of the

pterygoids are external to the palatines. The free nasals seem to point to a relationship different to that of *Ziphius*, although the other characters, especially the number of the vertebræ, bring this Beaked Whale under consideration into line with the latter genus. The arching of the premaxillæ over the nares is slight. The nasals are small, and do not arch, and other characters seem to preclude the *Berardius* type. The apex of the tooth is directed forwards and slightly upwards. *Hyperoodon* is excluded by the characters of the skull.

*Mesoplodon Hectori*, Gray, has one tooth at the apex of each mandible, and a narrow rostrum. Therefore of the types of *Mesoplodon* found in northern seas the above type approaches most nearly *Berardius* and *Ziphius*, and is most like the specimen here described. The tooth socket seems large for the tooth. The ununited nasals would point to a resemblance to an immature specimen of *Ziphius cavirostrum*, Cuv.

The tooth of *Mesoplodon bidens* is situated near the hinder end of the mandibular symphysis, and is compressed. The vertebral formula is C. 7, D. 10, L. 10, Cau. 19.

*Mesoplodon australis* has a tooth near hinder end of symphysis, and the palatines outside the pterygoids. In *M. dentirostris* the tooth is on a prominence, and the palatines surround the anterior end of the pterygoids. The only *Mesoplodon* with apical teeth seems to be *M. Hectori*.

The specimen was at first supposed to be a *Ziphius*. The works of Flower, Lydekker, and Beddard, and a paper by Gray, have been examined, as well as Dr. Scharff's thankworthy memoir, which has tempted me to send this note with the accompanying outline sketches. A portion of the skull of a Killer Whale is figured for comparison with the Duck Whale. The former was forwarded here by the divisional officer of the coastguards for Galway, with the subjoined letter from Mr. C. Barrett, of the Coastguard, Ballyvaughan, Co. Clare :—

“Whilst on Cruit Island, Donegal Bay, in the year 1885, I discovered a collection of bones. Prompted by curiosity, I made inquiries and found that the bones had been there for a great number of years. An old resident, who was 70 years of age, informed me that the said bones were there when he was a small boy. Among the bones was one very much larger than the others; it was about twelve feet in length, said to have been the back-bone belonging to some strange animal.”

HIERACIUM SENESCENS, BACKH.  
IN IRELAND.

BY REV. C. H. WADDELL, B.D.

I AM glad to be able to report the occurrence of this rare Hawkweed in Ireland. Early last season I spent a day in Tollymore Park, Co. Down, 13th June, 1900. It was rather early for Hawkweeds, and only three species were met with coming into flower, *Hieracium argenteum*, Fr., *H. flocculosum*, Backh., and *H. senescens*, Backh. My friend, Mr. S. A. Stewart, named the two former, but did not know the last plant. It was, therefore, sent to the Botanical Exchange Club, and Mr. Hanbury kindly examined it, and says it is undoubtedly *H. senescens*, and an interesting addition to the Irish Flora.

This species belongs to the *Alpina* group of Hawkweeds, the headquarters of which is Scandinavia, and, in these isles, Scotland; and no member of this group has hitherto been found in Ireland. The group is divided into two sections *Alpina genuina*, smaller plants with solitary heads, and *Alpina nigrescentia* intermediate between the true alpiners and the later groups, and remarkable for the dark pubescence on the heads and peduncles.

*H. senescens* was described first by Backhouse in his Monograph, and has not been found out of Scotland, where it grows on alpine cliffs and by mountain streams in six counties—Fife, Perthshire, Inverness, Forfar, Aberdeen, and Dumbarton.

It is strange that it should have so long escaped notice at Tollymore Park, which has often been visited by botanists. I can only account for the fact by its not being a very conspicuous species, unless to those well acquainted with the group, and perhaps to its early season of flowering in this sheltered place at a low elevation.

I collected four plants of it in flower on the Ordovician rocks by the Slimna river in the lower part of the Park, but, not knowing what it was at the time, did not trace out its distribution further.

Saintfield, Co. Down.



ON SOME FORMS OF RHINANTHUS NEW TO  
THE BRITISH FLORA.

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

A WELL-KNOWN Austrian botanist, Dr. J. von Sterneck, has for some time been studying the genus *Rhinanthus*, for which however he uses the name *Alectorolophus*, and I have recently sent him some of my herbarium sheets for his determination. His examination of these shows that three, to which he gives specific rank, are additions to the flora of Great Britain and Ireland. The first of these is one which he identifies as *Alectorolophus stenophyllus* Schur, Enum. Pl. Transs. Index. I collected it at Glengariff, Co. Cork, in 1890, and I have specimens from Lough Owel, Westmeath, collected by W. R. Linton in 1895, and from Bog of Lynn, Mullingar, collected by H. C. Levinge in the same year. Both of these were distributed through the Exchange Club under the name of *R. Crista-galli* L., var. *fallax* Wimm and Grab. Dr. von Sterneck refers both of them to *stenophyllus*. I have also *stenophyllus* from East Ross, West Ross, Easternness, Westernness, and South Aberdeen, &c., in Scotland, and from Berkshire, so that probably it is widely distributed. It is the *Rhinanthus Crista-galli* var. *angustifolius* of my published notes. According to our views of nomenclature it is *Rhinanthus stenophyllus* Schur, Enum. Pl. Transs., p. 512. In the "Index Kewensis" it is put as a synonym of *Rhinanthus minor* Ehrh. Beitr. vi., 144; but under the genus *Rhinanthus* in the same work, *Rhinanthus Crista-galli* Linn. is said to equal *major* and *minor*, and *R. minor* is kept as a species apart from *R. major*, while *R. Crista-galli* is simply put in italics; yet in treating of the genus *Alectorolophus*, while *A. Crista-galli* Bieberstein is said to equal *Rhinanthus Crista-galli* (put in Roman letters as a distinct species), *Alectorolophus minor* Dumort. is said to equal *R. minor*, and *A. minor* Reichb. is said to equal *R. Crista-galli*. That is, under the genus *Rhinanthus*, *R. major* and *R. minor* only figure as distinct, and *R. Crista-galli* sinks to a synonym, yet under *Alectorolophus* all three are given specific rank.

*Alectorolophus minor* Dumort. = *Rhinanthus minor* Ehrh. Beitr. vi., 144, is a very widely distributed form in Britain, which I have from Co. Antrim, West Ross, South Aberdeen (as a narrow-leaved form growing at 800 feet), and it is the prevailing plant in Anglesey and Carnarvon. A stout form from Oxford and Berks is my var. *fallax* Koch, but which does not appear to be recognised by Sterneck, who simply calls it *A. minor*. It also is found in Buckinghamshire, Northamptonshire, Bedfordshire, Middlesex, &c. The "*R. major*" of Mr. Saunders' collection from Harlington in Bedfordshire is, according to Sterneck, only *minor*, as are the Lincolnshire specimens labelled *R. major* collected and distributed by J. S. Rowse. *R. minor* ascends to 1,000 feet at Llanberris and 800 feet at Ballater and Gloucestershire, but doubtless reaches higher elevations. Dr. J. von Sterneck gives specific rank to Dr. Buchanan White's variety *Drummond-Hayi*, which I have from Forfar, Perth, and West Ross, and which ascends to over 3,000 feet in Perth.

I have *Alectorolophus major* Reichb. (= *Rhinanthus major* Ehrh. l. c.) from East Ross, from Bodorgan, Anglesey, and with some doubt from Buckinghamshire. I found *Alectorolophus borealis* Sterneck in "Ann. du. Cons. et du Jard. Bot. de Genève," 1899, p. 25 (= *Rhinanthus borealis*) at high elevations 2,200-3,000 feet on the mountains of Perth and Argyll, and noted at the time "a variety, but not *Drummond-Hayi*." *Alectorolophus monticola* Sterneck (= *Rhinanthus monticola*) I found on the Black Isle of Cromarty near the coast, and at Invercauld, South Aberdeen, at above 1,500 feet elevation.

High-street, Oxford.

## REVIEWS.

### BRITISH BIRDS.

**A Hand-book of British Birds**, showing the distribution of the resident and migratory species in the British Islands, with an index to the records of the rarer visitants. By J. E. HARTING, F.L.S., F.Z.S., member of the British Ornithologists' Union. New and revised edition, with thirty-five coloured plates, carefully reproduced from original drawings by the late Professor Schlegel. London, 1901: John C. Nimmo. Pp. xxxi. + 520. Price £2 2s. net.

The second edition of Mr. Harting's hand-book far surpasses the first edition both in size and general attractiveness. The number of pages has been trebled; and the addition of thirty-five coloured plates, representing the *heads* of 267 species, will make the book deservedly popular. The plates are beautifully executed, and contain nearly 500 figures—so as to show, where necessary, the distinction between old and young, male and female, and summer and winter plumage. For the matter, Mr. Harting's life-long services to zoology are a sufficient guarantee of its general trustworthiness, and render superfluous any attempt to enumerate the merits which are always discernible in what he writes.

The book is divided into two parts, of which Part I. is devoted to "British birds properly so-called," while Part II. serves the purposes of a capacious appendix, to which are relegated "rare and accidental visitants." The dividing line between the two classes thus separated is not an easy one to draw. Mr. Harting includes the Roller and Bee-eater, Purple Heron, Night Heron, Little Bittern, and Glaucous and Iceland Gulls, in the category of "British birds properly so-called"; and so treats of them in Part I., while consigning to Part II. the Greenland and Iceland Falcons, Snowy Owl (which he characteristically calls "Snow Owl"), and Squacco Heron. The object of this arrangement—in some respects an inconvenient one—is to separate those species of which it is worth while to enumerate every occurrence from those that are treated of in a more general way; and from this special point of view there is a good deal to be said in its favour. Yet it may well seem strange to readers in Ireland, where the Purple Heron has occurred once, and the Snowy Owl upwards of thirty times.

The classification followed is that of Yarrell's "History of British Birds," fourth edition. To some this will appear like a perverse rejection of the system more generally followed since the appearance of Saunders' "Illustrated Manual," and the complaint that reference is rendered difficult by adherence to the older order, has recently been made in the pages of this Journal with respect to another book. But it appears to the present writer that so long as the fourth edition of Yarrell retains its recognised pre-eminence as the best extant work on British birds, so long will it

remain a practical necessity for all ornithologists to be familiar with the order followed in that work—as well as with that adopted by Mr. Saunders; and while this is so, they can experience no great difficulty in consulting books in which either of these two orders is adhered to. Mr. Harting, in his introduction (pp. xv.–xix.), gives reasons for his retention of the older system—amongst others, that he cannot bring himself to accept a classification which sets the Swallows and Swifts far apart, when he believes them to be closely related.

Since there are so many reasons why Mr. Harting's book is sure to be largely consulted, it is the more deeply to be regretted that his information on Irish ornithology is by no means up-to-date. It is obvious on the most cursory glance that a great part of the book was written without any reference to Mr. Ussher's recent volume; and from internal evidence it can easily be gathered that the first 127 pages (Part I. to end of *Columba*) had unfortunately been printed off before "The Birds of Ireland" had appeared. Nor are the deficiencies confined to the birds dealt with in those pages, for though Mr. Ussher is quoted with regard to the Black Grouse and other *Gallinae*, we suspect that from this point to end of *Limicola* the proof-sheets had to be somewhat hurriedly altered to suit printers' exigencies; and it is only in dealing with the ducks and sea-fowl that Mr. Harting has been able to avail himself fully of Mr. Ussher's work, with the result that we find very few inaccuracies in that part of his volume.

While allowing that the want of Mr. Ussher's excellent book was a serious disadvantage, it is still impossible to acquit Mr. Harting of some carelessness in his consultation of the records that were available to him. We particularly regret to see that his references to Mr. More's well-known "List of Irish Birds" are all to the *first* edition of that publication (1885). The second edition, published in 1890, is mentioned in the bibliography; but Mr. Harting has, nevertheless, omitted to consult it. He has thus failed to discover that the Lapland Bunting, which he describes as "unknown in Ireland," occurred at the Fastnet Lighthouse in October, 1887. From the same source he might also have learnt that the Pied Flycatcher has been obtained in this country considerably oftener than he supposes. Of the eight examples now known to have occurred, five were particularized by More in 1890—and Mr. Harting mentions only two.

The Woodchat Shrike, Bartram's Sandpiper, and Sociable Plover, are three species whose occurrences in Ireland, besides that of the Lapland Bunting already noted, Mr. Harting ignores in the text of his work. The omission of the Sociable Plover is, however, acknowledged as an oversight in the Introduction (foot-note to p. ix). The occurrence of the Woodchat was chronicled in the *Ibis* for January, 1899 (p. 158). Of the *two* Irish occurrences of Bartram's Sandpiper, one was recorded in More's "List of Irish Birds,"<sup>1</sup> and the other in the *Irish Naturalist* for June,

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<sup>1</sup> Mr. Harting may have considered the antecedents of this example doubtful.

1895 (vol. iv., p. 166). The Sociable Plover, needless to say, formed the subject of an interesting article in this Journal, by Mr. E. Williams, in November, 1899 (vol. viii., p. 233).

Many other instances might be given of the way in which records of rare birds obtained in Ireland have been overlooked. The author quotes only one Irish occurrence of the American Robin, whereas a second was recorded in this Journal by Mr. Ussher in 1896 (vol. v., p. 214). This omission is the more important, since Mr. Harting, here differing from both Mr. Ussher and Mr. Saunders, considers that *Turdus migratorius* may fairly be claimed as a genuine though rare straggler to our shores. Of the White-winged Black Tern only three Irish-taken examples are enumerated the author omits both the specimens now in the Dublin Museum, though one of these, shot at Cappagh in May, 1875, is mentioned in More's list, and the other, killed at Newmarket-on-Fergus in June, 1893, is noticed in the *Irish Naturalist*, vol. ii., p. 253. Mr. Warren is credited with having obtained one Surf Scoter, instead of two, in the winter of 1896-7 (see *J.N.* vol. vi., p. 59); the Little Bustard shot in 1892 in Kerry, and seen in the flesh by A. G. More, is omitted (*J.N.*, vol. ii., p. 56); and so are two Snowy Owls recorded in this Journal (vols. ii., p. 25, and iii., p. 24). These and similar oversights are the more misleading, from the fact that the *Irish Naturalist* is frequently quoted, showing that its records have been consulted in a hasty and imperfect manner. That the second Irish occurrences of the Barred Warbler and Lesser Whitethroat, more recently published, have been ignored, may go without saying; the former, however, is noticed in its proper place in Saunders' "Manual," as well as in the Irish Migration Reports. The Two-barred Crossbill shot in Co. Antrim in 1867 is referred to as identical with the example recorded in the *Zoologist* for 1868 (p. 1376), and enumerated in More's list as obtained in Co. Dublin. Mr. Ussher has pointed out ("Birds of Ireland," p. 74), that these were two independent occurrences, and ought not to be confounded.

Of the Mealy Redpoll, Mr. Harting omits the interesting fact that several Irish specimens have been referred to the Greenland form, *Linota rostrata*. On the other hand, he treats the "Parrot Crossbill" as a distinct species, but gives only one instance of its occurrence in Ireland. Yet he had seen A. G. More's record of another (*Zool.*, 1892, p. 76), for at page 90 he cites this note as evidence that More considered the bird a good species. We may add from personal knowledge that More wrote the note in question without any idea of conveying such an opinion, an opinion which in fact he did not hold. Mr. E. Williams has stated (*Zool.*, 1891, p. 112), that the Parrot Crossbill occurred numerously in Ireland in 1890.

Another bird treated in this work as a distinct species is Pallas' Grey Shrike, *Lanius major*. Mr. Harting considers it an extremely rare visitant, and quotes only four British occurrences, none of them being Irish. The fact that both the Grey Shrikes in the Dublin Museum belong to this race is mentioned in More's list; the only Grey Shrike in Mr. R. M.

Barrington's collection is also *Lanius major*; and More, in one of his letters to Prof. Newton, since published, stated in 1885 that he had no certain proof of the occurrence of any other form in Ireland ("Life and Letters of A. G. More," p. 324).

It must be added that Mr. Harting's information on the breeding-ranges of birds in Ireland is lamentably defective. Mr. Ussher's admirable Report on this subject, presented to the Royal Irish Academy in 1894 (*Proc.*, 3rd Ser., vol. iii., No. 3), would have sufficed to show him that the Whinchat, Redstart, Garden-Warbler, Wood-Wren, Yellow Wagtail, Woodlark, Tree Sparrow, Siskin, Crossbill, Jay, and Stock-dove have been found nesting over a wider area than he supposes; and the information contained in that paper was further brought up-to-date by an article on the same subject in the *Irish Naturalist* for March, 1897 (vol. vi., pp. 64-73).

Another serious fault is the number of doubtful and discredited Irish records which Mr. Harting has allowed to retain their places unchallenged. The Red-breasted Goose and Brunnich's Guillemot, long ago turned out of our list by A. G. More, as well as the Reed Warbler and Ortolan, rejected for substantial reasons by Mr. Ussher, reappear in Mr. Harting's book without the slightest hint of their records being open to suspicion. Birds which were originally recorded as having been *seen* are frequently enumerated in words which might seem to imply that they had been *obtained*, e.g., the White Wagtail alleged to have been observed near Wexford (*Zool.*, 1866, p. 95); and worse still, the "Ivory Gull" said to have been seen in the heart of Dublin city, just above Grattan Bridge, on April 19th, 1892 (*Zool.*, 1892, p. 228). Mr. Warren pointed out at the time that no weight could be attached to this statement, as the bird was not obtained; and the present writer remembers that a white-mantled specimen of the common *Larus ridibundus* had frequented that part of the Liffey not long prior to the date specified for the "Ivory Gull."

The re-publication of these discredited stories would be no fault, but the reverse, if the doubts attaching to them had also been stated. Mr. Harting has included in his Part II. a notice of the American Goldfinch shot by Mr. Sheridan in Achill Island on September 6th, 1894, and here he concisely gives his reasons for believing that it had escaped from captivity, "probably from the deck of some homeward-bound vessel from America." Mr. Ussher, in "The Birds of Ireland," ignores the American Goldfinch altogether, but in this instance it seems to us that Mr. Harting has adopted the wiser course. So long as the grounds for suspecting error are stated, no harm is done by quoting particulars of the occurrence, and several useful objects are gained by it. The most important of these is the illustration of the diversity of the sources of error, against which the student of ornithology cannot be too repeatedly cautioned. Besides, the ignoring of a doubtful record by naturalists who have inquired into the circumstances may lead to its being afterwards resuscitated from oblivion by those who have not, and hence the blunder is given a fresh start in life, which a short paragraph in a

standard work would have averted. Thirdly, there is always—or generally—the bare possibility that the unlikely record may, after all, be true; for which reason it is better that every ornithologist should be given the opportunity of forming an opinion for himself.

Mr. Harting, however, has not followed this commendable course consistently, for he has ignored the Cape Pigeon and Ruppell's Tern, which are believed to have found their way by objectionable means into the Irish list; while the Sheathbill (*Chionis alba*) shot at Carlingford Lough in December, 1892, is omitted from Part II. of the Handbook, but curtly referred in the preface (p. xxiii.) to "an independent category of ocean waifs and strays." This is hardly a sound reason for excluding it from a list to which escaped cage-birds like the Golden-winged Woodpecker find admittance.

To the notice of the Pectoral Sandpiper shot near Portumna in October, 1888 (p. 429) are appended the words "Not noted by Ussher." This is simply an unaccountable oversight, as the record in question—the only Irish occurrence of *Tringa maculata*—appears in its proper place in Mr. Ussher's book (p. 282). The date, however, is there stated (probably by misprint) to have been October, 1886.

It is with extreme regret that we have felt it necessary to point out how numerous are Mr. Harting's oversights and mistakes with reference to Ireland; but nothing can prevent this edition of his "Handbook" from taking a high place among ornithological works, and it is of the utmost importance that those who go to it for information shall not be misled.

C. B. M.

### BEE-KEEPING.

**The Irish Bee Journal** (The Organ of the Irish Bee-keeping Association), a monthly journal. Edited by Rev. J. G. DIGGES, M.A. Vol. I. No. I. May, 1901. Pp. 12. Price, 1*d*.

We cannot but give a hearty welcome to this newest of Irish "monthly journals" devoted to so important a department of applied zoology as bee-keeping. It is satisfactory to know that the increase of the honey industry in the country is believed to warrant the establishment of this periodical which will have, there can be little doubt, a long and useful career. The twelve pages of this first number are filled with valuable information on such subjects as "Purchasing and Packing Stocks," and "Foul Brood," and news of appliances exhibited at recent shows, and reports of Associations. The scope for bee-keeping in the country is well brought out by a short paragraph which tells us that over £4,500 worth of honey was imported into the United Kingdom during last March.

## IRISH SOCIETIES.

### BELFAST NATURALISTS' FIELD CLUB.

APRIL, 24.—ANNUAL MEETING.—The PRESIDENT (F. J. BIGGER, M.R.I.A.) in the chair. W. GRAY, M.R.I.A. (Hon. Secretary), read the Committee's annual report, which referred to the work done by the members during the year, including several special investigations into different departments of natural history, carried on by individual members, sub-committees, and at field meetings. For this latter purpose the following places were visited:—Saintfield, 12th May; Carrickfergus, 2nd June; Tollymore Park, 23rd June; Navan and neighbourhood with the members of the Dublin Field Club, on 11th, 12th, and 13th July; Glenavy, 4th August; Greyabbey, 8th September. The winter session was opened by a *conversazione* in the Public Library, and during the session monthly meetings were held, at which lectures and exhibitions were given. The Committee had under consideration the desirability of republishing the Belfast Naturalists' Field Club Guide, prepared for the 1874 meeting of the British Association in Belfast. The arrangements are now in the hands of the City Committee for the reception and entertainment of the British Association in Belfast next year. The movement to invite the Association, which originated with the Belfast Naturalists' Field Club, has been crowned with success, and the invitation has been very cordially accepted at Bradford, and the Association will visit Belfast in the autumn of 1902. The sectional and sub-committees' reports were read in the following order:—The financial statement, Mr. W. H. Phillips; the fauna of Lough Neagh, Mr. H. Lamont Orr; report of Botanical Section, Mr. S. A. Stewart; librarian's report, Mr. G. Donaldson; the judges' report, Mr. S. A. Stewart. The judges appointed to examine and report on the collections sent in competition for the Club's prizes recommended that Prize 8 be awarded to Mr. James Orr for a set of Cretaceous fossils, including forty species, and that Prize 13 be awarded to Mr. W. A. Green for his collection of land and fresh-water shells, which included sixty-eight species and many varieties. A collection, sent by Mr. George Reilly, received high commendation; it contained fifty-six species and two varieties. A general discussion took place on the various reports submitted, which were adopted.

The election of the officers for the new year was then proceeded with, resulting as follows:—President, F. J. Bigger, M.R.I.A.; Vice-President and Treasurer, W. H. Phillips; Librarian, G. Donaldson; Secretaries, J. St. J. Phillips and R. Patterson, who were nominated by W. Gray, M.R.I.A., the outgoing Hon. Secretary. The Committee were re-elected, Mr. Gray taking Mr. Phillips' place.

On the motion of W. J. Fennell, seconded by John Dickson, a vote of thanks was passed to Mr. Gray for his services as Hon. Secretary and conductor of the Club's excursions during recent years.

The members present made several suggestions as to the new year's work, and the election of several new members brought the meeting to a close.



## CORK NATURALISTS' FIELD CLUB.

APRIL 25.—ANNUAL MEETING.—MR. THOMAS FARRINGTON, M.A. (President), in the chair. Mrs. F. BROOKE-HUGHES (Secretary) read the annual report. At the beginning of the session the Field Club numbered fifty. During the year three members resigned, and twelve new members joined, making the nett gain nine, with eleven honorary members; their total membership now stood at seventy. Nine excursions took place during the year, including those to Waterfall and Ballincollig; dredging and shore-hunting in Cork Harbour—this excursion was badly attended; Inchigeela Lakes, twenty-six members and friends attending—as the result of this excursion *Viola lactea*, found by several of the members, was added to the Cork flora, and *Carduus nutans* (Musk Thistle), found by Mr. Johnson, was added to the district; Queen's College, attended by thirty-eight members and friends; evening excursion to Goulding's Glen, eight members attended; Dublin Field Club's excursion to the Valley of the Boyne, to which the Cork Field Club members were invited; Monkstown and Glenbrook, five members attended; Rochestown and Douglas, fifteen members attended; Blackrock, eight members attended. Prizes were offered for the best collections of natural objects, but with the exception of the junior branch there was no competition. Among the juniors, Miss Queenie Farrington was awarded a prize. A display of scientific exhibits was held and was largely attended. Mr. R. A. Phillips reports the following additions made by him to the Cork flora:—*Listera cordata* and *Hieracium hypocharoides*, found on the Millstreet Mountains. Mr. Phillips has also recorded new stations for the following rare plants:—*Polypodium Phegopteris*, *Cystopteris fragilis*, and *Asplenium viride*.

The balance sheet showed the amount received in subscriptions, £13 2s. 6d. The working expenses of the Club were £9 1s. 5d., leaving a balance in hand of £13 3s. 4d., as against £9 2s. 3d. last year.

The report was adopted and the following appointments were made:—President, Thomas Farrington, M.A.; vice-presidents, Professor Hartog, John L. Copeman, W. H. Shaw, Miss H. A. Martin, J. H. Bennett, H. Lund; hon. secretary and treasurer, Mrs. F. Brooke-Hughes; curator, R. A. Phillips; committee, J. B. Lacy, F. R. Rohu, W. H. Johnson, Charles McCarthy, G. R. Thomas.

The CHAIRMAN, in proposing the re-election of Mrs. Brooke-Hughes as hon. secretary, said that the members were much pleased with the excellent way in which she had conducted the business of the Field Club.

Professor HARTOG proposed a vote of thanks to the outgoing officers, who were, he said, not alone indefatigable but successful. Mr. Phillips, their curator, had made numerous additions of new and interesting species to the flora of the county and district.

Mr. COPEMAN seconded the motion, which was unanimously adopted.

The paper of the Selborne Society on "The Waste of Animal Life" was then read and discussed, after which the meeting adjourned.

## NEWS GLEANINGS.

### The Field Club Union Conference.

The arrangements for the third triennial conference of the Irish Field Clubs, which will be held in Dublin on June 18 to 22, are now well forward, and the detailed programme will shortly be issued. It includes excursions to Glendalough, famed for its antiquities and the beauty of its scenery; to the Hill of Howth, and to Portmarnock, which is classic ground to the zoological and botanical collector. Visits under skilled guidance will be made to the Natural History Museum, the Royal Irish Academy collections, the Zoological Gardens, the Glasnevin Botanic Gardens, Trinity College and its Botanic Garden, Christ Church Cathedral, and elsewhere; and an evening conference on Field Club matters will be held in the Lecture Theatre of the Royal Dublin Society.

### Irish Topographical Botany.

Mr. Praeger's work will be issued by the Royal Irish Academy within the next few weeks.

### The Geological Survey.

The Drift Survey of Ireland has commenced, under direction of Mr. G. W. Lamplugh, whose name is well known in connection with similar work in the North of England. The Dublin district has been first undertaken, and it is hoped to issue the first sheet of the new map before the close of the present year.

### The Belfast Field Club.

We note with regret the retirement from the secretaryship of the veteran member, Mr. William Gray. The secretarial duties have been undertaken by Mr. J. St. J. Phillips, who has previously seen service in the same post, and Mr. Robert Patterson, well known to Irish zoologists. We congratulate the Club on having secured such efficient substitutes for Mr. Gray.

### A Conchological Exchange Club.

We have received the prospectus of a new Club "whereby students of the Mollusca can find a ready means of exchanging duplicate specimens." The Club is associated with the Midland Malacological Society, and the Chairman is Prof. W. E. Collinge, editor of the *Journal of Malacology*. Members of the society and subscribers to the Journal pay only 1s. a year to the Club; other members, 2s. 6d. A "pool" is established to which members are asked to contribute perfect localised specimens of British Mollusca (either land, freshwater, or marine). From this "pool" the desiderata of members will be as far as possible supplied. The Hon. Secretary is Mr. Guy Breedon, 38, Station-road, King's Norton, Birmingham. Doubtless some of our Irish conchologists will hasten to join the Club.

## NOTES.

### BOTANY.

#### *Leptodontium recurvifolium* in Kerry.

The rare and fine moss, *Leptodontium recurvifolium* (Tayl.), which is unknown outside the British Islands, was first found "on Knockavohila, a mountain between Kenmare and Killarney," by Dr. Taylor, in 1842.

Dr. Moore in his Report on the Mosses of Ireland, *Proc. R.I.A.*, 1872, says in quoting the record "Not hitherto we believe found elsewhere, or by any other person." Dr. Braithwaite, "Brit. Moss Flora," vol. i., p. 257, gives in addition to Taylor's locality, "Ben Voirlich, by Loch Lomond, M'Kinley, 1863; Glen Vaur, Griffith, 1878; Tyn-y-gross, Holt, 1885;" and remarks "This fine moss appears to be extinct both in the Irish and Scotch localities, so that its discovery in Wales is an interesting event." And Mr. Dixon, "Student's Handbook of British Mosses," p. 203, gives in addition three other Welsh localities, and remarks about the "Killarney and Ben Voirlich" localities "now extinct."

It is therefore very interesting to mention that this plant was re-discovered in Co. Kerry by the Rev. C. H. Brinstead, in 1896, at Connor Hill Pass, and on Brandon Mountain; and by myself in 1898, at Coomanard Loughs, which are situated in a remote and wild deep glen about two miles north-east of Connor Hill Pass.

H. W. LETT.

Loughbrickland.

### ZOOLOGY.

#### *Planorbis corneus* in Co. Sligo.

While on my way to Sligo with some naturalist friends for three or four days collecting last September in the district round Lough Gill, I met Mr. W. F. de V. Kane, who told me he had just taken specimens of this species in a little artificial pond made in recent years to hold water-lilies at Markree Castle. Colonel Cooper kindly sent me these with some additional specimens a few days later. As the only known habitat for this species in Ireland hitherto has been a small area of the central plain we think it is an introduction of late years to Markree, probably with some plants of the Water Soldier, *Stratiotes aloides*, or with some *Limnea peregra*, &c., which were introduced to keep down Duckweed. I think it better to put the find on record, as the pond runs into the Unshin River, and the species, if a new arrival in the county, might soon spread to likely habitats, of which there are many near at hand. During our visit a very careful look-out was kept for it in drains, ponds, &c., especially near Collooney and the country near Markree on chance that it might be native, but without success.

R. WELCH.

Belfast.

**Amphipeplea (Limnæa) glutinosa in the River Bann.**

Further search for this rare and interesting shell proves that it is plentiful along the margins of the river near Portadown, where I took twenty full grown specimens at Easter. This is about two miles further up than the locality recorded in the *Irish Naturalist*, 1900, page 48, where only a few examples were taken. The mouth of a drain opening into the river seems to be their favourite habitat, but I have taken them at intervals along the river bank with a scoop.

WM. A. GREEN.

Belfast.

**The Common Lizard in Antrim.**

In May, when looking for shells at the base of a wall at Whitehead, I discovered a specimen of this Lizard (*Lacerta vivipara*). It tried to escape through the grass. I caught hold of its tail, which broke off in my fingers and continued to wriggle for some minutes.

I had captured the Lizard in a handful of grass that I seized, and it now enjoys itself in a glass-topped box, and seems happy when basking in the sun. Its beauty is sadly marred by the loss of its tail. I hope it will live to grow another.

HUGH L. ORR.

Belfast.

**Early arrival of Swifts in Co. Wicklow.**

While staying with Mr. Barrington lately I saw a large number of Swifts—at least thirty—flying about Fassaroe in the forenoon of April 22nd. This is the earliest date at which I have ever seen a Swift; and Mr. Barrington tells me he has no recollection of its reaching Fassaroe so early in any previous year. I have noted—in fifteen years—the dates on which I saw the first Swift in Dublin between 1882 and 1897. Twice—in 1885 and 1896—the date was so early as April 26th, only one bird being seen on each occasion, once it was on April 27th (a group of four birds), once on May 1st (one bird), twice on May 2nd (one or two each time), once on May 3rd (a group of seven), twice on May 5th, twice on May 6th, three times on May 8th, and once—in 1883—as late as May 10th, when only one was seen. The average date of first appearance in Dublin would seem to be about May 3rd. The number of Swifts seen by me on the occasion of their first appearance has seldom exceeded two; and it was, therefore, very curious to see so large an assemblage as thirty or more at the unusually early date of April 22nd.

C. B. MOFFAT.

Ballyhyland, Co. Wexford.

**Spring Migrants in Co. Antrim.**

The following early arrivals of birds may be worthy of a notice:—Cuckoo, April 9th; Cliff-chaff, April 18th; Swallow, April 19th.

S. A. BRENNAN.

Cushendun, Co. Antrim.

## NOTES ON IRISH PLANARIAN WORMS.

BY R. F. SCHARFF, PH.D., M.R.I.A.

(Collected for the R. I. A. Fauna and Flora Committee.)

LAST year I published a short account of the species of Land Planarians inhabiting Ireland<sup>1</sup>. I pointed out that of the three different kinds which had been discovered in this country, one, *Placoccephalus Kewensis*, had probably been introduced with plants from the Oriental Region; and that of the remaining two, only one, *Rhynchodemus terrestris*, was undoubtedly a native, while the other, *Rh. Scharffi*, had so far been found in two localities only, and under such circumstances that its artificial introduction seemed likely.

Land Planarians being mostly confined to the Tropics, the discovery of an additional European species of this peculiar group of worms is always an interesting event. I am glad, therefore, to announce that, last April, while on the way to visit a cave near Ballymote, Co. Sligo, with Mr. Praeger, we met with several specimens of *Rh. Scharffi* under a tree trunk which lay close to the road. Artificial introduction of the worm in this locality is, I think, out of the question, and we can now safely add this species to the native Irish fauna.

Two of the specimens found were of a light salmon and another of a primrose colour, about  $1\frac{1}{4}$ -inch long (30 mm.). Under a lens the two eyes were clearly visible, and having taken several specimens of *Rh. terrestris* at the same time, I was able to make a few additional notes as to the principal external distinguishing characters between the two species.

Apart from the colour, which differs in the two species, *Rh. terrestris* being either light or dark grey, the body in the latter is much more regularly rounded, so that the sole on which the worm creeps is considerably narrower than in *Rh. Scharffi*; the worm is also quicker in its movements. The underside in *Rh. Scharffi* is yellowish while in *Rh. terrestris* it is white. The anterior portion of the body can be drawn out to an exceedingly fine point in *Rh. Scharffi*, so that the head region is always much narrower than in *Rh. terrestris*.

Science and Art Museum, Dublin.

<sup>1</sup> *Irish Naturalist*, vol. ix., 1900, pp. 215-218.

## INSTINCT IN YOUNG COOTS.

BY C. M. CUNNINGHAM.

WHILE crossing the marshes with a friend some weeks ago near Downpatrick a favourable opportunity occurred for observing the characteristics of young Coots. The ground consisted of a level stretch of black mud covered with tufts of reeds (*Phragmites communis*) interspersed with plants of the Great Water-dock (*Rumex Hydrolapathum*) the tufts or tussocks reaching as high as five or six feet in many instances. On our line of advance towards the railway lay a Coot's nest, with three young birds almost fresh from the shell and in the downy stage. Alarmed at our approach, two of them fled and had got some twelve yards away from the nest before we overtook them. The colour of the birds so perfectly harmonised with their surroundings that none but the sharpest eyes could have detected them. One lay perfectly silent and motionless, with its head close to the roots of some Water-docks; the black colour of the body matched the mud, the yellow and red of the head and neck harmonised with the red and yellow colours of the roots and stems of the Great Water-dock. The other bird betrayed itself and its companion by loud and plaintive chirping and efforts to get further away. After the birds had got used to our presence, finding themselves unmolested, they began to make their way back to the nest, which was hidden from them by several intervening tufts of reeds, and we stayed by to see if they would find the nest unaided. Slowly and surely, and with many a tumble and conical flutter on the damp ground, they made their way homewards, making wide circuits to avoid the obstacles in their path until they arrived safely in the nest. Then lying all three close together again, the resemblance to their surroundings was complete.

How were they able to find their way back to their nest? It was difficult for a man to find it if he turned away from it for a few moments, and the only physical aid was the wind, which blew steadily from the nest in the direction in which the birds had fled. Sight must have been of little or no avail, as the intervening tufts of reeds would seem alpine heights to these poor little nestlings.

Malone Road, Belfast

## MONOCRATERION AND OLDHAMIA.

BY G. F. MATTHEW.

(Geological Survey of Canada.)

SINCE Professor Cole has mentioned with commendation my work upon the Cambrian genera *Monocraterion* and *Frazna*, in an article on Oldhamia and Histioderma in the *Irish Naturalist* for April, 1901, and implies a desire for further knowledge of the former genus, I have re-examined the specimens of *Monocraterion* in view of his comment on the course and nature of the ray-impressions. The "impression of the supposed tentacles" can be traced only along the more open, and trumpet-shaped part, of the burrow of the animal, and they disappear where the walls of the burrow begin to descend rapidly, and from that down the sides are smooth.

As may be concluded from Torell's description of *Micrapium*, that form had a mound at the burrow, and this is the case also with the Canadian form of *Monocraterion*, only the mound has no connection with the slopes outside the burrow. When the summit of this mound is abraded, it is seen to consist of several superimposed layers like the coats of an onion. This cone had no connection with the sides of the burrow, as the tentacular markings and the smooth surface of sand on which the animal rested run out from beneath it. It appears not to have been a portion of layers thrown down upon the animal after death, as a shaly mud of different texture separates it from the overlying shale. We can only suppose that it was some sort of a protective coating, such as the caddis-worms, or some of the marine worms, build to protect the soft body.

Around the central mound, and resting partly on it, but chiefly on the flatter expanded part of the trumpet-shaped opening of the burrow, is a ring of mud or shale, part of a superior layer that covered the mound at the centre of the burrow and the prints of the tentacular rays. We may suppose that the mud bed that covered over this organism and its burrow sank down around the mound as the softer parts of the animal decayed, and left the depressed ring of shale which we now find surrounding the cone of the burrow. The prints of the tentacular rays are depressed on the upper surface of the

layers, and this may have resulted from the sinking of the covering of mud thrown down upon the outstretched tentacles after their decay, as suggested by Professor Sollas in explanation of the appearance of *Oldhamia radiata*.

The impressions of the tentacles in the principal specimen are most distinct on a shining layer of the flags, which is smooth and glossy, from a coating of minute spangles of mica. This smooth surface would indicate a suspension of the deposit of muddy sediment, and the continuance for a period of clear water with quiet conditions. It would appear that in such circumstances *Monocraterion* flourished, and spread abroad its tentacles with the greater confidence. In other more clayey layers the impressions of the rays are not so distinct.

About an inch below the top layer (above referred to) another mica-coated surface is spread out, and here the prints of the tentacles again become more frequent and distinct.

The size of the burrow in this genus, and its form, recall Mr. Kinahan's genus *Histioderma*. But although in two cases at the ends of the tentacles of *Monocraterion* there is an appearance of forking, so many other of the rays show no appearance whatever of dichotomy, but go straight out from the burrow in a simple ray, that I assume the appearance in these two cases is deceptive, and that there is no genetic relation between this form and *Histioderma*.

I have followed Torell in referring this form to the Worms; but there are characters which point to other branches of the Animal Kingdom, e.g., Coelenterata. Less questionable Annelid burrows and casts occur in the same layers with *Monocraterion*. Between the rays and the burrows or lairs of *Monocraterion*, the pits and galleries of *Arenicolites* (Torell's *Diplocraterion*) are not uncommon, and more irregular worm casts and trails are common.

The above remarks do not give a complete answer to the inquiry as to "whether the internal tentacular markings run up to the top of any given series of lateral and radial markings"; all that can be said is that they run up to the uppermost series. Including the Swedish and Canadian forms, *Monocraterion* ranges from the sandstones below the *Paradoxides* beds to those which belong to the *Olemus* zone.

Montreal.



## NOTE ON THE PRECEDING PAPER.

Mr. Matthew's interesting remarks, courteously enclosed in a letter to myself, will be welcome to workers in early Palæozoic strata on this side of the Atlantic. The important point seems to be that the uppermost series of impressions of the tentacles of *Monocraterion* runs over the more open part of the true burrow, and that other sets of impressions are found connected with the same burrow, a well-marked one occurring as much as an inch below the uppermost. This seems effectually to negative the idea that the various upper series are inorganic repetitions of the lower, through subsidence of several layers into the hollows left by the decay of the original tentacles. At the same time, if all the impressions are depressed on the upper surfaces of the layers, the tentacles were probably retractile, and left grooves as they withdrew. Mr. Matthew cannot intend us to conclude that the depressions were caused by the decay of the tentacles after *each* protrusion.

GRENVILLE A. J. COLE.

Royal College of Science.

## IRISH SOCIETIES.

## ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Nigerian Ram from Dr. Langley, four Squirrels from Mr. W. W. Despard, a pair of Wild Boars from the King, three pairs of Zebra Finches from Mr. A. E. Goodbody, a Crossbill from Mr. N. Mulvey, a Hare from Mr. J. H. Carbery, a Plover and eleven Gulls from Mr. L. F. Perrin, a Monkey from Mr. R. M'Kechnie, and a Seal from Mr. G. Shannon. Nine Monkeys, two Ruffed Lemurs, six Prairie Marmots, a Capybara, twelve Java Sparrows, twelve Manakins, two Lovebirds, a pair of Chimpanzees and a Sea-lion have been purchased. A Llama, a Lemur, two Racoons, three St. Kilda Lambs, and a Pigmy Calf have been born in the Gardens.

**BELFAST NATURALISTS' FIELD CLUB.**

JUNE 8.—BENDERG BAY.—The train arrangements of the County Down Railway allowed of an hour being spent at Downpatrick. The Secretary conducted the members through the Cathedral. Another member gave a history of the ancient cross. Leaving the Cathedral the party proceeded to the ancient rath. Returning to the station the party witnessed the start of a flock of seventy-five pigeons of the Ayr Homing Pigeon Club.

Some additional members having now joined, all proceeded by train to Ardglass, where cars were taken for Benderg Bay. Here the party dispersed, some along the shore, some to the top of the cliffs, to pursue their respective hobbies. Benderg Bay is a fine stretch of sand bounded at the north by Killard Point. Just beyond the high-water mark rise the steep cliffs of conglomerate with interstratified sands. The geologist places them as the product of interglacial times. Many of the rocks on the headland show the result of glacial action either in their rounded shapes or by the presence of well-defined striations marking the direction of the motion of the glacier. Many of the members passed over to Gunn's Island in quest of birds. On the way home several antiquities were visited, and a rapid drive brought them to the Castle Hotel in Ardglass, where tea was partaken of previous to proceeding to Belfast. In the train members were enabled to compare notes on the day. Here the botanists exhibited their finds, which included the Wild Beet (*Beta maritima*) from Benderg, as well as some rare grasses and mosses. Thirty-eight species of birds were noted. In the sandy cliffs of Benderg the Jackdaw builds its nest at the end of sand burrows; here also the Shel-drake was found breeding. On Gunn's Island three species of Tern were observed and eggs obtained, together with those of the pretty little Winged Plover. The conchologists had a busy time collecting shells on the shores of the two days—one lady securing *Trochus lineatus*, which is a local rarity. The beetles came in for some attention, and the records amply rewarded the members who pursued this branch of natural history. As a result of the day's work many intend to revisit this comparatively new but very interesting district to pursue a more detailed examination than could be effected in the all-too-short time of a single excursion.

JULY 18-20.—DUBLIN AND DISTRICT.—The proceedings of the joint Clubs at the Third Field Club Conference will be found on pages 140-141. The Belfast Club was represented by sixteen members, including Messrs. Heron, W. H. Patterson, Robert Patterson, J. St. J. Phillips, and the Rev. Father Quail.

### DUBLIN NATURALISTS' FIELD CLUB.

APRIL 2.—MR. J. E. PALMER in the chair.—DR. S. H. PETHYBRIDGE read some "Notes on the correlation between Plant-structure and Plant-habitat." A paper by Mr. J. N. LAIRD on the occurrence of Galena and Calcate in Carboniferous Limestone was communicated by the Secretary (Dr. Patten).

MAY 4.—EXCURSION TO PORTRAINÉ.—The first excursion took place, the venue being Portrairie. A party of twenty-four members and visitors, under the conductorship of Mr. H. J. Seymour, left Amiens-street by the 1.50 p.m. train for Donabate, and walked down to the shore below the Coastguard Station. A halt was made here, during which the conductor gave a short account of the geological structure and peculiar interest of the locality. The party then walked along the shore, and the conductor pointed out and explained in detail the various points of geological interest which had been referred to just previously. Some good specimens of barytes, which occurs in veins in the andesitic lavas near the harbour, were obtained, and also, amongst others, numerous specimens of the fossil coral *Halysites catenularius* from the Bala limestone further south. At about 6.30 p.m. the party returned by an inland route to Donabate, where tea was provided. At a business meeting held subsequently, Dr. Pethybridge in the chair, two candidates were proposed for membership.

MAY 25.—EXCURSION TO THE GLEN OF THE DOWNS.—Twenty members, under the guidance of R. Ll. Praeger, travelled by the 1.45 train to Greystones, and drove thence through Delgany to the Glen of the Downs. They then moved through the wood to the "View Rock," on the western side of the Glen, where an excellent survey of the scenery and geology of north-eastern Co. Wicklow was obtained. Egg cocoons of the scarce local spider, *Ero furcata*, were found hanging beneath the loose stones of the walls on the way up, while among the crags near the summit the White Beam Tree (*Pyrus Aria*) was noticed, and here undoubtedly native. A descent by glissading over the vast beds of the Great Wood Rush (*Luzula sylvatica*) was made, and the party returned on foot to Greystones by way of Killincarrig. After tea, the 8.45 train was taken back to town.

### CORK NATURALISTS' FIELD CLUB.

MAY 15.—The first excursion of the season took place to the Queen's College. There was a large attendance of members. Prof. M. Hartog, D.Sc., conducted the party through the Museum, and carried on a running scientific commentary on the various objects relating to the natural sciences. His lecturettes were much appreciated, note-books being greatly in evidence.

## IRISH FIELD CLUB UNION.

### THIRD TRIENNIAL CONFERENCE.

The third triennial Conference of the united Field Clubs of Ireland was held in Dublin on June 18 to 22. The proceedings opened with a reception given by the Dublin Club to the visitors at the Royal Botanic Gardens, Glasnevin, on the evening of June 18. The party included a number of members of the North Staffordshire Club, who were then concluding a week's excursion to the Dublin district. Tea and coffee were served in the open air, and the Curator of the Gardens, Mr. F. W. Moore, F.L.S., acted as conductor to the visitors, and demonstrated the most interesting features of the outdoor and indoor collections.

On Wednesday morning, on the kind invitation of the Royal Zoological Society of Ireland, a visit was paid to the Zoological Gardens in the Phoenix Park. In the unavoidable absence of the Secretary (Prof. J. D. Cunningham, M.D., F.R.S.), Dr. Scharff acted as conductor, and several interesting and instructive hours were spent in examining the very fine collection of animals. At 2.0 p.m. the party were received at Trinity College by Prof. E. Perceval Wright, M.D., and were shown by him over the College buildings and grounds. Later in the afternoon they assembled in the Science and Art Museum, where Mr. George Coffey, M.R.I.A., conducted them over the Royal Irish Academy's collections, drawing attention to the value of the various groups of objects in demonstrating the principles of pre-historic chronology. Subsequently the members were received in the Botanical Division by Prof. T. Johnson, D.Sc., who showed the systematic and economic collections of plants and plant products. Especial interest was taken in the seed-testing apparatus recently installed by the Department of Agriculture, and already fully employed. In the evening some members visited the sand-dunes of the North Bull, under the guidance of Mr. J. N. Halbert, while others followed Mr. H. J. Seymour to the cromleacs of Shangannagh and Glen Druid.

Thursday was devoted to a whole day excursion to Glendalough. The party travelled to Rathdrum by the 10.10 train, and thence took cars to the Valley of the Two Lakes. Time permitted of a tolerably thorough but rapid examination of the many antiquities and of the lake-shores, and a very enjoyable day was spent, rain which came on towards evening interfering but slightly with the day's programme.

On Friday morning the naturalists of the party took the 9.15 train to Portmarnock, whence they walked over the sand-hills and northward to Malahide, collecting many of the characteristic plants and animals of that rich locality. The antiquaries visited Christ Church Cathedral, where they were met by Sir Thomas Drew, R.H.A., under whose skilled guidance they visited every portion of the buildings. In the afternoon

all assembled at the Natural History Museum, where Dr. Scharff, Mr. Carpenter, and Mr. Nichols demonstrated in turn the study collections, the general collections of invertebrate and vertebrate animals, the collection of Irish animals, and the geological and palæontological collections. Dr. and Mrs. Scharff kindly entertained the party to tea. In the evening the Field Club Conference was held. In the unavoidable absence of Mr. F. J. Bigger, President of the senior Club, the chair was taken by Prof. G. A. J. Cole. The short address which Mr. Bigger had intended to deliver was read by the Secretary (Mr. Praeger). Mr. Carpenter followed with a paper on "The Dublin Museum: and Irish Naturalists." Prof. Cole gave an address on "Scenery and Geology in Dublin and Wicklow," pointing out, with the aid of a large series of lantern slides, the geological significance of the various natural features viewed on the excursions of the preceding days. Mr. Praeger spoke on "The Present State of our Knowledge of the Irish Flora," and exhibited a series of maps illustrating the history of botanical research, and showing which portions of the country were now most in need of attention at the hands of the field botanist. Mr. R. J. Ussher drew attention to the important work that lay open to Field Club members in the domain of ornithology, and especially emphasized the desirability of extending our knowledge of the distribution of birds, and of enlarging the collection of Irish bird skins in our National Museum. The remaining speakers included Mr. W. H. Patterson (Belfast), and Mr. Abraham Shackleton (Dublin).

On Saturday morning the final excursion of the meeting was held. The party took tram at 10 o'clock to Howth, and proceeded by the cliff walk to above the Bailey lighthouse, whence they crossed the hill to the cromleac, and descended through the demesne to Howth town, where lunch was served at the St. Laurence Hotel. The 4.5 train brought the members back to town, where the party broke up.

## NEWS GLEANINGS.

### The Cave Committee's Work.

The work of exploring Irish caves has been successfully undertaken this season in the County of Sligo. Keshicorran Mountain was visited the third week in May by Dr. Scharff, Mr. Coffey, Professor Cole, and Mr. Ussher. Mr. Plunkett, of Enniskillen, also paid these members of the Committee an opportune visit at their work. The digging out of one cave was carried on for more than a fortnight, with satisfactory results. Strata of different ages were discovered, and the objects found in them respectively have been carefully labelled and kept separate. The upper stratum yielded from all parts of the cave relics of a human settlement; among these objects were a stone celt, bronze pins, and many other evidences of the earlier stages of civilization in Ireland.

Beneath this was a stratum of clay, in which remains of bears were present all through the cave. The large collection, now awaiting determination in the Science and Art Museum, also comprises the remains of several other wild animals, and particular attention has been paid to the preservation of the very smallest bones.

### **The Dublin Zoological Gardens.**

The Gardens have never looked to better advantage than at present, and they contain a remarkably interesting stock of animals. It was recently announced in the papers that the King had been pleased to present some of his famous Indian Wild Boars to the Dublin Gardens, but it is, perhaps, not generally known that these fine examples of the pig tribe were captured with great difficulty in Windsor Park, before being placed in cages to be transported to Ireland.

The Society has been particularly fortunate lately in the lion-breeding industry, which is now known to be more successfully carried on in the Dublin Gardens than anywhere else in the world. Three young lions were born during June, and there can now be seen a whole series of baby lions in all stages of growth. The new Lion House, which is being erected, is now above ground, and will give visitors a good idea of the fine quarters which the rising generation of Dublin lions will possess.

However, the young lions are not the only new arrivals. One of the most remarkable and noteworthy events which has happened in the Gardens for a great many years is the birth of a young lemur. The animals are great favourites with visitors for, while active and indulging in amusing gambols, they never show any bad temper, so frequently manifested by their more advanced relatives the monkeys. Though the latter rise above the lemurs in brain-power, they fall below them in conduct. The birth in captivity of either monkey or lemur is an unusual event, for few Zoological Gardens can boast of having reared a young of either of these groups.

A couple of Chimpanzees have lately been purchased. Although still young, one of them, the female, is already a fine tall creature, and both are in magnificent health. Those who still treasure the memories of the departed Sindbad, the Orang-Utan, and of Johnnie and Tom, the Chimpanzees, have long looked in vain for their successors. We are glad they have now arrived, and we hope that they will live here even longer than Tom, who spent nearly five years of his existence in Phoenix Park.

One more new arrival has still to be mentioned, viz. ;—the Sea-lion. The docility with which the Sea-lion obeys the commands of its keeper and the certainty with which it catches the fish thrown to it are daily witnessed by large crowds.

### **Professor D. J. Cunningham.**

The learned Secretary of the Zoological Society, Professor D. J. Cunningham, F.R.S., has received the honorary degree of LL.D. from Glasgow University. We heartily congratulate him on this well-deserved honour.

## NOTES.

### PRACTICAL MICROSCOPY.

A new series of articles, dealing with the practical side of Microscopy, together with notes and queries, correspondence, and description of new apparatus, are appearing each month in *Knowledge*, under the editorship of M. I. Cross (the joint-author of the well-known handbook "Modern Microscopy.")

### BOTANY.

#### A New Variety of *Polystichum angulare*.

In visiting the garden of my friend, the Rev. Humphry Davy, last autumn, I noticed among his collection of native ferns one which was new to me, and which I believed to be unknown elsewhere. It was a variety of *Polystichum angulare* whose peculiarity was that the stipes and the rachis, not alone of the frond, but those of the pinnæ, and even of the pin-nules, took a sinuous course, winding, as a river, with numerous short bends, winds through a plain. With the permission of Mr. Davy I submitted a frond to the Secretary of the British Pterodological Society, and suggested *sinuosum* as a suitable name, in case the variety should be accepted. Soon after, on November 24, I heard from the President of the Society, Charles T. Druery, and on December 1 Mr. Druery wrote as follows:—"Many thanks for the fronds of *P.a. sinuosum*, a name which we may now safely adopt, as the flat character undoubtedly discriminates it from Mr. G. B. Wollaston's form. It is very curious and interesting." The fern which has thus been definitely added to the list of varieties, was found by Mr. Davy in the Dargle some twenty years ago. It has been constant ever since. An offshoot, given me by Mr. Davy last year, shows clearly and throughout the marked sinuous formation.

H. KINGSMILL MOORE.

Kildare-place, Dublin.

#### *Habenaria intacta* in Clare.

During the month of June Mr. P. H. Grierson has forwarded me fresh specimens of *Habenaria intacta* from two new stations in Co. Clare—the first one mile E.S.E. of Lehinch, the other a mile nearer Ennistymon. Besides showing a southward extension of the range of this rare plant, these stations offer another point of interest. Both are situated on the Coal-measures, some six or eight miles from the nearest limestone, whereas all previously recorded stations are on the limestone, and generally from ground where the bare rock lies on or near the surface.

R. LLOYD PRAEGER.

**ZOOLOGY.****Foraminifera.**

I wish to plead for further workers in this most interesting and little-worked branch of scientific research. The British Isles can boast of probably not more than some twenty serious students of this subject. Yet the study of Foraminifera is so engrossing and full of interest that anyone with the least taste for research, or with even a modified tendency towards collecting, would only have to take a cursory glance through a microscope at some of these minute wonders of the marine floor to be at once seized with the desire to know and see more of them.

A great advantage to anyone endeavouring to decide on some way of filling leisure time is that the cost of the apparatus and material necessary to study Foraminifera is not great. From £12 to £15, or less, will obtain practically all that is necessary for commencement. The requirements are: a microscope, binocular for choice, with inch and  $\frac{3}{4}$ -inch power; a condenser, some microscope slides, a fine camel's-hair brush, and some marine ooze, mud or sand. Other small requisites can be obtained for a mere trifle.

The sea bottom from almost any place is generally found to be teeming with these minute animals or their tests, otherwise shells. There are very few of us without the means of obtaining a sample from our own coasts, which have not yet been adequately searched, as it is proved by the continual additions to the list of Irish Foraminifera. Therefore, without going further, plenty of interesting home research remains to be done by earnest workers. Fossil Foraminifera, if not so numerous, present another sphere of action, of great geological interest. For example, suppose one has obtained from the Arctic regions a sample of some marine deposit of bygone days. Search among the material is practically sure of reward by finding specimens of Foraminifera, of course in a fossil condition, now only represented in its living or, as it is termed "recent state," in the Equatorial regions of the earth. The inference to be drawn is that where the specimen on the slide was living it occurred in a climate not far removed in temperature from that of our Equatorial regions, where the identical species is now to be obtained in a living form, unless our material was carried by some pre-historic Gulf Stream, to the Arctic regions, and so deposited. Is not an enigma such as this enough to induce anyone to take up the study of those wonderful microscopic shells, and try to prove by analogy, circumstantial evidence, or some means why a species should be found fossil and living in such widely differing temperatures?

I shall be most happy at any time to help, so far as I can, by advice or any other means in my power, anyone who may care to look even into the fringe of this far too little known study.

W. B. THORNHILL.

Castle Bellingham.



### Peacock Butterfly near Derry.

While driving on the Racecourse-road near Derry, not far from the spot where last year one was taken by Miss Campbell, I saw a Peacock Butterfly (*Vanessa io*). It will be interesting to observe whether it increases in numbers in the coming season.

W. E. HART.

Howth.

### Longevity of Land Mollusca.

On October 18th, 1896, Master Arthur W. Stelfox and I collected forty specimens of *Helix aspersa*, the shell usually known as the "Garden Snail," at Whitepark Bay, North Antrim coast. A proportion of these were then adult, fully a year old, and the remainder half or three quarters grown. Of these all were alive in January, 1898; thirty-six living December, 1899; thirty, June, 1900; twenty-four, August, 1900; twenty, October, 1900; and the latter, which included two of the shells adult when collected, were still alive and feeding actively on lettuce on June 6th this year. If any of these survive till October 18th, they will be at least five and a half to six and a half years old. Very few of the molluscs died in winter, they almost all died in the hot summer months, and those adult when collected survived many of the younger specimens. Some of the latter completed the shell well in captivity, others did not. Well-known conchologists in England who have made a special study of this species tell me they know of no case where it has lived so long, and I am keeping and feeding the specimens most carefully to see how long they really will live, when protected from natural foes, though under conditions very different of course from their native habitat.

R. WELCH.

Belfast.

### New Inland Station for *Hydrobia* (*Paludestrina*) *Jenkinsi*.

Last year while working Lough Neagh at Maghery, Co. Armagh, my wife found a dead specimen of *Hydrobia jenkinsi* on the shore; and on the chance of discovering a living colony I visited the locality again at Easter, with the result that at the "Bann-foot" (where the Upper Bann enters the lake) I found the sand and vegetation literally covered with the shell. Mr. H. L. Orr has since confirmed this find by visiting the spot.

Mr. Welch tells me that a keen search on the opposite side of the lake, at the mouth of the river at Antrim, on several occasions two years ago, resulted in only two specimens (alive), which came up in the dredge. It is curious to find it so scarce at Antrim and plentiful at Bann-foot. This find proves the species to have a wide distribution in the north-east, as it has now been recorded from Derry (Portstewart), Antrim, Down (Newry), and Armagh; and though local, the colonies are very large except in the case of Antrim.

WM. A. GREEN.

Belfast.

### Destruction of Cherry Trees by *Semasia wæberiana*.

Last year my gardener having called my attention to what he called "canker" in one or two cherry trees, I found the injury to proceed from the ravages of a wood-boring lepidopterous larva which I failed satisfactorily to identify, and suspected that they must be either *Sesia culciformis* or *S. myopiformis*. But in the first week of this present month of June I was at Berkhamsted, Herts., and examined a standard cherry which was thus affected, and every morning found freshly emerged imagines of *Semasia wæberiana*, as well as pupa cases newly extruded. On excavating some galleries in the unsightly swelling that disfigured the tree, I discovered that though shallow, they penetrated the wood itself, and were not confined solely to the cortex and cambium.

Any pupæ I found were spun up in slight cocoons with grass interwoven, outside of the opening of the borings. It is easy to detect a colony of these moths by the abnormal growth which the injuries give rise to. The bark dies and curls up and outwards in strips, and masses of gum exude, the cambium swelling out in wart-like excrescences, which result in the trunk or stem becoming tumid and disfigured; and eventually the tree or that part of it above the swelling dies. It would seem that if the stems which are showing signs of being attacked were painted over about 1st June with some mixture containing tar and paraffin in safe proportion, the moths would be prevented from laying their ova, and the evil might be arrested.

WM. FRAS. DE V. KANE.

Drumreaske, Monaghan.

### White Wagtail at Bartragh, Co. Mayo.

On the 12th of May, Captain Kirkwood saw a pair of *Motacilla alba* on a damp sandy flat near the garden at Bartragh, and on the 20th Mr. A. C. Kirkwood saw a solitary bird on the lawn outside the parlour windows. From the fact that this Wagtail has, during the migratory months of April and May, been seen in 1898, 1899, 1900, and 1901, and specimens obtained in the two first-named years, it may be safely assumed that this species, regularly every season, passes over Bartragh Island on its northern journey—probably to Iceland. As far back as April, 1851, I obtained a specimen on the Island of Bartragh, and on the 29th of April, 1893, I met a pair on the sandy flat outside the garden (where Captain Kirkwood saw them this season), and shot one bird, the other escaping and flying right off the Island. I have no doubt but, if a sharp look out was kept in April and May, these birds would be seen every season; but, very unfortunately and so much to be regretted, the state of health of my old and valued friend Mr. A. C. Kirkwood prevents his keeping that close observation of all visitors to the Island that he usually did, and so the visits of the White Wagtail are often unnoticed.

ROBERT WARREN,

Moyview, Ballina.

### Breeding of Wigeon in Ireland.

Early in May, 1901, Mr. John Cottney sent me some duck's eggs and down which he took near a lake within thirty miles of Belfast. Not having any similar down for comparison, on the 18th May, accompanied by two friends, I visited the lake and we were fortunate enough to find a clutch of exactly similar eggs, and flushed the female off the nest. When on the lake I saw several pairs of Wigeon. I sent the eggs and down to Mr. Ussher, and he, after careful comparison with authentic Wigeon's down and eggs, informs me he has no doubt whatever that they are Wigeon's. It is most satisfactory to be now able to include the Wigeon with certainty among the breeding birds of Ireland, and I have to thank Mr. Ussher for the great trouble he took in the matter.

Belfast.

ROBERT PATTERSON.

### The Dunlin breeding in Ireland.

In the latter end of May, 1885, I obtained evidence for the first time of the Dunlin (*Tringa alpina*) breeding in Ireland, in County Westmeath, on the shores of Lough Sheelin. The eggs were submitted by me to authorities in Dublin and in London, and were not recognised by them as Dunlins, but stated to be varieties of the Common Sandpiper. Since then by adopting other measures I have unquestionably verified my first observations of the Dunlin breeding on this lake. On May 22nd, 1901, I found quite a colony of Dunlins breeding on another Westmeath lake. Twenty pair, at least, would be a minimum estimate if anything of the actual number. I had them under observation for a week, and had the opportunity of photographing the adult birds both beside the nest and sitting on their eggs; they were very tame, and had a most pleasant and melodious little twittering song, somewhat resembling the distant clicking of a fishing-reel, only much softer in tone. I saw as many as twelve birds together at a time in one place. The nests were built in exceedingly short grass, some twenty paces from the lakeshore, and lay midway between the shingle on which Ringed Plover were nesting and the longer grass in which Redshank and Sandpipers were breeding. Although there was heather and marshy ground in the vicinity no Dunlin appeared to be breeding there. In looking up the literature on the subject of the Dunlin breeding in Ireland I was surprised at its scanty nature. Howard Saunders states—"In Ireland it is only known to nest in small numbers in the north-west." Mr. More that—"A few breed on the *bogs* and *moors* in the west and north of Ireland." Mr. Ussher—"The Dunlin has a wide range in the breeding season, and has been found nesting on elevated mountains, as well as on low-lying lake-shores in the centre of Ireland and marshes near the sea."

Mr. E. Williams very kindly came down to see the colony on receipt of a telegram from me. On minute examination of the birds he was of opinion that their plumage was different from that found at the same time of year among Dunlin on the sea-coast. These breeding birds were also of the long-billed variety of Patten.

Bray.

E. BLAKE KNOX.

**Breeding Habits of the Squirrel.**

As an inquiry was made some years ago in the *Irish Naturalist* as to the time of year at which young Squirrels are born, I may mention that a drey at Ballyhyland was examined this year by a boy on April 21st, and proved to contain five young, very small, with eyes still unopened. Last year a nest in the same tree was examined in May, and then contained young of a more advanced age. In 1898 I saw a drey which was freshly lined for the receipt of young on June 24th. This, according to Bell and other writers, would be the usual time of birth, but I see no reason to doubt the correctness of Mr. Barrett-Hamilton's conjecture that Squirrels breed twice in the year both here and in England. That they do so in England is indeed distinctly asserted by Mr. George Dewar, who in his interesting book "Wild Life in Hampshire Highlands," p. 290, says "they have two sets of young, one in April and the other in July."

C. B. MOFFAT.

Ballyhyland, Co. Wexford.

**GEOLOGY.****Pisolitic Iron Ore in Lough Neagh.**

When dredging in Lough Neagh, May, 1900, between Sandy Bay and Ram's Island, with Messrs. R. Patterson and H. L. Orr, we took in some hauls of the dredge several ounces of pisolitic ore. Some of this I sent to Prof. G. A. J. Cole, M.R.I.A., who states that "some of the spheroids show the characteristic concentric structure when broken open. A little carbonate of iron is present, but the main mass consists of limonite as usual." Similar deposits are found in Sweden and in sufficient quantity to be dredged and worked commercially as iron ores. It would be interesting to know whether this material in Lough Neagh is now forming. If so it is an interesting parallel to the Eocene pisolitic lake-deposits of the Antrim basalts. These are mined for iron ore in several places in the county, notably above Glenarm. There is a chance of course that the material is derived from some local deposit of Eocene age, but I have taken the same material in the dredge in smaller quantities in the northern part of the lough also.

R. WELCH.

Belfast.

[As Mr. Welch's record of an extremely interesting observation passes through my hands before publication, I should like to ask the attention of botanists to the possible relation between the ferruginous deposit and any algæ that may be prevalent in the same portion of Lough Neagh. The granules themselves may perhaps yield algal filaments on solution.

GRENVILLE A. J. COLE.

Dublin.

## IRISH TOPOGRAPHICAL BOTANY.

BY C. B. MOFFAT.

It is a pleasure to welcome the appearance of Mr. Praeger's long-projected "Irish Topographical Botany,"<sup>1</sup> the preparation of which has entailed on its author an expenditure of time and energy such as few can realise. In his preface Mr. Praeger claims for his work that it forms "forty exceedingly condensed county floras," and the claim is fully justified when the contents of the book are examined. This is more—and a good deal more—than we had a right to expect from the title; for Watson's "Topographical Botany," in setting out the comital distribution of plants in Great Britain, stopped far short of what Mr. Praeger has done. Mr. Watson gave for each species (except very common ones) a list of the counties for which it had been recorded, naming his authority for the record in each case. No localities, however, were mentioned, nor was any attempt made to estimate a plant's frequency or rarity in the different counties separately. Mr. Praeger goes carefully into details of this kind; he makes it a rule (except in the case of the most universally distributed species) to give *at least one locality in each county* for every plant, often adding two or three for the more interesting, and always indicating at the same time whether other localities are on record or not, as well as whether the plant is frequent, local, or scarce in the county. In most cases, too, an interesting short note on the general character of the range is appended to the list of county records. Thus every page in the volume is replete with interest to botanists, and the work is in no sense a mere index to existing records, as Watson's to a considerable extent was.

The author purposely refrains from going over ground which has already been traversed by the editors of the *Cybele Hibernica*, stating that he wishes his book to be regarded and used as a companion or supplement to that standard work on Irish botany. This principle of companionship to *Cybele Hibernica* has in some respects been carried to lengths that will rather surprise those who read Mr. Praeger's review of

<sup>1</sup> **Irish Topographical Botany.** Compiled largely from original material. By R. LLOYD PRAEGER, B.A., B.Sc., M.R.I.A. *Proc. R.I.A.* (3) vol. vii., 1901, pp. clxxxviii + 410, 6 maps. Price, 10s.

that book.<sup>1</sup> For instance, the nomenclature adopted in *Cybele* is followed absolutely, and the arrangement of genera and species is nearly the same in both books. The author rightly remarks that agreement in these matters is highly convenient in facilitating reference from one book to another, and he has, therefore, followed Messrs. Colgan and Scully at the cost of some suppression of personal views.

This sacrifice, however, brings into stronger relief the salient feature which renders the use of Mr. Praeger's book as a companion volume to *Cybele* strangely difficult: that is to say, the sub-division of Ireland into areas which are not always subdivisions of the Districts of *Cybele*, and whose numbering is entirely independent of the numbering of those Districts. For instance, Mr. Praeger's division 4 (Mid-Cork) lies partly in District I. and partly in District II. of *Cybele*. The two counties which form District IV. are numbered by Mr. Praeger 12 and 20, and the two which form District VIII. figure as 16 and 27. Thus it is by no means easy to bear in mind what numbers in "Irish Topographical Botany" correspond to given numbers in *Cybele*, and this is a serious impediment to those who wish to see how far the range of a plant as stated in the earlier volume is supplemented by the information given in the more recent one. This feature is hardly in keeping with the character of a companion volume. Mr. Praeger, in anticipation of criticism on this score, says in his Introduction that "The advantages of grouping the divisions under the twelve botanical districts employed in *Cybele* are slight in comparison with the suggestive facts of plant-distribution brought out by the adoption of a regular progress from a lower to a higher latitude, from a higher to a lower temperature." There is truth and force in this; but one cannot help seeing that at bottom it is an argument in favour of a further scheme which may combine both the advantages in question; in other words, it is an argument for abolishing the twelve Districts of *Cybele Hibernica* in favour of others corresponding more nearly with Mr. Praeger's sub-districts. The *Cybele* Districts, however, have been so long in use that great inconvenience would attend the carrying of Mr. Praeger's system of division to its

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<sup>1</sup> *Irish Naturalist*, vii., pp. 273-85.

logical consequences, and it is also evident that his forty areas, as numbered by himself, would not lend themselves to any plan of compact grouping.

Coming to the details of the county records, it is important to note the author's caution that these "cannot be understood without a knowledge of the explanatory portion of the Introduction" It would, indeed, be very easy for anyone making a hasty effort at using the book to be seriously misled. Thus, Mr. Praeger quotes, by preference, the *latest* records of the findings of a plant; so that anyone consulting his book in ignorance of this rule might be led into supposing that *Naias flexilis* was unknown in Ireland until 1896, the records being as follows:—

1. Kerry, S.—Glencar, '99.—Scully. Lough Caragh, '96.—Scully, *Cyb.* II.
2. Kerry, N.—Killarney, '99; south only, very rare.—Scully.
- 16 Galway, W.—Lough Cregdluff, '96.—P.

Of course, students of *Cybele* are well aware that the first discovery of this plant in the British Isles was in its West Galway station in 1850, and that it was found in South Kerry in 1876, and in North Kerry in 1885. The records quoted above therefore illustrate a contrast between the plan of *Cybele Hibernica*, in which the historical element is conspicuous, and that of the present work, in which it is altogether ignored.<sup>1</sup> Another rule stated in the Introduction is as follows:—

"The use of the words 'rare,' 'frequent,' &c., invariably implies the existence of records additional to those which are given. Conversely, the absence of such words may be taken to imply that no stations are known to the compiler beyond those which are quoted." This is a highly ingenious method of giving condensed information; but to those attempting to use the work without a preliminary study of the Introduction, it will prove a veritable pitfall.

The county records are in themselves surprisingly full, the small county of Monaghan being the only one whose ascertained flora still falls short of 500 species. It is impossible here to avoid expressing our sense of the immense debt of gratitude which Irish botanists owe to Mr. Praeger for the almost

<sup>1</sup> Perhaps it would have been a good rule to select, instead of the latest record, the most central locality known in each division, thus indicating the uniformity of a plant's distribution.

unlimited amount of energy which he has thrown into the work of personally exploring those large tracts of ground which had hitherto appeared least attractive to our field naturalists. It was, indeed, already a matter of common knowledge that he has added largely to the available data for nearly every county; but the appearance of this *magnum opus* brings the fact before us in a new and welcome form. The work is a supplement to *Cybele* in more senses than one. However, the numerous additional "district records" which have already been published in the *Irish Naturalist* form a feature essentially different from the main and legitimate object of the book, *i.e.*, that of giving more minute topographical particulars than the plan of *Cybele* allowed of; and it is by the degree of success which has attended this aim that the merits of "Irish Topographical Botany" must be chiefly judged.

So far as very rare species are concerned, *Cybele Hibernica* gives all recorded localities with a greater fulness than Mr. Praeger's plan (one line to each county with a record) admits of. Consequently, the special value of the work under notice is its presentation of the records for plants not so rare as to call for enumeration of localities in *Cybele*. The care with which this has been done is such that it would scarcely be possible to wish for a better book on so ambitious a plan. To criticise the details at all it is necessary for a reviewer to take the county with which he happens to be best acquainted, and in doing this one must not lose sight of Watson's reply to his anticipated local critics, that "in a compilation concerning itself with *all* the counties, a hundred oversights or omissions would be only equivalent to a single such defect in one of their own county lists."

Taking, then, the county of Wexford, we can note a few instances in which Mr. Praeger's records for plants found in this division are not followed (as, in accordance with his rule, they should have been) by any of those "implicatory" words—"rare," "frequent," "not rare," &c.—which mean that other localities besides those cited are known to the author. Such oversights occur in the cases of *Papaver rhœas*, *Lychnis diurna*, \**Hypericum calycinum*, *Arctium minus* (perhaps here from suspicion of error), and *Mentha sativa*. *Osmunda regalis* is



incorrectly described as “now extremely rare” in the county; though its range is reduced, there are places where it is still abundant, and likely to remain so. The note on *Pinguicula lusitanica*, “N.E., chiefly, rare,” is misleading, as this butterwort is common in all the bogs of the N.W., where *P. vulgaris* is absent. As to the last-named plant, we are sure Mr. Praeger has authority for including it in the Wexford flora, but no localities are known to us; while we should certainly have considered *Antennaria dioica* rare, instead of “more or less frequent,” in the county. To criticise further we should almost have to inquire into the shades of meaning which separate “not rare” from “frequent,” and “very frequent” from “common.” If for every county the main result is as accurate as for Wexford, the whole is excellent indeed.

Six coloured maps add greatly to the interest and attractiveness of the volume. The large map of “Ireland in forty botanical divisions” (Plate I.) is particularly good, and the petrological map, in nine colours (Pl. V.), also deserves special notice. Plate II., showing the “progress of field work,” is perhaps of more personal than botanical interest, and we question whether the section of it which aims at showing the “state of county lists in 1895” conveys an impression quite fair to previous explorers. Ought Division 15 (south-east Galway), for instance, to have been left uncoloured, implying that no work of importance had been done there? More’s “Notes on the flora of the neighbourhood of Castle Taylor” supplied material from which a list of more than 200 species might easily have been made. True, More named in that paper only some 130 out of the total of 432 species which he mentioned having found about Castle Taylor. But he added to those 130 a list of all the most common plants which he had *failed* to find, and, as he used Watson’s census-figures as the criterion of frequency, this was only another way of stating what species of equally high census rank (*i.e.*, 15 Provinces) occurred at Castle Taylor. It does not therefore seem very accurate to include the county-division among the many whose ascertained floras did not, on the average, exceed 100 species.

The Introduction contains an excellent brief account of the physical and botanical features of each division, stating in every case the area, prevalent geological formation, per-

centage of mountain, pasture, and arable land, highest elevation, principal rivers, general character of the flora, and numbers of species in it. A list of the rarest plants found in the county is also in each case subjoined, and the only additional feature which we could wish to have seen included would be a corresponding list of the commonest species *not* ascertained to occur.

Another important feature in the Introduction is a very full bibliography of Irish botanical records. This includes unpublished as well as published material; but we miss from it reference to a MS. list of 634 plants found in Co. Wexford, which has sometimes been cited in the text and is also referred to at p. xcvi. in the author's list of contractions. Although partly a compilation, it contained original records for some 570 species, and should therefore have been represented by an A in the right-hand column on p. lxxxv., and also noted on p. ci.

Misprints are remarkably rare, and place-names are given with remarkable fidelity. The census figures for *Orobancha hederæ*, *Mentha sativa*, and *Populus tremula*, do not, however, correspond with the number of county divisions for which records are quoted.

Ballyhyland, Co. Wexford.

## NEWS GLEANINGS.

Professor A. C. Haddon.

We learn that Prof. Haddon intends to resign the chair of Zoology in the Royal College of Science for Ireland, which he has so ably filled since 1880. Since he ceased to reside in this country, his visit each autumn has been eagerly welcomed by his many friends, and it is with keen regret that we now think of the loss of his inspiring presence for those few months in each year. Still we hope that one who has done so much for Irish natural history will never become a stranger in the land. The foundation of the Dublin Field Club and of the *Irish Naturalist* were largely due to his influence, and their progress has been constantly helped by his sympathetic support. We understand that the ethnological studies, which have already brought him fame, will henceforth occupy him fully. Our hearty wishes for the ever-increasing prosperity of his brilliant career are tinged with sadness, for

“ Now his chair desires him here in vain

“ However they may crown him elsewhere.”

## SOME IRISH SPECIES OF FRESHWATER HYDRA.

BY A. H. TOPPIN.

THERE have been very few records of the freshwater Hydra in Ireland of late years, and it may be of interest to some readers to know that both brown and green species occur in the County of Dublin. The latter was obtained last year by Mr. Halbert in some quarry-holes near Crumlin, Co. Dublin; while Mr. F. M. Sellens found, in a pond at Sutton, Co. Dublin, both *Hydra viridis* and *H. fusca*, which he exhibited to the Dublin Microscopical Club (1, p. 95) Thompson (2, p. 459), distinguished four Irish species of *Hydra*, viz.:—*H. viridis*, Linn.; *H. vulgaris*, Pall.; *H. fusca*, Linn.; and *H. verrucosa*, Templeton; but as has been observed by Allman (3, p. 328), *H. verrucosa* is probably identical with *H. fusca*, while the name *H. grisea*, Linn., being older, should stand for *H. vulgaris*, Pallas.

About the beginning of May last, I obtained some specimens in a pond near Loughlinstown, Co. Dublin, which seemed to agree in most of the characters with *H. grisea*. They varied in colour from an orange-brown to a pale yellowish-brown, and in one case perfectly white; but this might have been due to confinement for a considerable number of days. In each specimen the body was cylindrical, and ranged from five to seven mm. in length. The tentacula, six to eight in number, were as long as, or rather shorter than the body; but in one specimen, when the body was contracted, they were longer. The thickest part of the body appeared to be the middle, and it gradually tapered towards the mouth and base, and, therefore, differed in shape from *H. fusca*. At the anterior end, the body broadened out, forming a kind of oval-shaped head surrounded by the tentacles.

All the specimens which I examined seemed to agree with *H. grisea* in shape, colour, and length of tentacles, but not in number, as *H. grisea* possesses from seven to twelve, whereas all my specimens never had more than eight (the white specimen having six only). In this respect they seemed to accord with *H. fusca*, but differed entirely from that species in all other characters.

Thompson records *H. viridis* as having been obtained at Bandon, Co. Cork, by Prof. Allman. *H. grisea* has been met with in the north, south, and east of Ireland, several specimens having been obtained at the Zoological Gardens, Dublin, in 1846, by Mr. Hyndman. *H. fusca* has also occurred in the north and east of Ireland (2, p. 459).

Prof. Leidy regarded the American green and brown types of Hydra as being identical with the European forms—*H. viridis* and *H. fusca* (4, p. 311); but the late Prof. Agassiz found them to be quite different, and named them *H. gracilis* and *H. carnea*, the chief differences being that *H. gracilis* has the power (not possessed by *H. viridis*), of extending the body in a remarkable degree; and *H. carnea* has very short tentacles, while *H. fusca* has very long ones (5, p. 354).

Prof. Leidy obtained both forms west of the Rocky Mountains, and these he found to accord in character with the European species. In specimens collected in a lake in the Uinta Mountains, Wyoming, at 10,000 feet elevation, the brown Hydra was at first brick red with a brighter red head, but after keeping it for a week, it assumed the pale brown hue, as ordinarily observed in the animal nearer home (4, p. 312).

*H. fusca* has been found in France at high elevations in the Alps, in Lac de Gimont and Lac de l'Ascension, whilst in Lac de la Roche it has been found along with *H. viridis* (6, pp. 43-61).

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Science and Art Museum, Dublin.

## THE DUBLIN MUSEUM AND IRISH NATURALISTS.

BY GEORGE H. CARPENTER, B.SC.

[Read before the Irish Field Club Union Conference, June 21, 1901.]

NATURALISTS who live in Dublin, in welcoming representatives of their colleagues from other parts of Ireland, have been anxious to show to the best advantage the opportunities now given by the scientific institutions of the capital for the study of natural and historical objects. Dublin naturalists willingly and cordially yield pride of place to those of Belfast as the pioneers in Irish Field Club work. In this, as in many other walks of life where initiative must be taken by the people, the North has led the way. But for the support of national scientific institutions we must, for the present at least, depend on a department of the Government, and these institutions have naturally grown up in that city which the Government regards as the capital of Ireland. It cannot be but that Dublin naturalists should benefit by these institutions more than do those who live far away from them. But though they must be placed somewhere, and Dublin is fortunate enough to house them, Dublin wishes them to be regarded not as local but as national—the property not of a city nor of a province, but of the country as a whole. And those whose daily work lies in these institutions are the most wishful that they should both deserve and command a widespread national interest.

If an institution be truly national, it should at once be useful to, and derive help from, those who throughout the land are students of its special subjects. In this paper the Natural History Collections of the Science and Art Museum will alone be dealt with. If the Museum is rightly regarded as the National Museum of Ireland, these collections should be able to claim the interest of all the naturalists in the country. The subject is therefore a fitting one for a Field Club Conference.

To the casual visitor a Museum consists solely of its exhibition rooms and the specimens contained therein. The things are there in the cases to be looked at and that is all about it. So deeply ingrained is this view in the unscientific public mind that a person of high standing and attainments has ven-

tured on the opinion that, the specimens once having been put into cases, the scientific staff of the Museum might as well be superannuated, and the institution left to the care of a few able-bodied men with dusters. But the modern Museum officer looks on the exhibition rooms under his care as a means for interesting and educating the people who pass through. Every specimen must be shown with a purpose, be naturally and artistically mounted, be clearly and intelligibly labelled, and be placed in proper relation as regards other objects. Let it not be supposed that we imagine this ideal to have been attained in the Dublin Museum, but this is what we aim at. Especial pains have been taken to place our specimens in proper relations to each other. The extensive re-arrangement which the collections have undergone to this end, have already been described in the *Irish Naturalist*,<sup>1</sup> The aim has been, in the general collection of animals, in the upper room of the natural history building, for example, so to arrange the specimens that the principles of animal classification cannot but be seen. It is hoped that even the casual museum visitor will not fail to be impressed by the zoological object-lesson offered to him. But a fair proportion of the visitors to our galleries are serious students, attached to the Royal University or to some other institution. These students come from all parts of Ireland, and through them at least the Dublin Museum can claim to do something for national education in its broadest sense. And the scientific culture of such students cannot but benefit the Irish Field Clubs.

As befits a department of a metropolitan Museum, the general collection will become, it is hoped, as full and as instructive as possible. But merely from considerations of space no attempt can be made in Dublin to rival the general zoological collections of such centres as London and Berlin. The department in which the Dublin zoological collections should stand pre-eminent is the representation of the Fauna of Ireland. This may seem a "local" subject to the visitor from Great Britain or from the Eastern or the Western Continent. But to us who inhabit the country and who regard the country as a topographical unit, its fauna is a matter of national interest. The "local" collection in the Dublin Museum therefore must

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<sup>1</sup> Vol. vi., 1897, pp 127-131.

illustrate as far as possible the fauna of the whole island. No smaller area will suffice, and this should establish a bond between the Museum and naturalists throughout the country.

It is well that the hall of our Museum which houses the exhibition collection of Irish animals should house also a small series illustrating the fauna of each of the great zoological regions of the earth. For study of Irish animals will be barren unless the facts presented to us are read in the light of the study of Geographical Distribution generally. Especial care has therefore been bestowed on a case showing some of the generalisations to which a study of the Irish Fauna seems to lead us—the mingling in Ireland of an ancient South-western with a less ancient Northern fauna, together with the absence from Ireland of the Eastern group of animals characteristic of the British lowlands.

The exhibition Irish collections will, it is hoped, some day contain a representative of every kind of animal inhabiting the country. It does not need much study of the collection to see, at present, how far from realization this ideal is. And now we come to see how naturalists throughout the country can help their national Museum. Let them take up and study some of the neglected groups of Irish animals. For example, the Mites, the smaller Hymenoptera and Diptera, several orders of the lower Crustacea and many of the Worms are waiting for investigators, and it may be years before any of the professional zoologists in the country can turn their attention to these groups.

But the visit which this Conference has paid to the Museum has shown the members that in those groups of animals which have received some attention, the specimens exhibited form but a very small proportion of those stored in cabinets for study and comparison. These study collections form the bulk of the Museum's wealth, and for the detailed work which will surely be some day undertaken on the better-known groups of Irish animals, such collections can hardly be too rich. At first sight these collections seem to benefit the naturalists resident in or near Dublin to the exclusion of dwellers in Ulster, Connaught, or Munster. But, as a matter of fact, workers in distant parts of Ireland can and do receive help from the Museum specimens. Much time is spent by the

Museum officers in answering inquiries about specimens sent up from the country for determination. The better the collection under the officers' care, the more readily and fully can they answer such inquiries. And not a few cases have arisen in which such correspondence has proved of the greatest benefit both to the inquirer and to the Museum, and tended directly to the advancement of science. An isolated worker begins to collect some group of animals. The identification of his specimens sent to Dublin for determination increases his interest in the study, and helps him to understand the system of the group; while his duplicates, gladly given, enrich the Museum collection, and will in years to come benefit other workers, and form a permanent record of the distribution of species in Ireland.

The growth of the Museum study-collections re-acts beneficially not only on the individual worker but on the Field Clubs as a whole. It becomes possible to make up small loan collections for distribution to local centres, and series of Irish Lepidoptera and Mollusca have in this way been already sent to the Museum of the Cork Field Club, while a selection of Irish Birds has been sent to form the nucleus of a City Museum in Waterford. We must hope that a Waterford Field Club may be a result of interest thus stirred up in the near future. Several years ago a number of duplicate mammals were lent to the Municipal Museum of Belfast, and quite recently a selection of vertebrates representing all the classes and several orders have been sent on loan to the Museum of Queen's College, Galway.

Thus by the joint action of the Museum officers and of local naturalists, the private collections of the latter and the national public collections in Dublin benefit mutually, and the enrichment of the Dublin collections enables substantial help to be given to provincial institutions.

And not only by giving their duplicates can Irish naturalists enrich our national collections. A sum of money is voted annually for the purchase of specimens, and there can be a patriotic as well as an unpatriotic action in the matter of selling. We have all heard of the recent Gold Ornament controversy. Collectors in this country having collections they want to sell, or knowing of persons not particularly



interested in zoology into whose possession rare specimens happen to fall, can do much by offering or securing an offer of such to the National Museum instead of letting them go to decay, or be bought up by rapacious private collectors in other countries. Some most valuable and welcome help in this respect has recently been afforded to the Museum by naturalists both in the north and south of Ireland.

May the naturalists of Ireland realize then that the collections which they have seen to-day are national property supported by public funds, cared for by public servants. And may one result of this Dublin Conference be that Irish naturalists take an increasing and ever more helpful interest in their own National Museum.

## DITRICHUM VAGINANS,

A NEW BRITISH MOSS IN IRELAND.

BY J. H. DAVIES.

ON a day in April last—22nd April, 1901, to be precise—I had the pleasure of gathering on the summit of Colin Mountain a Dicranaceous Moss, with an unfamiliar facies, which proved to be *Ditrichum vaginans*, a species new to the British Moss-flora. All that I saw was sterile, and it is hoped that fertile specimens may yet be obtained.

Colin Mountain, which has an elevation of only about 1,080 feet, is one of the range of basaltic hills which, beginning near Belfast with Cave Hill (Ben Madigan), extends in a south-westerly direction along the County Antrim side of the broad valley of the Lagan, and ends a short distance above Lisburn. From Belfast and Lisburn it is nearly equidistant. To the northern botanist these hills (none of them of any great altitude), their attractive rocky and shady glens and stretches of boggy and heathy moorlands are classic ground.

The plant occurs in several spots, not very far apart, in considerable quantity, and grows in densely compacted tufts or patches, in places partly concealed by *Polytrichum piliferum*, on bare turfy and stony ground amongst heath. It did not seem to agree with any book description to which I then had access, and failing, after close scrutiny and painstaking

efforts to determine it, I submitted specimens to Mr. H. N. Dixon, F.L.S., who, with his accustomed kindness, examined the plant, which he had no hesitation in referring to the present species, a continental moss hitherto unknown as British. He writes:—"This is a very interesting plant. It is *Ditrichum vaginans* (Sull.) Hampe., and is distinguished from *D. homomallum*, var. *zonatum* [= *D. zonatum*, Brid.] by the shorter adpressed leaves with recurved margins and stouter nerve." Dr. Braithwaite, F.L.S., to whom Mr. Dixon forwarded examples, verifies the identification, and the plant will be described and figured by him in a supplement to the concluding volume of his *British Moss Flora*, which, in an interesting letter, he informs me is now nearing an end. As it will likely be some time before that appears, it may be well that I should append a synonymy and a translation of Limpricht's description (*Laubmoose*, vol. 1., p. 500.) When Dr. Braithwaite reaches his supplement he will, no doubt, give a fuller description, with needful comparisons and elucidations, in his usual manner.

***Ditrichum vaginans*** (Sull.) Hampe.

Syn.—*Trichostomum vaginans*, Sulliv. Musc. Alleghan. No. 176. (1846).  
*Leptotrichum homomallum*, var.  $\beta$ . *strictum*, Schimp. Syn., ed. 1., p. 144. (1860).

*Leptotrichum avimontanum*, Schimp. in Schedulis.

*Didymodon tenuis*, Sendt. nach Milde, Bryol. Sil., p. 135.

*Aongströmia Lamyi*, Boul. Musc. de l'Est., p. 553. (1872).

*Leptotrichum vaginans*, Schimp. Syn., ed. 2, No. 140. (1876), excl. var.  $\beta$ .

*Ditrichum lineare* (Sw.) Lindb. in Sched.

Descr.—Dioicous; in dense yellow-green tufts. Plants erect, filiform, with very slender erect shoots. Leaves erect, appressed when dry, from a longish ovate concave base, gradually pointed, channelled towards the point, margin entire, revolute in upper half, nerve strong, ending in the point. Cells smooth, elongated and rectangular below, more quadrate above. Capsule erect, cylindric, light brown; lid conical; peristome teeth of two filiform legs, yellow, feebly papillose.

Hab.—Sandy clay (not on limestone) in the mountains.

Distr.—France, Rhine provinces, Westphalia, Vosges, Ardennes, Pyrenees, Bavaria, &c.

Recent addition—Ireland (Colin Mountain, Co. Antrim, 1901).

To the two well-known British bryologists whose names have been mentioned I have to acknowledge my great indebtedness.

Lisburn.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a West African Python from Captain J. B. Eames, a Fieldfare from Mr. J. Ormiston, a Monkey from Mr. W. D. Byrne, a pair of Ring-Snakes from Mr. L. P. Brown, a Tortoise from Miss F. Wingfield, and four Kestrels from Mr. R. W. Woodrow.

## NOTES.

### ZOOLOGY.

#### A Stray Viper near Wexford.

A correspondent informs us that a specimen of the Viper (*Pelias terris*), upwards of three feet long, was captured and killed, on June 9th, by Mr. S. Kamp, of Wexford, who found the snake in a field close to the town. It was first seized by a terrier dog, and ultimately overpowered and carried to the town, where it attracted much attention. Nothing seems to be known as to the method of introduction of the reptile.

#### Night-jars on the Cave Hill, Belfast.

Having heard from a friend about a strange bird, which, from his description, I thought must be a Night-Jar, seen close to the Earl of Shaftesbury's demesne about a week ago, I, under my friend's guidance, went to the place on the evening of the 4th of July. We had not been there very long before one flew quite close to us--so close, indeed, that I could distinctly see the white markings on the wings. After that we heard them on all sides making their "eo-ic," as Mr. Seebohm describes the note, when flying. We then saw one light on a fir tree, and immediately begin to "Jr-r-r-r," which it kept up for some minutes, then changed to another fir top, and began again. The noise must have been fairly loud, as we heard it a good way off. We saw two more, but not quite so close. Many more were calling round amongst the trees. They do not seem to be a very shy bird, as they came quite close to my friend when he first saw them. Some have been shot lately by gamekeepers round about, and set up by Shiels, of Corporation-street, where I saw them. Dr. Bowdler Sharp, in his Hand-book of British Birds, describes them as scarce in the North. They seem pretty plentiful round Belfast.

W. II. WORKMAN.

Belfast.

### Arrival of the Swift at Londonderry.

On reading Mr. Moffat's most interesting notes on the arrival of the Swifts (*Cypselus apus*) at Dublin, I looked up my notes since 1892 to find the dates of their arrival here, and I think no other migrant keeps so well up to time. Frequently a single pioneer bird appears a few days before the host arrives.

The following are the dates of arrival at Londonderry:—

1892,	.	.	10th May.
1893,	.	.	5th May.
1894,	.	.	7th May (one bird on 4th).
1895,	.	.	8th May (one bird 29th April); (reported by friend on 6th May).
1896,	.	.	6th May.
1897,	.	.	12th May (one bird on 2nd May).
1898,	.	.	4th May.
1899,	.	.	6th May.
1900,	.	.	6th May.
1901,	.	.	9th May (one bird on 5th May). (Mr. Milne reported one bird as seen on 22nd April).

D. C. CAMPBELL.

Londonderry.

### Slaughter of Sea-birds.

I wish to call attention to the flagrant breach of the Wild Birds Act by persons shooting sea-gulls on Sunday from the public road at Sutton—a three-fold offence. Let anyone walk along there at low-water and say if the sea-gulls, for their services, do not merit our protection as much as dogs in Constantinople or the Adjutants in India.

W. E. HART.

Howth.

[Where are the police?—EDS.]

### *Cenistis quadra* on Carlingford Mountain.

This rare and local moth has been discovered in a highland and northern locality by Mr. N. Colgan, who forwarded on July 22nd a female specimen to the Dublin Museum, stating that he had picked it up a few days previously near the top of Carlingford Mountain, Co. Louth, at an elevation of about 1,800 feet. Hitherto this insect has occurred only in a few of our southern counties—Wicklow, Wexford, Waterford, and Limerick.

G. H. CARPENTER.

## A NEW IRISH SEDGE,

CAREX IRRIGUA.

BY NATHANIEL COLGAN, M.R.I.A.

EARLY in July last, on opening a box of fresh specimens of an interesting morbid growth of the Cranberry sent me by my friend, Dean d'Arcy of Belfast, who had just gathered them at Parkmore, Co. Antrim, I was puzzled by the appearance of some over-ripe plants of sedge which lay on top of the damp Sphagnum packing. An examination of the fruit and bracts, and leaves showed that they agreed closely with those of *Carex irrigua* (Hoppe), earlier named *C. magellanica* by Lamarck; but, unfortunately, the material was too imperfect in other points to justify a positive identification in the case of a critical species. On inquiry I learned that these defective specimens of what seemed likely to prove an addition to our Irish flora, had been gathered by a very youthful botanist—the Dean's daughter, Ellinor, aged eleven. Her keen eye had detected the unfamiliar plant as she roamed over the bogs at the head of Glenariff on the 6th July last, and when the box of Cranberry specimens; gathered for me on the same day, was about to be closed, she insisted on having her sedges put in on top and sent off to be named.

Ten days elapsed before we found an opportunity of following up the clue so unexpectedly put into our hands. Starting on the 16th July last by the early morning train from Belfast, Dean d'Arcy and I reached the Parkmore terminus of the Ballymena and Cushendall Mountain Railway by half-past eight, and, striking south across the wet bogs, in another half-hour found ourselves surrounded by the nodding and dancing fruit-spikes of unmistakable *Carex irrigua*. There were hundreds of plants, varying in size from 6 to 16 inches, and springing from a bed of Sphagnum, embroidered with the delicate runners and gem-like flowers of Cranberry. We found the sedge in three distinct stations, ranging from about 900 to 1,100 feet above sea-level; and, judging from the aspect of the country around here, it seems probable that further search would lead to the discovery of other stations. In two of the three stations near Parkmore, the plant had already been noted by its first discoverer ten days earlier.

There is considerable diversity of opinion amongst authors as to the standing of *C. irrigua*, and as to the characters best fitted to distinguish it from *C. limosa*, which in many points it closely resembles. Amongst modern writers the prevailing tendency appears to be in favour of admitting it to full specific rank, though some earlier authorities have reduced it to the position of a variety, or even of an alpine form, of *C. limosa*.

Both in the New World and in the Old, the distribution of *C. irrigua* is a very wide one. On the European continent it appears to be decidedly northern and alpine in its range, ascending to upwards of 7,000 feet in the Alps. I have but scanty information as to its vertical range in Great Britain. Specimens from Perthshire, sent me by my friend the Rev. E. S. Marshall, are labelled as ranging there to 1,300 feet. It seems not improbable that some of the numerous extant Irish records for *C. limosa* may be referable to its closely similar congener, *C. irrigua*, and I would venture to suggest to Irish botanists a re-examination of any herbarium specimens labelled *C. limosa* to which they may have access, especially such as have been gathered in North Ireland.

Mr. Arthur Bennett, to whom I have submitted specimens of the Parkmore plant, agrees with me in referring it to *C. irrigua*, though he finds the leaves unusually narrow. In the character drawn from the leaf-form, the Irish plant varies considerably, the leaves in many of my specimens being quite as broad as in Scotch examples; but in no instance do they approach to the sharply-keeled type characteristic of *C. limosa*. Amongst the numerous distinctions of greater or less importance which, taken together, render it by no means difficult to separate the two species, there is one of which no mention is made by any of the authors I have found time to consult. The fruits of *C. irrigua* are distinctly stalked, while those of *C. limosa* are quite sessile on the spike rachis. This is true of all the specimens I have examined, and it would be interesting to know whether it holds good generally for the two plants. Mr. Bennett is of opinion that the Dorset record for *C. irrigua*, given in the second edition of *Topographical Botany*, and accepted by Hooker in the third edition of his *Student's Flora*, is a very doubtful one, and should probably be referred to *C. limosa*. We cannot, then, argue from any

extreme southward range of the species in England to the probability of its occurrence in Southern or, indeed, in Western Ireland. But it is otherwise with Northern Ireland. Here, in a more alpine climate, large areas of high-lying, spongy bog offer a congenial habitat for this interesting species—interesting not merely to the botanist as a subject for critical discussion, but also to the unscientific student of our native plants, by reason of the peculiar circumstances attending its addition to the Irish flora.

Sandycove, Co. Dublin.

## NEWS GLEANINGS.

Professor C. J. Patten.

We join with the numerous friends of Dr. Chas. J. Patten, Senior Demonstrator in Anatomy at Dublin University, and Secretary to the Dublin Naturalists' Field Club, in congratulating him heartily on his appointment to the Chair of Anatomy in the Firth University College, Sheffield.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include four Hoopoes, from Mr. J. N. Lentaigne, a pair of Caracars, from Mr. J. Hogg, four Amherst's Pheasants and three Golden Pheasants from Mr. H. Jameson, a Coatimundi from Mr. R. Coffey, a Thrush from Dr. Tweedy, a Touracon from Mr. D. A. Donovan, a Peacock from Mr. T. P. Bradshaw, a Leopard from Lieut.-Col. Duke, a pair of Entellus Monkeys from Lieut.-Col. Masters, a Seal from Mr. W. Hamilton, a Cormorant and a Herring Gull from Sergeant M'Goldrick, and a Sparrow-hawk from Mr. W. Higginbottom. Three Wild Boars have been born in the Gardens. A pair of Yellow Baboons and a Black Ape have been bought.

**DUBLIN NATURALISTS' FIELD CLUB.**

JULY 18-20.—EXCURSION TO SLIGO.—The long excursion of the Club was held this session in Sligo from the 18th to 20th July, inclusive, and was conducted by Mr. Seymour. During the whole of the time spent in the locality the weather was practically perfect, which fact contributed in no small degree towards making the excursion one of the most successful and enjoyable held by the Club for some time. Some fifteen members and visitors left Broadstone Terminus on the morning of the 18th July, and reached Sligo about 2 p.m. After lunch the party, reinforced by some members of the Belfast Naturalists' Field Club, left the Imperial Hotel in a four-horse drag and drove to Carrowmore, the Carnac of Ireland. About an hour was spent in examining, both internally and externally, the numerous pre-historic monuments here, which are believed to mark the site of a desperate battle fought about 30 B.C., and resulting in the final expulsion of the Firbolgs from Ireland. Afterwards the drive was continued to Knocknarea Glen, a remarkable deep cleft, about half a mile long, in Carboniferous limestone, and full of trees and luxuriant ferns. From here five of the more active members of the party set off to climb Knocknarea, the remainder exploring the Glen and afterwards driving round to Strandhill. When near the summit (1,078 feet) of the hill a dense fog came down, and completely obscured the view of the country from the mountaineers—who, nevertheless, went on to the top of the gigantic carn, marking the reputed burial place of Maev, Queen of Connaught. After a short rest there they came down again to Strandhill, and, joining the rest of the party, drove back to Sligo, which was reached about 8 p.m.

On the next morning, the weather being delightfully fine, in spite of the deluges of rain during the night, the party left at 9 o'clock, and drove to Drumcliff, where a short time was spent examining the sculptured stone cross and the incomplete round tower in the vicinity. Thence on to the foot of the steep southern slope of Ben Bulbin (1,722 feet). Leaving the drag the party commenced the ascent of the mountain, going in an easterly direction towards King's Mountain (over 1,500 feet), this summit being reached by fourteen members—who were rewarded with a truly magnificent view of the surrounding country. A few went on a little further to the east to get a glimpse of Glencar Lake, which they were presently to explore.

All then descended through a rocky gorge cut by a stream in the mountain side, and getting on the drag again drove to Glencar Lodge—occupied by Mr. Siberry, the gamekeeper on the Wynne Estate. Here, in a most charming situation, lunch was served by the hospitable household, to which the members did ample justice.

After lunch the party visited the beautiful and picturesque Glencar Waterfall, and spent some hours collecting in the vicinity of the lake. The return journey was commenced at 5.30, Sligo being reached at 7 o'clock. The members proceeded at once to Sligo Abbey, where the chief items of interest were pointed out and explained by the resident caretaker.



On the third and last day of the meeting the rendezvous was Lough Gill—one of the most beautiful lakes in Ireland—to which the members proceeded in boats, passing through scenery excelled only, perhaps, by Killarney. The lake was crossed, and the party landed near Slish Wood Gap. The time available was spent collecting in the woods and along the shore, and the return journey was begun at 1 o'clock. Sligo was reached at 2 p.m.; and after early dinner the party broke up—about half the number returning to Dublin—the railway company very kindly arranging for a through carriage to accommodate the members.

A large number of snap-shot photographs were taken by three photographic members of the party during the excursion, and an interesting record of the trip has been thus obtained. Lantern transparencies of the photos will be shown at the coming conversazione in October.

A large number of the rare plants for which the Ben Bulbin range is famous, were collected. The best find was the Bee Orchis (*Ophrys apifera*), gathered near Knocknarea Glen by Miss E. M'Intosh. The only previous Sligo record dates from before the first edition of *Cybele Hibernica*.

On Ben Bulbin the entomologists were fortunate in finding the mountain ground-beetle *Carabus glabratus*, a first record for Connaught. With it were other highland species, notably—*Calathus nubigena*, *Taphria nivalis*, and *Olisthopus rotundatus*.

At Lough Gill the best zoological finds were a small rove-beetle, *Trogophleus arcuatus*, and a local longhorn-beetle, *Strangalia armata*, both being previously unrecorded from the province of Connaught.

### CORK NATURALISTS' FIELD CLUB.

AUGUST 5.—EXCURSION TO SHERKIN ISLAND.—Fourteen members and friends met at Baltimore, whence boat was taken to Sherkin. The island contains ruins of an ancient abbey and castle, which were explored, and affords magnificent views of Cape Clear and the mountains and promontories of West Cork. Many interesting plants were collected during the day, among them being *Trifolium arvense* and *Carum Petroselinum*, found on the abbey walls, *Eryngium campestre* and *Cuscuta Trifolii*, new to West Cork; *Althæa officinalis*, *Artemisia Absinthium*, *Bartsia viscosa*, *Euphorbia hiberna*, *Polygonum Raii*, and *Carex muricata*.

On the mainland about Baltimore were noted *Sativa Verbenaca* and *Rumex pulcher*. Insects were collected and kept for identification.

After tea the party had a walk through the famous Baltimore Fishery School, thus winding up what all agreed was a profitable as well as a most enjoyable day.

# NOTES.

## BOTANY.

### Irish Topographical Botany.

For Mr. Moffat's excellent critical notice of my book, I offer him my sincere thanks. Regarding some points, I fear he is unduly complimentary; but on the other hand, he has done useful service in pointing out several omissions. Regarding one or two of his criticisms, I should like to offer a word of explanation. Mr. Moffat turns the search-light of his unequalled knowledge of the flora of Co. Wexford on the records for that county in "Irish Topographical Botany," and I am relieved to find that he finds so little in the way of error or omission.

*Hypericum calycinum*.—Mr. Moffat's MS. notes say, "several roadside localities," without any particulars; these are purposely omitted, like many other similar records.

*Arctium minus* and *Mentha sativa*.—Further records purposely omitted, pending confirmation by an authority. I trust Mr. Moffat will not object to have his records treated as I treated those of my own which were not backed by the opinion of an authority.

*Papaver Rhæas* and *Lychnis diurna*.—In these cases Mr. Moffat is right. Other records in his MS. list should be recognized by the addition of the word "rare" after the record which I quote.

*Osmunda regalis*.—There is a slip here, in the inclusion of county-division 12 in the note on p. 386. This is clear from the note given on p. 385, where the plant is correctly described as frequent in Wexford.

*Pinguicula lusitanica*.—"N. E." is a misprint for "N. W." This reconciles Mr. Moffat's statement with mine.

*Pinguicula vulgaris*.—Found by myself near foot of Blackstairs in 1899. As regards the maps showing progress of field-work, Mr. Moffat points out that, by implication, a list of over 200 species might have been compiled from More's paper on the flora of Castle Taylor, and that S. E. Galway ought, therefore, to have been lightly coloured on the first map. This is so. I can only plead that in a rapid survey of some hundreds of papers for positive results, a negative result, such as this, was easily overlooked. While regretting the oversight, I can hardly think that it justifies the rather severe generalization about want of fairness to previous explorers which Mr. Moffat draws from it.

The only other point to which I wish to refer concerns the MS. list of Wexford plants referred to by Mr. Moffat. This was compiled during a number of years past by Capt. Barrett-Hamilton and himself, and he most kindly placed it in my hands. But it ought *not*, according to the standard used, to be quoted in any one of the three places where Mr. Moffat says it ought. The "Bibliography" does *not* include private manuscript material, and its inclusion there would be unwarranted. Neither ought it to appear in the right-hand column on p. lxxxv., marked "A," as an analysis of its contents and dates will show; nor in

the list on p. ci. since, as stated, this is merely a list of sources principally used, and Mr. Moffat's list furnished fewer records than some dozens of others which are likewise omitted. Almost every important record contained in this list appears in published papers by Mr. Moffat or others, to which he will find all due credit is given in the proper places.

R. LLOYD PRAEGER.

### **Spiranthes Romanzoffiana in Antrim.**

Mr. William West, F.L.S., of Bradford, sends me a fresh specimen of *Spiranthes Romanzoffiana*, from Co. Antrim. He writes that he found it between Antrim and Toome, growing in fair quantity in rather damp grassy places among *Spiraea Ulmaria*, *Achillea Ptarmica*, *Comarum palustre*, &c. on July 31st. A fourth northern station for this extremely rare orchid is most welcome. It is worthy of note that all the Ulster localities, in Armagh, Antrim, and Londonderry, are situated in the basin of the River Bann. That four stations for this plant should be discovered in ten years in so well worked a part of Ireland as the north-east, is one of the most remarkable features of recent research in Irish botany.

R. LLOYD PRAEGER.

### **Pyrola secunda refound in Ireland.**

After an interval of over sixty years this interesting plant has been again found in Ireland. On August 2nd Mr. W. N. Tetley, of Portora Royal School, brought me two fine specimens collected by him at Carrol Glen, near Carrick Lake, Co. Fermanagh, on June 26th last. Mr. Tetley describes the plant as growing on a rough ledge of limestone rocks. He saw only one patch of it, but did not search for more.

*P. secunda* is a characteristic plant of the Scottish type of distribution. In Ireland, its only previous stations—four in number—were in the Counties of Antrim and Derry, where it was discovered by Dr. Moore about the year 1835, and has never been refound in spite of repeated searches by various botanists in the definite stations recorded. Mr. Tetley is to be congratulated on a most interesting discovery.

In connection with this plant Mr. S. A. Stewart sends me the following important note:—

*Pyrola secunda*.—I find in the Belfast Museum a specimen which had been overlooked both by myself and Corry. We said in the *Flora N.E.I.* that it was first found in Ireland by Moore. Not so; we have a specimen labelled "Derry, Mr. Brown." Now, this must have been Robert Brown, who lived in Derry about 1801 or 1802. There is no date or special locality for our specimen. These omissions were too common a century ago, and even later. In this connection I may mention that *Pyrola secunda* was one of the plants for which D. Moore was awarded a prize at the fete in the Belfast Botanic Gardens in 1838 (Coronation Fete).

R. LLOYD PRAEGER.

Dublin.

**Eryngium campestre in Ireland.**

On Monday, August 5th, on the occasion of the Cork Naturalists' Field Club excursion to Sherkin Island, Co. Cork, I gathered specimens of an *Eryngium* pointed out to me by Mrs. J. J. Wolfe, which on subsequent examination proved to be *E. campestre*—a species apparently not seen in Ireland since 1819, when it was recorded by Drummoud, from near Lismore, Co. Waterford. It grows in some quantity on one spot in an old pasture field with exclusively native plants, and may be indigenous; but further search for other stations in the locality would be desirable before adding it with certainty to our list of undoubted natives. Its distribution in England is not inconsistent with its being a native in Co. Cork, as Mr. Arthur Bennett, F.L.S., who has kindly verified the identity of my specimens, considers it likely to be native in West Cornwall, Kent, Suffolk, and Devon, but doubtful elsewhere.

R. A. PHILLIPS.

Cork.

**ZOOLOGY.****Notes on Humble Bees.**

I recently had an opportunity of watching the curious behaviour of two Humble Bees (*Bombus terrestris*)—a queen and a worker. The queen was wet and chilled, and the worker came along and showed great solicitude. It crawled over the body of the larger bee and examined its wings and legs minutely, and fetched water from a water-lily leaf with which, as I thought, to loosen the queen's wings, which seemed fixed to her body. It also lay on the body of the queen for two minutes, or more, motionless, as if to warm it. Then they both rolled over, and seemed to fight viciously with each other, and then rolled off a large water-lily leaf on which all the above actions took place, and I secured both by lifting them out of the water.

F. W. BURBIDGE.

Trinity College Botanic Gardens.

**Vanessa io near Londonderry.**

When at Burnfoot, about seven miles from Derry, near Lough Swilly, I saw, on the road to Inch (which road is generally covered with water), a Peacock Butterfly, and another in a lane leading to railway-crossing about a hundred yards from Burnfoot Station. It was between the 11th and 25th of May that I saw these two, during the very hot weather. The Butterflies were so large that I heard the rustling of their wings when flying, and I distinctly saw the round rings on each wing. Of course it is just possible I may have met with the same butterfly twice, on different days. However, having seen *one* shows that they are not extinct in that locality.

W. T. C. WARD.

Belfast.

### Conchological Society—Committee for Collective Investigation.

The following are the subjects for enquiry proposed for 1901-1902. Returns should reach the Secretary (S. E. Boycott, The Grange, Hereford), not later than September 1st, 1902:—

I. Do you find *Vallonia pulchella* and the form *costata* together or separately? In dry or moist situation? Do intermediate forms occur? Does each form seem to affect a particular kind of habitat?

II. Are *Tachea nemoralis* and *T. hortensis* found together or separately? (1) In the same district? (2) In the same locality (hedgebanks, &c.)? Is there any difference in the habitat most affected by each species?

III. Do *Clausilia rugosa* (*bidentata*) and *Balia perversa* occur together? What habitat are they found in?

IV. Are there any constant differences between the radulæ of:—

(1) *Hyalinia cellaria* and *H. alliaria*. (2) *Limnæa peregra* and *L. auricularia*. (3) *Succinea putris* and *S. elegans*. (4) *Tachea nemoralis* and *T. hortensis*?

V. Record the circumstances attending the disappearance to which certain species, such as *A. glutinosa*, *H. fusca*, and *V. edentula*, are subject. How are such disappearances to be accounted for?

### Notes on Fishes from the Co. Down Coast.

As a sea-fisherman, when observing "plays" of gulls, razorbills, &c., ravenously devouring fry, I have sometimes questioned the wisdom of so much protection for these enemies of the "harmless necessary" herring, while the embryo "two-eyed beefsteaks" are left entirely at their mercy. It has recently been stated (in the *English Mechanic*, I think), that since sea-birds were protected, fish have been decreasing. Although this would be difficult to prove, it is clearly probable.

In my piscatorial efforts with a net on the Glassdrummond coast this season, I captured a fish of a kind I had never seen before. At first sight we took it for a Grey Mullet, but the shape of its head being different, we sent this, with a description of the body (which also we ate, and very good it was), to Mr. Robert Patterson of Belfast, who pronounced it a Basse (*Labrax Lupus*), and rare on our northern Irish coasts.

J. BROWN.

Longhurst, Dunmurry.

### The Snake near Wexford.

One would like to know a little more about the "Stray Viper, near Wexford," reported in the August number of the *Irish Naturalist*.

The statement that it was "upwards of three feet long" affords presumptive evidence that it was *not* a Viper, but a Common Snake, examples of which are from time to time introduced by way of experiment to see "whether snakes can live in Ireland."

J. E. HARTING.

Burlington House, London.

**Bird Notes from the Mourne Mountains.**

A Night-jar has been frequently observed flying about the lawn here this summer. Last month, while staying at Glassdrummond on the coast, near Annalong, we saw one almost every evening fluttering round the house, which stands on a high knoll overlooking the sea. I was told these birds are frequently seen in the mountains there, and that their nests are found in the bracken.

Large birds of the hawk tribe also frequent the Mourne Mountains, and on one occasion I was much struck by the fierce shrieking noise made by the wings of one of them when striking down on its prey, close to where we stood. No doubt such a sound would have a very terrifying effect on the quarry, which in this case proved to be a carrier pigeon, apparently killed by impact with the ground, as there was no visible wound. Its pursuer (the larger of the two) was, no doubt, too much taken up with the excitement of the chase to notice us till all was over, when he quickly flew away, and we ate the pigeon.

J. BROWN.

Loughurst, Dunmurry.

**Hawfinch near Londonderry.**

On 5th July I examined a male Hawfinch (*Coccothraustes vulgaris*), which had been killed by Mr. Motherwell in his garden at Garshney Crossroads, near Londonderry.

D. C. CAMPBELL.

Londonderry.

**Night-jar near Belfast.**

What Mr. Workman writes in July number of the *Irish Naturalist*, as to the Night-jar on Cave Hill is interesting. It seems to haunt the whole range of hills to the north and west of Belfast. Thompson speaks of its occurrence in Colin Glen, four miles west of the city. Crow Glen is three miles north-west of Belfast, and here I heard the jarring song of this bird only a few days ago, and should have got close enough to see it had not the clatter made by four heavy-footed bipeds scared it away. Two miles north-east of this glen is Carr's Glen, where I have also listened to the Night-jar, and I have heard two or three of them at the Knockagh cliffs, some six miles further north. It must be on the increase here. A century since, Templeton, who was a lover of birds, as of all nature, considered it rare. Thompson, gave some few localities, and spoke of it as not common. Perhaps it benefits by keeping late hours, and thus evading the prowling nuisances with guns.

S. A. STEWART.

Belfast.

### Constant recurrence of Night-jars.

For the last three summers a Night-jar has frequented a grove on the opposite side of the River Suir to my house.

This summer I did not expect to hear his jarring note, as extensive blasting operations are in progress on the new Waterford and Rosslare Railway exactly at this spot, so I was much surprised to hear him again on the night of the 1st August exactly at the old haunt.

E. A. GIBBON.

Waterford.

### Breeding of the Dunlin.

Referring to Mr. Blake Knox's interesting notes upon the breeding of the Dunlin (*Tringa alpina*) in Westmeath, I should like to say that his description of where the nests were built—viz., "in exceedingly short grass some twenty paces from the lake shore"—exactly describes the positions of the nests on the sloblands at Inch, Lough Swilly. All those I found were in small tufts of rank grass on the bare slob along the margin of the water. The open lough (salt water) was a few hundred yards away.

When I visited Inch in the end of May last I found no nests, but saw many Dunlins in breeding plumage; and noticed one flock of twelve and another of about thirty, also a number of single birds. Where the birds were single, or in pairs, they were exceedingly tame, and sometimes allowed me to approach to within a few yards.

D. C. CAMPBELL.

Londonderry.

### Bat catching flies in day-time.

On July 30th, when driving at about noon, I saw a bat working in the same way as at night. I saw him distinctly change his course suddenly to catch flies. I could not see what kind of a bat it was. This took place on the main road about two miles from Waterford.

E. A. GIBBON.

Waterford.

## PLANT RECORDS WANTED.

BY R. LLOYD PRAEGER.

Now that "Irish Topographical Botany" has appeared, it may be useful to publish a list of the more conspicuous gaps in the county-lists, compiled in connection with the final season's field-work, and now revised. It has, indeed, been suggested that such a list might have appeared in the book (*ante*, p. 154). While thinking it would hardly have been in place there, I gladly take the opportunity of publishing it here, and hope its publication will lead to the early filling up of many of the more evident oversights, either from existing material in the hands of some of my fellow-botanists, or by means of field-work.

The following lists show the commoner plants not yet on record for each of the forty county-divisions. The usual test for a "commoner plant" has been one that is on record for thirty or more of the divisions: but in the case of sea-coast plants, and of a few others of well defined partial range, it has been necessary to employ a different standard. A species has been occasionally included although a record exists, if that record is unsatisfactory on account of doubtful determination or probable introduction.

A few of the plants in these lists are no doubt genuine absentees. For instance, the absence or rarity of *Pimpinella Saxifraga*, *Ceanothe Phellandrium*, *Parnassia palustris*, *Selaginella selaginoides*, in the South of Ireland appears to be a fact; and several common plants of the east and centre are apparently genuinely absent from the wilder portions of the west, from Kerry to Donegal. I have not attempted to discriminate between such probably real absentees, and others whose non-inclusion in the county lists is evidently purely the result of oversight: it is in fact most desirable that attention should be paid to both groups, and their presence or absence definitely decided.

I may add that it is my intention to have this paper reprinted, and I shall be glad to send copies to anyone who will help to look up any of these missing plants as opportunity offers.



## 1. KERRY SOUTH.

Nasturtium palustre.	Lithospermum officinale.
amphibium.	Euphorbia exigua.
Hypericum perforatum.	Elodea canadensis.
Potentilla procumbens.	Epipactis latifolia.
Parnassia palustris.	Juncus glaucus.
Pimpinella Saxifraga.	Lemna trisulca.
Ænanthe Phellandrium.	Potamogeton crispus.
Valerianella dentata.	Selaginella selaginoides.
Crepis paludosa.	

## 2. KERRY NORTH.

Nasturtium amphibium.	Lithospermum officinale.
Prunus Cerasus.	Origanum vulgare.
Potentilla procumbens.	Rumex Hydrolapathum.
Parnassia palustris.	Euphorbia exigua.
Ænanthe Phellandrium.	Selaginella selaginoides.
Petasites fragrans.	

## 3. CORK WEST.

Nasturtium palustre.	Habenaria conopsea.
Parnassia palustris.	Lemna trisulca.
Scandix Pecten-Veneris.	Scirpus pauciflorus.
Ænanthe Phellandrium.	Carex teretiuscula.
Anthemis Cotula.	Hudsonii.
Solanum Dulcamara.	vesicaria.
Elodea canadensis.	Chara hispida.

## 4. CORK MID.

Nasturtium amphibium.	Scirpus pauciflorus.
Cakile maritima.	Carex teretiuscula.
Parnassia palustris.	Psamma arenaria.
Eryngium maritimum.	Deschampsia flexuosa.
Antennaria dioica.	Agropyron junceum.
Vaccinium Oxycoccus.	Cystopteris fragilis.
Pinguicula vulgaris.	Aspidium aculeatum.
Euphorbia Paralias.	Lastrea Oreopteris.
Epipactis latifolia.	Selaginella selaginoides.
Lemna trisulca.	Nitella opaca.

## 5. CORK EAST.

Parnassia palustris.	Empetrum nigrum.
Drosera anglica.	Carex teretiuscula.
Achillæa Ptarmica.	Hudsonii.
Vaccinium Oxycoccus.	Cystopteris fragilis.
Pinguicula vulgaris.	Lastrea Oreopteris.
Scirpus pauciflorus.	Selaginella selaginoides.

## 6. WATERFORD.

<i>Viola tricolor.</i>	<i>Eleocharis multicaulis.</i>
<i>Polygala serpyllacea.</i>	<i>Scirpus pauciflorus.</i>
<i>Geum rivale.</i>	<i>lacustris.</i>
<i>Drosera anglica.</i>	<i>Eriophorum vaginatum.</i>
<i>Myriophyllum alterniflorum.</i>	<i>Rhynchospora alba.</i>
<i>Apium inundatum.</i>	<i>Schoenus nigricans.</i>
<i>Achillæa Ptarmica.</i>	<i>Carex teretiuscula.</i>
<i>Arctium minus</i>	<i>Phleum pratense.</i>
<i>intermedium.</i>	<i>Festuca elatior.</i>
<i>Primula officinalis.</i>	<i>Ophioglossum vulgatum.</i>
<i>Veronica montana.</i>	<i>Selaginella selaginoides.</i>
<i>Pinguicula vulgaris.</i>	<i>Chara aspera.</i>
<i>Chenopodium Bonus-Henricus.</i>	<i>hispida.</i>
<i>Polygonum lapathifolium.</i>	<i>vulgaris.</i>
<i>Sparganium simplex.</i>	

## 7. TIPPERARY SOUTH.

<i>Ranunculus sceleratus.</i>	<i>Achillæa Ptarmica.</i>
<i>Brassica alba.</i>	<i>Arctium minus.</i>
<i>Raphanus Raphanistrum.</i>	<i>intermedium.</i>
<i>Viola canina.</i>	<i>Samolus Valerandi.</i>
<i>tricolor.</i>	<i>Hyoscyamus niger.</i>
<i>Cerastium tetrandrum.</i>	<i>Salix repens.</i>
<i>Rosa spinosissima.</i>	<i>purpurea.</i>
<i>Sedum anglicum.</i>	<i>Allium ursinum.</i>
<i>Myriophyllum spicatum.</i>	<i>Potamogeton heterophyllus.</i>
<i>Gnaphalium sylvaticum.</i>	<i>Selaginella selaginoides.</i>
<i>Bidens tripartita.</i>	<i>Chara aspera.</i>

## 8. LIMERICK.

<i>Ranunculus trichophyllus.</i>	<i>Veronica montana.</i>
<i>Viola palustris</i>	<i>Scutellaria galericulata.</i>
<i>canina.</i>	<i>Empetrum nigrum.</i>
<i>Polygala vulgaris.</i>	<i>Habenaria chloroleuca.</i>
<i>Lychnis diurna.</i>	<i>Eleocharis multicaulis.</i>
<i>Arenaria trinervia.</i>	<i>Scirpus pauciflorus.</i>
<i>Montia fontana.</i>	<i>fluitans.</i>
<i>Callitriche stagnalis.</i>	<i>Carex Hornschuchiana.</i>
<i>Filago germanica.</i>	<i>Catabrosa aquatica.</i>
<i>Gnaphalium sylvaticum</i>	<i>Lolium temulentum.</i>
<i>Jasione montana.</i>	<i>Cystopteris fragilis.</i>
<i>Vaccinium Oxycoccus.</i>	<i>Lycopodium Selago.</i>
<i>Myosotis repens.</i>	<i>Selaginella selaginoides.</i>
<i>Veronica hederæfolia</i>	<i>Chara aspera.</i>

## 9. CLARE.

Cardamine flexuosa.	Mentha sativa.
Viola tricolor.	Polygonum lapathifolium.
Montia fontana.	Salix purpurea.
Malva moschata.	Orchis incarnata.
Trifolium hybridum.	Potamogeton heterophyllus.
Vicia angustifolia.	Carex Hudsonii.
Prunus Cerasus.	Melica uniflora.
Potentilla procumbens.	Lastrea spinulosa.
Myriophyllum spicatum.	Nitella opaca.
Callitriche stagnalis.	

## 10. TIPPERARY NORTH.

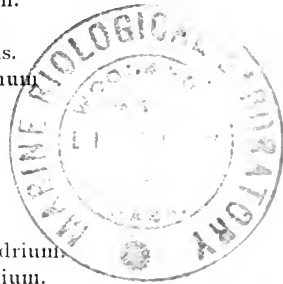
Viola tricolor.	Scutellaria galericulata.
Lychnis diurna.	Chenopodium Bonus-Henricus.
Ononis arvensis.	Allium ursinum.
Vicia hirsuta.	Sparganium simplex.
Sedum anglicum.	Potamogeton heterophyllus.
Gnaphalium sylvaticum.	Eleocharis multicaulis.
Tanacetum vulgare.	Carex lævigata.
Carduus pycnocephalus.	Melica uniflora.
Lithospermum officinale.	Lolium temulentum.
Solanum Dulcamara.	Chara aspera.
Pinguicula lusitanica.	Nitella opaca.

## 11. KILKENNY.

Ranunculus trichophyllus.	Arctium intermedium.
Cochlearia officinalis.	Scutellaria galericulata.
Raphanus Raphanistrum.	Suaeda maritima.
Viola tricolor.	Polygonum lapathifolium.
Lychnis diurna.	Populus tremula.
Cerastium tetrandrum.	Empetrum nigrum.
Potentilla procumbens.	Phleum pratense.
Geum rivale.	Cystopteris fragilis.
Rosa spinosissima.	Equisetum maximum
Gnaphalium sylvaticum.	sylvaticum.
Arctium minus.	Nitella opaca.

## 12. WEXFORD.

Nuphar luteum.	Drosera anglica.
Nymphaea alba.	Oenanthe Phellandrium.
Chelidonium majus.	Arctium intermedium.
Nasturtium amphibium.	Vaccinium Oxycoccus.
Geranium lucidum.	Littorella lacustris.
Sempervivum tectorum.	Polygonum lapathifolium.
Parnassia palustris.	Salix purpurea.



12. WEXFORD—*continued.*

Habenaria conopsea.	Cystopteris fragilis.
Potamogeton heterophyllus.	Lastrea spinulosa.
Scirpus pauciflorus.	Chara hispida.
Rhynchospora alba.	Nitella opaca.
Carex Hornschuchiana.	

## 13. CARLOW.

Ranunculus trichophyllus.	Chenopodium Bonus-Henricus.
Aquilegia vulgaris.	Atriplex patula.
Nymphæa alba.	Myrica Gale.
Cerastium tetrandrum.	Epipactis latifolia.
Geranium lucidum.	Habenaria bifolia.
Drosera anglica.	Carex teretiuscula.
Apium inundatum.	vulpina.
Scandix Pecten-Veneris.	Alopecurus geniculatus
Lithospermum officinale.	Festuca elatior.
Thymus Serpyllum.	Lolium temulentum.
Littorella lacustris.	Chara aspera.

## 14. QUEEN'S CO.

Nymphæa alba.	Bidens tripartita.
Nasturtium palustre.	Myosotis repens.
Raphanus Raphanistrum.	versicolor.
Viola canina.	Convolvulus arvensis.
tricolor.	Chenopodium Bonus-Henricus.
Lychnis diurna.	Polygonum lapathifolium.
Cerastium tetrandrum.	Epipactis latifolia.
Vicia hirsuta.	Eleocharis multicaulis.
Cotyledon Umbilicus.	Phleum pratense.
Sedum anglicum.	Agrostis canina.
Callitriche stagnalis.	alba.
Œnanthe crocata.	Nitella opaca.
Sambucus Ebulus.	

## 15. GALWAY SOUTH-EAST.

Ranunculus sceleratus.	Myosotis repens.
Cakile maritima.	Hyoscyamus niger.
Raphanus Raphanistrum.	Salsola Kali.
Viola tricolor.	Populus tremula.
Malva moschata.	Agrostis canina.
Sedum anglicum.	Psamma arenaria.
Crithmum maritimum.	Agropyron junceum.
Tanacetum vulgare.	Lastrea Oreopteris.
Jasione montana.	

## 16. GALWAY WEST.

Ranunculus penicillatus.	Mentha sativa.
Chelidonium majus.	Chenopodium Bonus-Henricus.
Nasturtium amphibium.	Rumex Hydrolapathum.
Viola odorata.	Salix alba.
Arenaria trinervia.	purpurea.
Trifolium hybridum.	Lemna trisulca.
Smyrniium Olusatrum.	Carex teretiuscula.
Sium angustifolium.	vulpina.
CEnanthe Phellandrium.	Phleum pratense.
Sambucus Ebulus.	Trisetum flavescens.
Petasites fragrans.	Catabrosa aquatica.
Vaccinium Oxycoccus.	Glyceria maritima.
Symphytum officinale.	Festuca elatior.
Verbascum Thapsus.	Bromus sterilis.
Utricularia vulgaris.	

## 17. GALWAY NORTH-EAST.

Chelidonium majus.	Arctium minus.
Cakile maritima.	Crepis paludosa.
Viola tricolor.	Jasione montana.
Lotus uliginosus.	Statice rariflora.
Vicia hirsuta.	Myosotis repens.
angustifolia.	Mentha sativa.
Prunus Cerasus.	Chenopodium Bonus-Henricus.
Geum rivale.	Empetrum nigrum.
Callitriche stagnalis.	Epipactis latifolia.
Eryngium maritimum.	Carex vulpina.
Smyrniium Olusatrum.	lævigata.
Scandix Pecten-Veneris.	Phleum pratense.
CEnanthe crocata.	Agrostis canina.
Filago germanica.	Deschampsia flexuosa.
Tanacetum vulgare.	Lastrea Oreopteris.
Petasites fragrans.	

## 18. KING'S CO.

Ranunculus penicillatus.	Arctium minus.
Lychnis diurna.	intermedium.
Hypericum humifusum.	Myosotis repens.
Ononis repens.	Convolvulus arvensis.
Vicia hirsuta.	Pinguicula lusitanica.
angustifolia.	Scutellaria galericulata
Potentilla procumbens.	Littorella lacustris.
Sedum anglicum.	Polygonum Hydropiper.
Callitriche stagnalis.	Epipactis latifolia.
CEnanthe crocata.	Sparganium simplex.
Filago germanica.	Potamogeton heterophyllus.
Gnaphalium uliginosum.	Cystopteris fragilis.
sylvaticum.	

## 19. KILDARE.

Nasturtium amphibium.	Polygonum Hydropiper.
Viola palustris.	lapathifolium.
Polygala serpyllacea.	Salix repens.
Hypericum humifusum.	Epipactis latifolia.
Lotus uliginosus.	Juncus squarrosus.
Potentilla procumbens.	Eleocharis multicaulis.
Sedum anglicum.	Scirpus setaceus.
Sempervivum tectorum.	Carex sylvatica
Œnauthe crocata.	lævigata.
Sambucus Ebulus.	Phleum pratense.
Filago germanica.	Agrostis canina.
Gnaphalium sylvaticum.	Melica uniflora.
Bidens tripartita.	Lastrea Oreopteris.
Arctium intermedium.	æmula.
Verbascum Thapsus.	Botrychium Lunaria.
Pinguicula lusitanica.	Equisetum sylvaticum.
Scutellaria galericulata.	

## 20. WICKLOW.

Ranunculus trichophyllus.	Anthemis Cotula.
Nymphæa alba.	Veronica Anagallis.
Nasturtium palustre.	Lycopus europæus.
Saxifraga tridactylites.	Salix purpurea.
Sempervivum tectorum.	Sparganium minimum.
Drosera anglica.	Potamogeton heterophyllus.
Myriophyllum alterniflorum.	perfoliatus.
Scandix Pecten-Veneris.	Scirpus pauciflorus.
Bidens cernua.	Carex teretiuscula.
tripartita.	

## 21. DUBLIN.

Nymphæa alba.	Habenaria bifolia.
Hypericum dubium.	Sparganium minimum.
Drosera anglica.	Eleocharis multicaulis.
Myriophyllum alterniflorum.	Rhynchospora alba.
Utricularia vulgaris.	Carex Hudsonii.
minor.	vesicaria.
Littorella lacustris.	Cystopteris fragilis.
Myrica Gale.	Aspidium aculeatum.
Populus tremula.	Lastrea spinulosa.

## 22. MEATH.

Anemone nemorosa.	Veronica scutellata.
Lychnis diurna.	Melampyrum pratense
Montia fontana.	Pinguicula lusitanica.
Hypericum dubium.	Teucrium Scorodonia.
Ilex Aquifolium.	Quercus Robur.
Lathyrus macrorrhizus.	Eupetrum nigrum.
Geum rivale.	Orchis mascula.
Potentilla procumbens.	Allium ursinum.
Sedum anglicum.	Luzula maxima.
Sambucus Ebulus.	Ruppia rostellata.
Solidago Virgaurea.	Eleocharis multicaulis.
Bidens tripartita.	Carex lævigata.
Arctium minus.	Hornschuchiana,
Jasione montana.	vesicaria.
Lysimachia nemorum.	Lastrea Oreopteris.
Veronica agrestis.	æmula.
montana.	Equisetum sylvaticum.

## 23. WESTMEATH.

Cerastium tetrandrum.	Solanum Dulcamara.
Montia fontana.	Hyoscyamus niger.
Vicia angustifolia.	Veronica polita.
Lathyrus macrorrhizus.	Pinguicula lusitanica.
Sedum anglicum.	Mentha sativa.
Callitriche stagnalis.	Thymus Serpyllum.
Scandix Pecten-Veneris.	Teucrium Scorodonia.
Œnanthe crocata.	Polygonum lapathifolium.
Sambucus Ebulus.	Euphorbia exigua.
Filago germanica.	Populus tremula.
Guaphalium uliginosum.	Juncus squarrosus.
sylvaticum.	Eleocharis multicaulis.
Bidens tripartita.	Scirpus fluitans.
Senecio sylvaticus.	Carex vulpina.
Arctium intermedium.	lævigata.
Jasione montana.	Nardus stricta.
Erica cinerea.	Blechnum Spicant.
Myosotis repens.	Lastrea Oreopteris.
versicolor.	Equisetum sylvaticum.

## 24. LONGFORD.

Aquilegia vulgaris.	Trifolium hybridum.
Lychnis diurna.	Vicia hirsuta.
Cerastium tetrandrum.	Lathyrus macrorrhizus.
Hypericum dubium.	Prunus Cerasus.
humifusum.	Callitriche stagnalis.

24. LONGFORD—*continued.*

<i>Ceananthe crocata.</i>	<i>Epipactis latifolia.</i>
<i>Sambucus Ebulus.</i>	<i>Eleocharis multicaulis.</i>
<i>Gnaphalium sylvaticum</i>	<i>Agrostis canina.</i>
<i>Crepis paludosa.</i>	<i>alba.</i>
<i>Jasione montana</i>	<i>Festuca arundinacea.</i>
<i>Erica cinerea.</i>	<i>Bromus mollis.</i>
<i>Linaria Cymbalaria.</i>	<i>Agropyron repens.</i>
<i>Pinguicula lusitanica.</i>	<i>Ophioglossum vulgatum.</i>
<i>Parietaria officinalis.</i>	<i>Nitella opaca.</i>
<i>Salix repens.</i>	

## 25. ROSCOMMON.

<i>Raphanus Raphanistrum.</i>	<i>Chenopodium Bonus-Henricus.</i>
<i>Hypericum humifusum.</i>	<i>Populus tremula.</i>
<i>Ononis arvensis.</i>	<i>Empetrum nigrum.</i>
<i>Trifolium hybridum.</i>	<i>Epipactis latifolia.</i>
<i>Lotus uliginosus.</i>	<i>Eleocharis multicaulis.</i>
<i>Vicia hirsuta.</i>	<i>Carex vulpina.</i>
<i>angustifolia.</i>	<i>laevigata.</i>
<i>Callitriche stagnalis.</i>	<i>Agrostis canina.</i>
<i>Smyrnum Olusatrum.</i>	<i>alba.</i>
<i>Ceananthe crocata.</i>	<i>Melica uniflora.</i>
<i>Filago germanica.</i>	<i>Festuca arundinacea.</i>
<i>Gnaphalium sylvaticum.</i>	<i>Lastrea temula.</i>
<i>Jasione montana.</i>	<i>Botrychium Lunaria.</i>
<i>Lithospermum officinale</i>	<i>Chara aspera.</i>
<i>Hyoscyamus niger.</i>	

## 26. MAYO EAST.

<i>Ranunculus penicillatus.</i>	<i>Atriplex patula.</i>
<i>sceleratus.</i>	<i>Rumex Hydrolapathum.</i>
<i>Lychnis diurna.</i>	<i>Euphorbia exigua.</i>
<i>Lotus uliginosus.</i>	<i>Salix alba.</i>
<i>Rosa arvensis.</i>	<i>Empetrum nigrum.</i>
<i>Myriophyllum spicatum.</i>	<i>Carex vulpina.</i>
<i>Valerianella dentata.</i>	<i>Bromus sterilis.</i>
<i>Anthemis Cotula.</i>	<i>Lolium temulentum.</i>
<i>Tanacetum vulgare.</i>	<i>Lastrea Oreopteris.</i>
<i>Lithospermum officinale.</i>	<i>Botrychium Lunaria.</i>
<i>Lycopus europæus.</i>	



27. MAYO WEST.

Ranunculus trichophyllus. penicillatus.	Tanacetum vulgare.
Aquilegia vulgaris.	Carduus pycnocephalus.
Glaucium flavum.	Primula officinalis.
Chelidonium majus.	Convolvulus arvensis.
Cakile maritima.	Solanum Dulcamara.
Stellaria Holostea.	Hyoscyamus niger.
Malva moschata.	Veronica hederæfolia.
Geranium lucidum.	Scutellaria galericulata.
Vicia hirsuta, angustifolia.	Euphorbia exigua.
Sempervivum tectorum.	Elodea canadensis.
Eryngium maritimum.	Avena pubescens.
Sium angustifolium.	Melica uniflora.
Pimpinella Saxifraga.	Bromus asper. sterilis.
Scandix Pecten-Veneris.	Lolium temulentum.
Æthusa Cynapium.	Agropyron repens.
Asperula odorata.	Aspidium aculeatum.
Valerianella dentata.	Ophioglossum vulgatum.
	Equisetum maximum.

28. SLIGO.

Aquilegia vulgaris.	Tanacetum vulgare.
Papaver dubium.	Statice rariflora.
Glaucium flavum.	Solanum Dulcamara.
Chelidonium majus.	Verbascum Thapsus.
Brassica Rapa.	Veronica hederæfolia. agrestis.
Cakile maritima.	Lycopus europæus.
Viola odorata.	Origanum vulgare.
Hypericum perforatum. humifusum.	Euphorbia exigua.
Ononis arvensis.	Empetrum nigrum.
Lotus uliginosus.	Potamogeton heterophyllus.
Vicia angustifolia.	Scirpus fluitans.
Sempervivum tectorum.	Carex extensa.
Eryngium maritimum.	Phleum pratense.
Crithmum maritimum.	Glyceria maritima.
Æthusa Cynapium.	Bromus sterilis.
Valerianella dentata.	Lastrea Oreopteris.
Filago germanica.	Equisetum maximum.
Anthemis Cotula.	Nitella opaca.

## 29. LEITRIM.

Ranunculus trichophyllus. penicillatus. sceleratus.	Scabiosa arvensis. Filago germanica. Gnaphalium sylvaticum.
Aquilegia vulgaris.	Authemis Cotula.
Papaver dubium.	Tanacetum vulgare.
Chelidonium majus.	Carduus pycnocephalus.
Brassica alba.	Jasione montana.
Reseda Luteola.	Lithospermum officinale.
Silene Cucubalus.	Convolvulus arvensis.
Viola odorata.	Hyoscyamus niger.
Polygala vulgaris.	Verbascum Thapsus.
Hypericum perforatum.	Origanum vulgare.
Malva moschata.	Euphorbia exigua.
Ononis arvensis.	Parietaria officinalis.
Trifolium hybridum.	Salix repens.
Potentilla procumbens.	Epipactis latifolia.
Anthyllis Vulneraria.	Sparganium simplex.
Vicia hirsuta.	Lemna trisulca.
Lathyrus macrorrhizus.	Scirpus fluitans.
Sedum anglicum.	Glyceria maritima.
Smyrniium Olusatrum.	Festuca rigida.
Pimpinella Saxifraga.	Bromus sterilis.
Scandix Pecten-Veneris.	Lolium temulentum.
Crithmum maritimum.	Botrychium Lunaria.
Valerianella dentata.	Chara hispida.

## 30. CAVAN.

Ranunculus trichophyllus. penicillatus. sceleratus.	Arctium intermedium. Carduus pycnocephalus. Jasione montana.
Aquilegia vulgaris.	Vaccinium Oxycoccus.
Papaver Rhæas.	Lithospermum officinale.
Chelidonium majus.	Solanum Dulcamara.
Brassica alba.	Hyoscyamus niger.
Cerastium tetrandrum.	Verbascum Thapsus.
Hypericum dubium.	Scrophularia aquatica.
Malva moschata.	Pinguicula lusitanica.
Ononis arvensis.	Chenopodium Bonus-Henricus.
Anthyllis Vulneraria.	Salix repens.
Vicia hirsuta.	Orchis pyramidalis.
Rosa spinosissima. arvensis.	Sparganium minimum.
Saxifraga tridactylites.	Potamogeton heterophyllus.
Smyrniium Olusatrum.	Carex teretiuscula.
Sambucus Ebulus.	Avena pubescens.
Anthemis Cotula.	Bromus sterilis.
Tanacetum vulgare.	Lolium temulentum.
Arctium minus.	Osmunda regalis.

## 31. LOUTH,

Ranunculus trichophyllus.	Populus tremula.
Nasturtium amphibium.	Empetrum nigrum.
Geranium lucidum.	Potamogeton heterophyllus,
Geum rivale.	perfoliatus.
Saxifraga tridactylites.	Scirpus setaceus.
Myriophyllum spicatum.	Carex lævigata.
Sambucus Ebulus.	Hornschuchiana.
Anthemis Cotula.	Avena pubescens.
Veronica polita.	Bromus giganteus.
Scutellaria galericulata.	Cystopteris fragilis.
Littorella lacustris.	Chara aspera.
Salix purpurea.	Nitella opaca.

## 32. MONAGHAN

Aquilegia vulgaris.	Vaccinium Oxycoccus.
Chelidonium majus.	Primula officinalis.
Nasturtium amphibium.	Hyoscyamus niger.
Erophila vulgaris.	Verbascum Thapsus.
Brassica alba.	Veronica hederæfolia.
Viola odorata.	polita.
Polygala vulgaris.	montana.
Cerastium tetrandrum.	Pinguicula lusitanica.
Arenaria trinervia.	Mentha sativa.
Hypericum dubium.	Origanum vulgare.
Malva moschata.	Chenopodium Bonus-Henricus.
Geranium lucidum.	Euphorbia exigua.
Ononis arvensis.	Parietaria officinalis.
Anthyllis Vulneraria.	Salix repens.
Rosa spinosissima.	Populus tremula.
Saxifraga tridactylites.	Empetrum nigrum.
Myriophyllum spicatum.	Rhynchospora alba.
Pimpinella Saxifraga.	Carex vulpina.
Æthusa Cynapium.	Avena pubescens.
Solidago Virgaurea.	Festuca elatior.
Tanacetum vulgare.	Bromus sterilis.
Senecio sylvaticus.	Lastrea Oreopteris.
Arctium minus.	Osmunda regalis.
intermedium.	Chara aspera.
Carduus pycnocephalus.	hispida.
Leontodon hirtus.	vulgaris.

## 33 FERMANAGH.

Ranunculus trichophyllus.	Hyoscyamus niger.
sceleratus.	Verbascum Thapsus.
Papaver Rhæas.	Scrophularia aquatica.
dubium.	Veronica polita.
Brassica alba.	Utricularia vulgaris.
Cerastium tetrandrum.	Pinguicula lusitana.
Malva moschata.	Origanum vulgare.
Ononis arvensis.	Chenopodium Bonus-Henricus.
Saxifraga tridactylites.	Euphorbia exigua.
Sedum anglicum.	Parietaria officinalis.
Sempervivum tectorum.	Scirpus fluitans.
Scandix Pecten-Veneris.	Carex teretiuscula.
Filago germanica.	Alopecurus pratensis.
Petasites fragrans.	Festuca rigida.
Arctium intermedium.	Bromus sterilis.
Carduus pycnocephalus.	Lolium temulentum.
Jasione montana.	Ophioglossum vulgatum.
Vaccinium Oxycoccus.	Botrychium Lunaria.
Lithospermum officinale.	Chara hispida.

## 34. DONEGAL, EAST.

Ranunculus trichophyllus.	Arctium intermedium.
Papaver Rhæas.	Statice rariflora.
Glaucium flavum.	Primula officinalis.
Nasturtium palustre.	Euphorbia Paralias.
Viola arvensis.	Sparganium minimum.
Hypericum dubium.	Lemna trisulca.
Trifolium hybridum.	Chara aspera.
Œnanthe Phellandrium.	hispida.
Valerianella dentata.	vulgaris.

## 35. DONEGAL, WEST.

Ranunculus penicillatus.	Anthemis Cotula.
Aquilegia vulgaris.	Carduus pycnocephalus.
Glaucium flavum.	Vaccinium Oxycoccus.
Nasturtium palustre.	Hyoscyamus niger.
amphibium.	Verbascum Thapsus.
Viola odorata.	Origanum vulgare.
canina.	Rumex Hydrolapathum.
arvensis.	Parietaria officinalis.
Hypericum dubium.	Elodea canadensis.
Malva moschata.	Lemna trisulca.
Trifolium hybridum.	Carex Hudsonii.
Potentilla procumbens.	Trisetum flavescens.
Sium angustifolium.	Lolium temulentum.
Œnanthe Phellandrium.	

## 36. TYRONE.

<i>Aquilegia vulgaris.</i>	<i>Primula officinalis.</i>
<i>Erophila vulgaris.</i>	<i>Scrophularia aquatica.</i>
<i>Cochlearia officinalis.</i>	<i>Thymus Serpyllum.</i>
<i>Cerastium tetrandrum.</i>	<i>Salix repens.</i>
<i>Arenaria serpyllifolia.</i>	<i>Orchis pyramidalis.</i>
<i>Sagina nodosa.</i>	<i>Lemna trisulca.</i>
<i>Malva moschata.</i>	<i>Potamogeton heterophyllus.</i>
<i>Geranium lucidum.</i>	<i>Scirpus fluitans.</i>
<i>Ononis arvensis.</i>	<i>Carex Hudsonii.</i>
<i>Vicia hirsuta.</i>	<i>præcox.</i>
<i>Saxifraga tridactylites.</i>	<i>distans.</i>
<i>Sium angustifolium.</i>	<i>Hornschnuchiana.</i>
<i>Scandix Pecten-Veneris.</i>	<i>Glyceria maritima.</i>
<i>Valerianella dentata.</i>	<i>Festuca rigida.</i>
<i>Anthemis Cotula.</i>	<i>Ophioglossum vulgatum.</i>
<i>Arctium minus.</i>	<i>Selaginella selaginoides.</i>
<i>Carduus pycnocephalus.</i>	<i>Chara hispida.</i>
<i>Leontodon hirtus.</i>	<i>vulgaris.</i>
<i>Jasione montana.</i>	<i>Nitella opaca.</i>

## 37. ARMAGH.

<i>Brassica alba.</i>	<i>Carduus pycnocephalus.</i>
<i>Geranium lucidum.</i>	<i>Rumex Hydrolapathum.</i>
<i>Ononis arvensis.</i>	<i>Salix repens.</i>
<i>Saxifraga tridactylites.</i>	<i>Habenaria bifolia.</i>
<i>Sium angustifolium.</i>	<i>Carex teretiuscula.</i>
<i>Petasites fragrans.</i>	<i>distans.</i>
<i>Arctium minus.</i>	<i>Lolium temulentum.</i>
<i>intermedium.</i>	<i>Lastrea spinulosa.</i>

## 38. DOWN.

<i>Ranunculus penicillatus.</i>	<i>Lithospermum officinale.</i>
<i>Geranium lucidum.</i>	<i>Carex Hudsonii.</i>
<i>Parnassia palustris.</i>	<i>Lastrea spinulosa.</i>

## 39. ANTRIM.

<i>Glaucium luteum.</i>	<i>Ruppia rostellata.</i>
<i>Brassica alba.</i>	<i>Lastrea spinulosa.</i>
<i>Crithmum maritimum.</i>	<i>Chara hispida.</i>

## 40. LONDONDERRY.

<i>Glaucium luteum.</i>	<i>Statice rariflora.</i>
<i>Crithmum maritimum.</i>	<i>Euphorbia Paralias.</i>
<i>Anthemis Cotula.</i>	<i>portlandica.</i>
<i>Petasites fragrans.</i>	<i>Sparganium minimum.</i>
<i>Arctium minus.</i>	<i>Festuca rigida.</i>
<i>Leontodon hirtus.</i>	<i>Chara fragilis.</i>

A REMARKABLE FISH  
(*LUVARUS IMPERIALIS*)

OBTAINED ON THE SOUTH COAST OF IRELAND.

BY R. F. SCHARFF, PH.D.

ON the 24th July last a very peculiar fish was captured near the "Seven Heads," one of the rocky promontories of the southern coast of the County Cork. It was sent to the market in Cork under the impression that it was a Sturgeon, and was duly disposed of.

Fortunately, Mr. J. E. Longfield, of Enniskean, Co. Cork, had a curiosity to know more about the fish, and with the true instincts of a naturalist he took careful measurements and a photograph of it. He gives the length of the fish as having been 4 feet 6 inches, and the weight about  $1\frac{1}{2}$  cwt. The general colour he describes as a metallic reddy orange, lighter underneath, which was easily rubbed off, leaving the fish of a silvery colour all over. The tail and lateral fins were of the brightest scarlet—almost vermilion. The first ray of the dorsal fin was extended into a most peculiar looking flexible tendril about one foot long with a similar extension on the ventral fin. The mouth was small, with very small if any teeth. Both dorsal and ventral fins were composed of a series of semi-detached fins, and there was a slight projection or keel at each side of the body near the tail.

When these descriptions and the photograph arrived at the Museum during my absence, Mr. Nichols identified the fish as *Luvarus imperialis*—an exceedingly rare species, which, like most other rare animals, possesses none but the scientific Latin name. It had not hitherto been met with in the Irish seas.

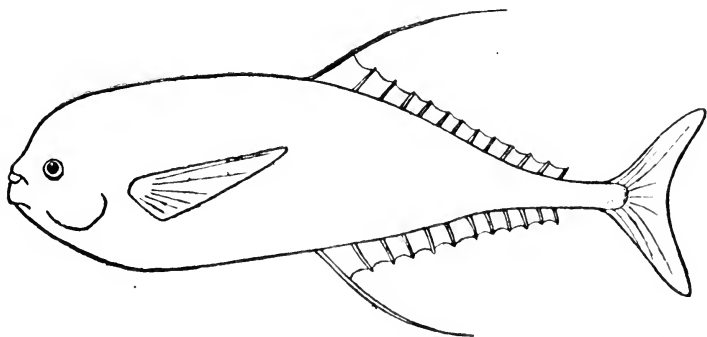
Although Mr. Longfield's description differs in some important respects from the original one of the eminent French zoologist Rafinesque, I feel no hesitation in agreeing with Mr. Nichols's determination of the fish.

One of the most striking differences between the original description and that of Mr. Longfield, is that the latter describes the dorsal and ventral fins as being composed of a series of smaller fins. However, in carefully examining the photograph with a lens one perceives clearly—certainly in

the case of the anal (Mr. Longfield's ventral fin)—that this supposed series of small fins was produced after death, and that it was originally one connected fin.

Another difference from the original was the fact of the first dorsal and the first ventral fin rays being elongated in our Irish specimen and not so in the other. This, however, is not of serious importance, as in many species of fish the mature male differs from the female by the possession of a similar elongation of the fin ray. The character may, therefore, be looked upon as a sexual one.

*Luvarus imperialis* was first taken on the coast of Sicily by Rafinesque, and described by him in 1808. It has since been noticed again in the Mediterranean, on the west coast of France, at Madeira, and on the coast of Cornwall. There are apparently only three specimens in existence in museums, one in the Museo Civico at Genoa, another in the Musée d'Histoire Naturelle of Paris, and a third in the British Museum. It is to be greatly regretted that the first Irish specimen has not been preserved; at the same time it is satisfactory to know that we possess such a careful description of the fish as that of Mr. Longfield's, who, it is to be hoped, will take steps to secure the next specimen he meets with for one of the Irish museums.



*Luvarus imperialis.* One-fourteenth natural size.

Mr. Longfield's photograph not having proved quite suitable for reproduction, I have had a copy drawn replacing the pectoral fin in its right position and restoring the dorsal and anal fins to what I considered was their original structure.

Science and Art Museum, Dublin.

SOME NOTES ON THE FLORA OF GLENARIFF,  
CO. ANTRIM.

BY DEAN C. F. D'ARCY, D.D.

DURING a short stay at Parkmore, at the head of Glenariff, in the earlier part of the summer, I was able to make a few observations of the more interesting plants of that part of Co. Antrim. The flora of the glen is exceedingly rich. Perhaps there is no spot in Ireland where the more beautiful of our common spring flowers grow in such abundance, or bloom so profusely. A striking ornament in May is the Bird Cherry (*Prunus Padus*), which, in one place, grows in a thicket so obviously natural that all suspicion of the cunning hand of the planter is impossible.

The lower part of the glen is broad and open, but bounded on both sides—north and south—by steep grassy slopes clothed in part with dense Hazel scrub, and crested with long lines of precipitous crags. These cliffs are, in most places, difficult and dangerous to climb; the treacherous trap rock disintegrates at a touch, often in the most unexpected manner. Here and there magnificent gorges seam the cliffs from top to bottom. In its upper part the glen divides into two narrow ravines. Of these, the northern is by far the richer. Here it is that the spring flowers bloom in greatest abundance; and here, also, the natural wood is most diversified.

There are two other regions of considerable botanical interest which must be connected with Glenariff: a circle of boggy mountains surrounding its upper extremities and supplying the water of its river, and a series of plateaux of dry pasture varying in height from 1,000 to 1,200 feet above sea-level, supported upon the summits of the cliff-walls which bound the broad lower glen.

On the cliffs several interesting plants were seen. Here the pretty *Arenaria verna* is abundant, and *Saxifraga hypnoides* frequent, especially in the gullies and gorges. In a wet gully on the south side, about 900 feet above sea-level, *Hymenophyllum unilaterale* was found in considerable quantity. This seems to be a new station. Along a mile or so of the north cliffs *Juniperus nana* grows in great abundance. It is also to be found, though not so abundantly, on the south cliffs. This



plant was reported from Glenariff by Templeton, and, in recent years, by Mr. Praeger. But, perhaps, the most interesting "find" in this part of the glen was the Yew (*Taxus baccata*). It was reported from here in 1795 by Templeton (see *Flora of North-East Ireland*, p. 133), who found it, as he tells us, "among rocks at Glenariff on the north side, about half way up the glen." He adds, "It is now reduced to a few stunted plants growing out of the crevices of the rocks." It has never been reported since Templeton's time; and the authors of the *Flora of North-East Ireland* considered it extinct in the county in 1888. I am happy to say that I found two trees growing very high up on the face of the cliff, in the part of the glen described by Templeton. One of them is evidently very old, and, though of stunted growth, has a trunk of considerable thickness. It is not possible to get quite close to it without a rope; but I was able to get near enough to be absolutely certain of its identity. Mr. N. Colgan visited the spot since, and confirmed the identification.

All along the north side of Glenariff, wherever the trap has become thoroughly disintegrated, *Orobanche rubra* grows freely. High up the cliffs, to the very summits, may be seen the spots of rich red colour, which mark its presence so distinctly. In one place, close to the high road—on some warm slopes of crumbling rock—this plant is to be found in an abundance which is probably unequalled.

Turning from the cliffs to the grassy plateaux above them, I have to note the Moonwort (*Botrychium Lunaria*) as very abundant, and growing to larger dimensions than I have seen elsewhere. It is not too much to say that the Moonwort will be found all round Glenariff, in almost every suitable spot, if one only takes the trouble to look for it. The Adder's Tongue (*Ophioglossum vulgatum*) I found in one place only, not far from Parkmore House. In the same neighbourhood, *Cystopteris fragilis* grows in profusion.

On the grassy plateaux were also found *Lycopodium clavatum* and *L. alpinum*. The former, already reported from Evisk and from Slievenanee in this neighbourhood, I found in great quantity on the north side of the glen, half-way between Parkmore and Lurigethan. The latter I saw in many places, some of which have been already reported by other observers.

In the glen the following interesting plants were observed:—*Rubus saxatilis*, *Pyrola minor* in several places (already reported from Glenariff by Rev. S. A. Brenan), *Sedum rupestre*—growing on natural rocks, far from cultivation, and looking native—*Epilobium angustifolium* and Beech Fern, luxuriant in many places.

On the boggy mountains surrounding the upper glen some interesting plants were observed. *Vaccinium Oxycoccus* (Cranberry)—first found in this neighbourhood, some years ago, by the Rev. S. A. Brenan, and noted by me in several places—was this year remarkable for an extraordinary morbid development of its young shoots. Specimens having been sent to Mr. Greenwood Pim, the strange growth was found by him to be due to a microscopic fungus, *Calyptospora gæppertiana*, which is common in America on *Vaccinium Vitis-idea*. Here, too, *Carex irrigua* was first discovered in Ireland by Miss E. D'Arcy, as already recorded in the September issue of this Journal.

On Slievenanee I found *Salix herbacca* growing in considerable quantity about some rocks near the little cairn at the north end of the summit. This plant was found here by Mr. Templeton, as reported in *Flora Hibernica*, but does not seem to have been noted in the locality since. On an old disused road, high up on the side of Trostan, *Anthemis nobilis* (Chamomile) grows in some abundance.

Perhaps it may be of interest to mention that in Glenballyemon, not far from Retreat, I found *Lastrea Oreopteris* and *L. emula*, two ferns which, though not exactly rare in Ireland, are far from common in Co. Antrim.

Belfast.

## THE MALE OF VESPA AUSTRIACA.

BY DENIS R. PACK-BERESFORD, D.L.

IN the *Irish Naturalist*, vol. vi, p. 285, an interesting article appeared by Mr. H. K. G. Cuthbert on the rarest of Irish wasps — *Vespa austriaca*. In that article, as also in Mr. Edward Saunders' "British Hymenoptera Aculeata," it was stated that females only of this wasp had been found in Great Britain. Since then, however, the Rev. O. P. Cambridge recorded in the *Irish Naturalist*, vol. vii., p. 18, the capture of one male in Dorsetshire, and in vol. viii., p. 163, Mr. C. W. Buckle records the capture of a single male in Co. Donegal in August, 1898. Two or three specimens have also been taken, Mr. Saunders tells me, in Scotland, but these, with the exception of Mr. C. Robson's discovery of males and females in the nest of *V. rufa* (*Science Gossip*, vol. v., 1899, p. 69), are the only instances on record of its capture in these islands.

It is, therefore, interesting to be able to record its occurrence in considerable numbers. On the morning of August 7th this year I caught a wasp, which I identified as a male *V. austriaca*, and knowing from experience that where one male is caught there are often more, I began a diligent hunt, and was rewarded by catching 17 more on the same afternoon and 30 on the following day. After that I caught few nearly every day till August 25th—my total in all amounting to 128 specimens.

Both Mr. Carpenter and Mr. Edward Saunders, to whom I sent specimens, have been so kind as to examine them and confirm their identity. All were caught in one part of my grounds—a piece of rough grass, some two acres or so in extent, in which are planted specimen conifers of various kinds, and which is nearly surrounded by fir plantations. I caught them hawking round nearly all the young specimen trees, but *Abies Nordmaniana* seemed to be specially favoured. One young specimen in particular of this tree was, during nearly the whole of August, covered with workers of *V. vulgaris* and *V. rufa*. I caught a few males of *V. rufa* at the same time, and succeeded in finding three nests of that species in the immediate neighbourhood, but these contained nothing but *V. rufa*, as I took all three nests, and examined every wasp in them.

The nest from which the *V. austriaca* were coming must have been very near, as I found them nowhere else, but my most diligent search failed to discover it.

Fenagh House, Bagnalstown.

## MOSSES NEW TO IRELAND.

BY REV. H. W. LETT, M.A.

THREE fine mosses have recently been collected in Ireland which appear to be new to the country. Their occurrence in Ireland is interesting, as hitherto they have been known in the British Isles only in a few localities in Scotland.

**Campylopus Shawii**, Wils.—Adrigole, near Glengarriffe, Co. Cork, June, 1896; Rev. C. H. Binstead.

**Campylopus Schimperi**, Wils.—By the side of the stream, at 1,400 feet, in Derrymore Glen, near Cahir Couree Mountain, Co. Kerry, April, 1899; Rev. H. W. Lett and D. M'Ardle.

**Dicranum uncinatum**, C. M.—On rock faces, at 1,200 ft., by the sides of two streamlets on the south-east face of Nephin Mountain, Co. Mayo, May, 1901; Rev. H. W. Lett and D. M'Ardle. This plant was growing in luxuriant cushions in a few places on the shaded sides of the little ravines.

To the above may be added the following notes on three other and rare mosses which have been discovered for the second time in Ireland, and all in new stations:—

**Campylopus subulatus**, Schpr. — [Cromagloun, Killarney, Co. Kerry, June, 1885; Schimper and Wilson.] Near Glengarriffe, Co. Cork, June, 1900; Rev. C. H. Binstead and Dr. Braithwaite.

**Hypnum dilatatum**, Wils.—[There does not appear to be any record of this from Ireland, except that in Dr. Braithwaite's *Brit. Moss Flora*, vol. iii., p. 57—Torc Waterfall, Killarney, 1865, Capt. Hutton.] Connor Hill Pass, near Dingle, Co. Kerry, September, 1897; Rev. H. W. Lett and D. M'Ardle.

**Hypnum fluviatile**, Swartz.—[Ballinhassig, near Cork, in Mackay's *Flora Hibernica*, pt. 2, p. 38.] On rocks in Bann River, at Corbet Mills, two miles east of Bannbridge, Co. Down, July, 1900; Rev. H. W. Lett and C. H. Waddell.

Aghaderg, Loughbrickland.

## WASPS IN COUNTY WICKLOW.

BY R. M. BARRINGTON AND C. B. MOFFAT.

FROM 1893 TO 1901 the number of queen wasps killed at Fassaroe amounts to 1,155. The following are the numbers for each year (none were killed in 1895 owing to change of gardeners), showing in what proportion the different species prevail:—

YEAR.	<i>Vespa vulgaris</i> .	<i>V. germanica</i> .	<i>V. rufa</i> .	<i>V. sylvestris</i> .	<i>V. norvegica</i> .	<i>V. austriaca</i> .	TOTAL.
1893 (during May), .	39	—	12	1	7	3	62
1894 (to June 6th), .	42	8	2	15	13	—	80
1896 (to May 28th), .	82	6	4	21	16	1	130
1897 (to June 17th), .	60	25	23	69	23	1	204
(June 18th to 24th),	—	—	—	—	—	3	
1898 (to July 2nd), .	26	—	—	22	3	—	51
1899 (to May 18th), .	17	2	4	12	—	—	235
(May 19 to 31), .	36	5	12	17	6	—	
(May 31 to June 13),	52	4	31	18	5	2	
(June 14 to July 9),	4	—	3	1	—	4	
1900 (first lot), .	89	25	8	6	12	—	189
(second lot), .	26	10	1	3	4	—	
(third, July 2nd), .	3	—	—	1	—	1	
1901, . . . . .	112	30	19	21	20	2	204
Total . . . . .	588	115	119	207	109	17	1155

From the above table it appears that *Vespa vulgaris* slightly outnumbers the remaining five species added together, while *V. sylvestris* comes second in order of numerical preponderance; *V. rufa*, *V. germanica*, and *V. norvegica* rank respectively third,

fourth, and fifth, but are very nearly equal in numbers. The percentages are :

vulgaris.	germanica.	rufa.	sylvestris.	norvegica.	austriaca.
50·9	10	10·3	17·9	9·4	1·5

It does not follow that these figures give an accurate idea of the relative strength of each species in autumn, because some probably have larger nests than others ; but they may be taken as representative of the numbers of the *queens* in early summer, as far as it is possible to take a satisfactory census in one locality.

The proportions have varied to an extraordinary degree in different years. This may be seen from the following table, showing for each species what percentage of the total number killed belonged to it in each year :—

YEAR.	V. vulgaris.	V. germanica.	V. rufa.	V. sylvestris.	V. norvegica.	V. austriaca.
1893, . . .	62·9	0	19·4	1·6	11·3	4·8
1894, . . .	52·5	10	2·5	18·7	16·2	0
1896, . . .	63·1	4·6	3·1	16·2	12·3	0·8
1897, . . .	29·4	12·3	11·3	33·8	11·3	2·0
1898, . . .	51·0	0	0	43·1	5·9	0
1899, . . .	46·4	4·7	21·3	20·4	4·7	2·6
1900, . . .	62·4	18·5	4·8	5·3	8·5	0·5
1901, . . .	54·9	14·2	9·3	10·3	9·8	1·0

*Vespa vulgaris* has held the first place every year, except 1897, when *V. sylvestris* outnumbered it. The second place is usually held by *V. sylvestris*, but was taken by *V. rufa* in 1893 and 1899, and by *V. germanica* in 1900 and 1901. *Vespa norvegica*, though the scarcest (except *V. austriaca*) of the six, has never been so rare as *V. sylvestris* was in 1893, *V. germanica* in 1893 and 1898, and *V. rufa* in 1894 and 1898.

*Vespa germanica* fluctuates more than *V. vulgaris* in numerical strength. Of the total number killed (115), 90 were obtained in the three years 1897, 1900, and 1901, and only 25 in the remaining five years. *V. germanica* is said by Mr. Saunders to be almost as common as *vulgaris* in the south of England.

It is well known that *Vespa rufa* occurred in unusually large numbers in many parts of Ireland in 1899 (see *Irish Naturalist*, vol. viii., pp. 163, 208, and 209). The number of queens killed at Fassaroe that year amounted to 50; while in the course of the remaining seven years only 69 were killed altogether. *V. rufa* did not, however, prevail here to nearly so great an extent as it did in parts of Counties Carlow, Derry, and Down, according to notes furnished by Mr. D. R. Pack-Beresford (*I. N.*, vol. viii., p. 209); for out of a total of 361 queen wasps killed by that gentleman, as many as 261—or 72 per cent.—were of this species, whereas its percentage at Fassaroe was only 46½.

Of the two tree-wasps, *Vespa sylvestris* and *V. norvegica*, the former is much the more common in this locality—unless the habits of the two differ so largely as to affect the proportions captured, which does not appear probable. It may be pointed out that the queens of these two species, added together, amount to more than a fourth (27 per cent.) of the whole number; a very large proportion, considering how much more numerous are the nests of the ground-building species.

Concerning the rare *Vespa austriaca*, of which altogether 17 specimens have been obtained here in the eight years treated of, it is important to note that in 1897, 1899, and 1901 the wasps killed were forwarded for examination in two or more instalments, each instalment consisting of the wasps killed up to the date of sending; and in each case it was found that *V. austriaca* occurred chiefly in the later lots. Thus, out of 201 wasps killed up to June 17th, 1897, only one was referred to that rare species; but three killed between June 18th and 24th were all *V. austriaca*. In 1899 two lots of 35 and 76 respectively, killed before the end of May, consisted solely of the more common kinds; but 112 killed in the first thirteen days of June comprised two *V. austriaca*; and a further consignment of 12 between June 14th and July 9th contained 4 specimens of the rarity. Again, in 1900, the only specimen of *V. austriaca* obtained turned up in the last lot forwarded for

examination, about July 2nd; whereas two previous lots, reaching the large total of 184 wasps, had contained none of that species. These figures tend to show that the last fortnight of June is the best time for collectors to look out for this very interesting Irish wasp.

There is a remarkable contrast between the total numbers of wasps killed in the two consecutive springs of 1898 and 1899. In the former year only 51 were obtained; in the latter 235. The average number per year is 144. It is possible that the wetness of the spring of 1898 (when April and May registered  $9\frac{1}{2}$  inches of rain at Fassaroe) may account for the scarcity in that year. The same period in 1894 had a still heavier rainfall, nearly 10 inches; but in that season also the number of queen wasps killed (80) was considerably under the average. In the dry spring of 1893 the total figure is only 62; but this proves nothing, as in that year few were looked for after the beginning of May.

The majority of the wasps were in most years killed on young shoots of hawthorn, and chiefly towards evening. On one day in early June, in 1899, the gardener killed as many as 74 on the raspberry canes; and it would appear from the figures corresponding to this period in the table, that *Vespa vulgaris* and *V. rufa* were probably the species to which most of these belonged.

Mr. Edward Saunders says in letter, 1897:—

“I do not know of any character which distinguishes the nests of *sylvestris* and *norvegica* apart; but then I have, unfortunately, few opportunities of seeing nests.

“Please look for the ♂ of *V. austriaca* (*arborea*) as the autumn comes on, as that has only once been recorded from Britain. It may be known like the ♀ by having no cheeks between the eyes and mandibles, and having black-haired tibiæ. *Sylvestris*, &c., have black-haired tibiæ, but then they have long cheeks. I should have expected, on account of the short cheeks, that *austriaca* would have associated with *vulgaris* or *germanica*, or probably *rufa*, which last it specially resembles. *Austriaca*,<sup>1</sup> like the ♀ *Psithyri*, probably hibernates in an impregnated state, and comes out with the other Wasps. It looks as if it lives at large late in the season, when the queens of other species are attending to their communities.”

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<sup>1</sup>This was written before Mr. Robson's discovery placed beyond all doubt the inquiline habit of *austriaca* in the nests of *rufa*, and before Mr. Cuthbert obtained the first Irish specimen of the male.



At Fassaroe the nests of the tree-and bush-building wasps are not nearly so common as thirty to forty years ago, and those which nest in the ground appear to have increased during the same interval. As no specimens were preserved in the earlier years, the species cannot be referred to more definitely.

To Mr. Carpenter and Mr. Edward Saunders we are indebted for the identification of the specimens tabulated in this paper. They would all be called "wasps" by the general public—who only recognize one species. One of the most recent and far-fetched applications of the name "wasp," which has come under our notice, occurred in the letter of a Light-keeper who forwarded "a remarkable-looking wasp" on August 25th from Old Head, Kinsale. It was a Death's-head Moth!

Fassaroe, Bray.

## NOTES.

### BOTANY.

#### The Moss Exchange Club.

We have received the Sixth Annual Report of the Moss Exchange Club, which shows steady progress. The number of members is now thirty-seven. The copious critical notes and reports on plants sent in to the distributor should be of much value to students of bryology.

#### Another station for *Lastrea Thelypteris* in Co. Westmeath.

This interesting and rare fern grows luxuriantly over a small area of the very wet marsh at the south-east end of Lough Owel. I noted it there last August. Some of the fronds which I gathered were considerably over two feet in length.

CHARLES F. D'ARCY.

Belfast.

#### *Hypopithys multiflora* near Roscommon.

Mr. S. V. Coote sends me fresh specimens of this rare plant from his demesne, Carrowroe Park, Roscommon, collected on September 16; he describes it as being "fairly common in the beech and fir woods" there.

R. LLOYD PRAEGER.

Dublin.

## ZOOLOGY.

## Selection of Plants by Animals.

A Cottony scale-insect, which Mr. R. Newstead has kindly identified as *Cryptococcus fagi*, occurs in the Trinity College Botanic Gardens. It is curious in its habitat. We have a Weeping Beech that was originally grafted upon the Common Beech as a stock, and the curious fact is that the *Cryptococcus* exists on the stock portion *only*, rarely, if ever, spreading over the grafting-line, that is to say, on to the adjacent bark of the scion, or weeping variety above.

This is, of course, only one of the countless instances where "selection" of the most discriminating kind is made by insects, molluscs, and even fungi, as to their food or habitats.

We grow here, for example, two dwarf Narcissi, which ordinary visitors often mistake for the same plant, though an expert at once can see a difference.

The common Grey Slug also discriminates between them, and eats off the flowers of the one (*N. nivar*), while rarely or never touching those of the other (*N. narrys*). There are varieties of fruiting Hollies here which closely resemble each other in early winter, and yet the endemic fruit-eating birds of the garden—Blackbirds, Thrushes, etc., and the Mistle Thrushes Fieldfares, etc.—that come down from the hills on approach of frost and snow, clear off every berry on some bushes, and leave those of others untouched! In this case my own experience tells me that they eat those berries containing most sugar, and leave the acid or astringent ones alone as long as possible short of absolute starvation.

But as even the plants show great discrimination in selecting food, support, shelter, shade, or sunshine, etc., one need not wonder at beings higher in nature's scale doing so as well.

F. W. BURBIDGE.

Dublin.

### *Agrotis cinerea*—a new Irish Moth.

I captured at light, on June 21st, 1897, at Tullylagan, Co. Tyrone, what I supposed at the time was a variety of *Agrotis corticea*.

Subsequently examining it more closely, I came to the conclusion that it could hardly be a variety of that species, as the markings did not agree in any way with that insect. On coming to Dublin I brought it to the Kildare-street Museum, to make sure about it, where Mr. Carpenter identified it as *Agrotis cinerea*. It agrees more with the continental than with the British specimens in the Museum collection.

T. GREER.

Blackrock, Co. Dublin.

### Abundance of *Vanessa io* in 1901.

The many references to the Peacock Butterfly in the current volume of the *Irish Naturalist*, pointing to its local or relative abundance, or to its appearance in places where it was hitherto rarely or never seen, show that some of the seasonable conditions which favour insect development must have lately affected this interesting species.

Round Sligo, between July 18th and 22nd, I noticed it in great numbers, in fact it was there by far the commonest of the coloured butterflies. Likewise about Limerick, early in August I saw it frequently; and in Co. Kerry, along the Feale at Ballinruddery, and in the woods of the Knight of Kerry's demesne.

At the latter place the Silver-washed and Greasy Fritillaries were also numerous, but for every single example of these species there were at least half-a-dozen Peacocks.

H. G. CUTHBERT.

Dublin.

### *Sirex gigas*, L., in Co. Down.

I captured a fine female example of the above large Saw Fly on the 20th inst., at rest on the trunk of a felled fir-tree in Clandeboye demesne near Bangor. I was greatly surprised to meet with this extraordinary insect, which is, I believe, of rare occurrence in Ireland.

L. H. BONAPARTE WYSE.

Bangor.

[*S. gigas* can hardly now be considered a rare insect in Ireland. Every summer several specimens came to the Dublin Museum from all parts of the country.—G. H. C.]

### Habits of Humble Bees.

My little son has read with delight Mr. Burbidge's note in the *Irish Naturalist* for September, on the behaviour of two bees. He wishes me to write and ask—

1st. Why Mr. Burbidge calls them Humble bees and not Bumble bees?

2nd. Why should a queen bee that was already wet and chilled require more cold water?

3rd. Why did the worker bee fight viciously with the queen to whose wants it was so assiduously attending a moment previously?

4th. What did the worker bee "fetch" the water in?

JAMES R. FITZGERALD.

High-street, Clones.

I will answer in all seriousness the four questions that have been propounded.

1. I called *Bombus terrestris* a "Humble Bee," because that appears to be the authentic designation of which "Bumble Bee" may possibly be only a corruption.

2. Possibly the queen bee did not want more water, it might be that the worker only wished to use some for moistening the wings that adhered to the body.

3. I am not sure that the worker bee fought viciously with the queen bee, it may have been *vice versa*, and that the worker was merely acting as it did in self-defence. I said that they "seemed to fight viciously with each other," not that either one or the other actually did so.

4. The worker bee to all appearance carried the water by the aid of its jaws (maxillæ).

F. W. BURBIDGE.

Dublin.

### Entomological Notes from Abbeyleix.

During the present year I took the following beetles amongst many more in this locality:—*Chlenius vestitus*, Payk. *Agabus bipustulatus*, L.—on a garden hedge. *Halyzia conglobata*, L. *Sphæridium bipustulatum*, F.—one perfectly black specimen. *Necrophorus ruspator*, Er. *Cycharanus fungicola*, Heer. *Sinodendron cylindricum*, L.—numerous specimens in rotting wood. *Meloe proscarabeus*, L.—widely distributed from April to early June. *Adimonia tanacetii*, L.—apparently widely spread here. *Galerucella viburni*, Payk.—numerous in the woods.

J. MONTGOMERY BROWNE.

Abbeyleix.

### Reported occurrence of the Red-throated Pipit in Ireland.

In the *Zoologist* for July, Mr. F. Coburn writes fully concerning two specimens in his possession, which he considers undoubtedly referable to this species—the one shot by himself in Mayo in 1895, the other by Mr. H. Elliott Howard in Donegal in 1898. We have not noticed this record earlier, since we understand that our leading Irish ornithologists are not yet satisfied regarding the identity of these specimens. We trust that further investigation will definitely determine whether *Anthus cervinus* is to be added to the Irish list.

### Turtle Dove in Co. Dublin.

On Bank Holiday, 5th August, I obtained a Turtle Dove (male) in adult plumage at Portmarnock, Co. Dublin. The bird was alone; it would be interesting to find this species breeding in Ireland, as most of the specimens have been obtained early in spring and in the autumn, the latter almost invariably being immature birds.

W. J. WILLIAMS.

Rathgar.

### Wood Sandpiper in Co. Dublin.

On the 19th of August, whilst beating a small piece of marsh ground near Sutton for Snipe, a bird rose uttering a peculiar note which I was not familiar with. On shooting it I was much pleased to find it was a Wood Sandpiper in immature plumage. This, I believe, is the first occurrence of this rare Sandpiper in Co. Dublin, and the sixth occurrence in Ireland—one having been obtained in Calary Bog, Co. Wicklow, 23rd August, 1885, and two shot by Dr. Knox in same locality on the 3rd August, 1896.

W. J. WILLIAMS.

Rathgar.

### Black-tailed Godwits in Co. Wexford.

On the 6th of August inst., my friend, Mr. A. L. Otway, shot on the mud-flats of Wexford Harbour a Black-tailed Godwit, which he kindly sent to me. Its head and neck were reddish, its breast barred, and its back mottled with black, in the plumage of summer. I have sent it to Messrs. Williams and Son for the Museum of Science and Art, Dublin.

On the 9th of August Mr. Otway shot another bird of the same species, which he sent to the Museum direct.

Both specimens were shot on the slob-lands near the mouth of Wexford Harbour, and many others were observed. I am informed by Mr. Otway that on two occasions he saw flocks of twenty to thirty, but that in the majority of instances there were single birds. The white at the base of the tail and the white base of the secondaries, described by Mr. Warren, as easily distinguishing the Black-tailed Godwit, were noticed

After they were first seen these birds rapidly diminished, and by the 20th of August they had become very scarce.

The early date at which the first was shot, its occurrence in summer dress, and the observation of flocks which appeared to be of the same species are facts of interest, especially in view of the late discussion in the *Irish Naturalist* by Mr. Barrett-Hamilton and Mr. Warren.

It is, however, to be observed that the flocks reported to the former were seen in winter, and were not fully identified as being of the same species as the specimen he obtained.

R. J. USSHER.

Cappagh, Co. Waterford.

## REVIEWS.

### ALL ABOUT IRELAND.

**Ireland: Industrial and Agricultural.** Handbook for the Irish Pavilion, Glasgow International Exhibition, 1901. Dublin: 1901. Department of Agriculture and Technical Instruction for Ireland. Pp. 290. With numerous illustrations. Price 2s. 6d. net.

The new "Department of Agriculture and Technical Instruction for Ireland" is to be congratulated most heartily, on the excellent "official handbook" to the Irish Pavilion at the Glasgow Exhibition recently published.

The Editor, Mr. William P. Coyne, says in his preface:—"It was thought well to take the opportunity afforded by the publication of such a work, to make it something more—indeed, something other—than an ordinary guide to the Irish Pavilion. The book opens with a description of the general geological and physiographic features of the country, followed by articles on the climate, flora, and fauna of Ireland. An analysis of the economic distribution of the population is then given, preliminary to an account of the internal means of communication and the banking facilities of the country. The next section is devoted to agricultural and technical education and art instruction. As leading up to the functions of the State Departments in regard to agriculture and industry, an account is given of the splendid work done by some of the great voluntary associations in Ireland in developing the material resources of the country. Two chapters are occupied with a necessarily curtailed analysis of the work of the Congested Districts Board, and the powers and constitution of the Department of Agriculture and Technical Instruction for Ireland. The principal Institutions of Science and Art which have now passed under the control of the Department are briefly described. Special articles deal with agriculture, live-stock, sea and inland fisheries, shipbuilding, the linen industry, the modern Irish lace industry, and the art and cottage industries of Ireland."

I have quoted this statement from the preface because it states more succinctly, and probably more clearly than I could do, what was the object of the Department in publishing this handbook; and it is the merest justice to the Department to say that this handbook fully carries out the promise held out in the preface. No doubt, in many of the articles there are statements made, and in some there are views expressed, with which I at least cannot fully concur; but this must necessarily happen in a work of such general character as this is, and the highest praise is due to the authors for the ability, learning, candour, and care shown by them in the several articles to which their names are annexed, and by the Editor or his unnamed—but very able—subordinates in the unsigned articles.

Having said so much of the work as a whole, we must consider how much of it comes sufficiently within the scope of the *Irish Naturalist*, as

to the appropriateness between them. Six of the articles clearly do. Those on "The Topography and Geology of Ireland," and on "Irish Minerals and Building Stones," by Prof. Cole, F.G.S.; on "The Soils of Ireland" and "The Climate of Ireland," by Mr. J. R. Kilroe; "The Flora of Ireland," by Dr. Johnson; and "The Animals of Ireland," by Mr. G. H. Carpenter.

In addition to these, the articles on "The Dublin Museum of Science and Art," by Col. Plunkett; on "The Ponies of Connemara," by Dr. Ewart, F.R.S.; on "The Irish Cattle Industry," by Mr. Robert Bruce; and on "The Sea Fisheries of Ireland" and "Inland Fisheries," by Mr. W. S. Green; and the unsigned articles on "The National Library," "The Irish Horse-breeding Industry" and "Sheep-breeding in Ireland," are of great general interest to all who have the scientific, the economic, or even the general interest of the country before their eyes. The residue of the handbook relates to subjects which are too far apart from these ordinarily dealt with by the *Irish Naturalist* to be expressly reviewed in it.

To deal now with the six papers which come directly into the field of the *Irish Naturalist*, the first paper of Prof. Cole's—to which the second is in substance an appendix—in addition to being a very clear and interesting summary of the views now held of the early geological history of Ireland, is by its eloquence a worthy proem to the whole book of which it is the first paper. Those who read it as it should be read, can hardly fail to form a desire to see with their own eyes the scenes therein so vividly described.

To them, also, will appear the vast importance of noting, as *indices* of whether or not there were local conditions which would allow of such deposit being formed, in the North of Ireland—as in Scotland—the Lower Carboniferous, with beds of coal, as at Ballycastle, resting directly on much older schistose rocks; and, perhaps, most remarkable of all, the gap in the Devonian series which led Prof. J. Beete-Jukes to divide the series into two groups. Or, on the other hand, as in the case of the later Carboniferous strata in Leinster and Munster, which show conditions proving the gradual removal of a great load of Coal-measures and lower Carboniferous grits, which once lay over the Carboniferous limestone, and has, except in bits, now disappeared.

Mr. Kilroe's two papers on the soils and on the climate of Ireland, which immediately follow those of Prof. Cole, give a clear, succinct, and intelligent account of the subjects dealt with, as might be expected from the scientific position of the author.

Dr. Johnson's paper, which comes next, is of great interest, from the valuable bibliography of Irish botany which it contains, and which will give the intending visitor—no matter what branch of botany he may seek to pursue—the fullest means of knowing where to find the guide for his work. The last sentence of this paper is but too sadly true;—"It must be a matter of surprise that so much excellent work has been done, when it is remembered that botany has hitherto received no encouragement either in the Elementary Schools or in the Boys' Secondary (or Inter-

mediate) Schools of the country, and that in the Girls' Secondary Schools it has been treated as a polite accomplishment, largely taught and altogether examined theoretically."

The remaining paper, which deals directly with the subject matter with which the *Irish Naturalist* is mainly concerned, is that by Mr. Carpenter on "The Animals of Ireland." This paper is remarkable not only for the care with which it summarizes the points—both of similarity with, and of difference between, the faunas of Ireland and of Great Britain—but shows that wide grasp of the changes in local connections, now more than ever necessary to be firmly held by one who wishes his view of the relationship now existing to correspond to, and correlate with, the known facts of earlier geological history. This paper also points clearly out how the south-western "Lusitanian" and the northern "Arctic" forms mix and overlap in the West of Ireland. This, familiar as it is to anyone who has worked either at the fauna or the flora of the West of Ireland, is specially interesting to anyone whose acquaintance and knowledge of these overlapping forms is confined to those existing in Scotland, where, from the difference in latitude, the "Lusitanian" forms are comparatively few and the "Arctic" forms very numerous, and how in common forms like the Varying Hare (*Lepus variabilis*) this "Arctic" type is that which is found throughout, and gives its character to the entire country. This paper also points out most clearly and distinctly how in Ireland, and especially on the western coast, and most of all in the sea washing that western coast, the "Lusitanian" and the "Arctic" type overlap.

Mr. Carpenter has pointed out the different courses by which these two sets of animals came to the west coasts of Ireland; the earliest from the south, then that overborne by those across the land connection with Scotland and Scandinavia, and that communication finally cut off before the later flow of animals from the east, Dr. Scharff's "Siberian migration" could reach Ireland.

There are two points on which a more distinct statement of Mr. Carpenter's views would have been more satisfactory than the way in which they have been put forward. First, as to the remains of bear in Ireland, Mr. Carpenter evidently does not look on the modern European Bear (*Ursus arctos*) as the same species with the "Grizzly Bear" (*Ursus horribilis*). If so, then the Irish Cave Bear was a species now found not nearer than the "Barren Grounds" of British North America, or possibly than the Rocky Mountains.

Second, in the reference to the former extent of distribution of *Helix pisana*, there is no reference to the fact that both the Azores and Madeira are "Pelagic" islands, so that even a wide extension of the European coast line would fall very short of them. These are, however, very small points.

The short summary of the "Economic Zoology" which follows and concludes Mr. Carpenter's valuable treatise is of much interest. Even if the Irish farmer can congratulate himself on the absence of the Voles



and the Mole, the birds, molluscs and insect larvæ described, give great cause for anxiety.

This ends the list of those articles which deal directly with the matters over which the *Irish Naturalist* is concerned. There remain, however, a number of articles dealing with matters more or less closely connected with the subjects. As to some of these it is not necessary to say more than that the subject dealt with has been treated clearly and intelligently. As to four of these articles that, however, would not be enough. Prof. Ewart's article on "The Ponies of Connemara" is, as might be expected, a model of what a paper on that subject should be. In his account of the existing varieties, the physical features of the country which has produced these varieties, and, I am sorry to have to say, his view as to the probable result of the present unregulated system of replacing Connemara sires by Welsh cob or Hackney sires. Prof. Ewart also deserves great credit for the illustrations to his paper, which are most excellent.

Mr. Bruce's paper, which follows Prof. Ewart, gives a very clear and definite account of how the present "Kerry" and "Dexter," if they are to be taken as distinct breeds, has originated, and are now being kept up, and is of great interest to those interested in the question.

The only other papers which I can here refer to are Mr. Green's on "The Sea Fisheries of Ireland" and on "Inland Fisheries"; two papers in which the present conditions of the fisheries of Ireland are succinctly described.

There are other papers in this volume to which praise might well be given, there are many other papers well deserving of praise, but we know that the field to which praise from the *Irish Naturalist* is appropriate is not a large one, and it is better to end by saying too little than too much.

R. R. KANE.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include four Peafowl, from Sir J. Banks; a Black-headed Gull, from General Sir J. Davis; a Carrion Crow, from Mr. T. P. Hart; and two Barn Owls, from Mr. Brooke.

### DUBLIN NATURALISTS' FIELD CLUB.

AUGUST 24.—EXCURSION TO LUCAN.—Twenty-five members attended. The party on arriving at Lucan walked from the Spa along the river-bank as far as the Salmon Leap and back. The day was beautifully fine and a good deal of collecting was done. After having tea at the Lucan Hotel the party returned to Dublin by the 7.30 train.

**BELFAST NATURALISTS' FIELD CLUB.**

JULY 6. THE CAVE HILL.—The party numbered about twelve. They visited the old stone fort at Ballyvaston and the ruins of the old church, of which foundations only are to be seen. In the field containing the fort some of the members found the Adder's-tongue fern. From the summit of Cave Hill a line of forts was pointed out, one of which was visited.

AUGUST 10.—Benevenagh's attractions were spoiled by a very wet morning, so that only two members turned up at the station.

JULY 11-13. THE ANTRIM COAST ROAD.—Members and friends assembled at the Northern Counties Station on Thursday morning in time for the 9.55 train. Zoologists, geologists, and botanists were well represented; and the scientific results of the three days' work, when fully worked out, promise to be creditable to the working members, and a valuable addition to the "Proceedings" of the Club.

On arrival at Larne, the drive along the Coast Road was commenced. The first stopping-place was Waterloo, where the party spent some time examining the Lias and Rhætic beds. On the land side of the road the overlying beds of Greensand were next visited. Resuming seats, the party proceeded along the coast through the Black Cave tunnel to Ballygalley Head, where the well-known "corn sacks" were noted. Passing O'Halloran's Castle, a more modern structure diverted attention, namely, Ballygalley Castle, a small but quaint specimen of Scottish baronial architecture, built in 1625. The Ballyrudder gravels were next noted, being celebrated through the investigations conducted by the B.N.F.C. some years ago. At the "Madman's Window," on the south side of Glenarm, a considerable time was spent. Glenarm was the next stopping-place. The party visited the large Chalkquarry on the Larne road, and several good fossils were picked up. The premises and workings of the Iron Ore Company were next examined, and the processes explained.

The large landslips between Glenarm and Carnlough were observed with interest. The next stopping-place was on the north side of Carnlough, where a small stream was examined and some specimens of the fresh-water Limpet obtained. The best find of the day was *Helix intersecta*, being new to East Antrim. At Garron Point the party stopped again, and, sending the luggage up to the hotel, spent some time examining the cliffs and rocks.

On Friday, the 12th, the party divided, the main body continuing the investigations of the previous day, examining the old fort and the natural history of the undercliff. After lunch this section continued the drive round the coast road and up the beautiful Vale of Glenariff. In the meantime the walking party, leaving Garron Tower at 9 o'clock, ascended the steep cliffs at the back, and began the examination of the botany and zoology of the moorland and bogs comprising the plateau.

Everything being of value from these high grounds, a miscellaneous collection was made—plants, beetles, spiders, shells, moths, butterflies. The most important discovery of the day was a colony of Herring Gulls breeding beside one of the lakes, being the first inland breeding-place known in Ireland, although thousands breed on our sea-cliffs all round the coast. For this and other reasons the walk took longer than was anticipated; but fatigue was banished on meeting the first section at the teahouse in Glenariff. Here the party was increased by the addition of some members staying in Cushendall, and the drive down Glenariff was begun. Red Bay castle and caves gave rise to an animated discussion. At Cushendall a very pleasant evening was spent.

The following morning (Saturday) some of the members were making ornithological notes by 5 o'clock, while the photographic section was again early astir, and visited Waterfoot in search of artistic snapshots. After 8 o'clock breakfast, the party again mounted vehicles and drove to "Ossian's Grave." The "grave" was photographed, and the drive to Cushendun resumed.

On arriving here the celebrated caves in the Old Red Sandstone were visited and thoroughly explored. After inspecting the remains of Garra Castle, the steep ascent of Tornamoney Hill was undertaken, in order to visit Tornamoney cashel. The large circle of stones is between 50 and 60 feet in diameter, and has a chamber in the thickness of the walls. Another cashel on the opposite side of the hill was next visited, but it was found to be in bad preservation and hardly worth the climb. Descending the hill, Cushendun was again reached, and soon the drive back began; it was with regret that Parkmore was reached. After a quick run to Belfast the party separated.

**AUGUST 24. THE GOBBINS.**—It is now some thirty-three years since the B.F.N.C. visited and explored the district of Islandmagee known as "The Gobbins." On Saturday, 24th August, the Field Club again visited the district. About one-half of the party of seventy started by the 12.50 train for Ballycarry Station. Arriving there, the majority of the party soon reached the high ground overlooking the North Channel. Here they descended from the cars, and proceeded on foot to the shore. In former years it was somewhat difficult progress, but on this occasion it was easily undertaken by everyone, as convenient stiles and footbridges have been erected by the Northern Counties Railway Company. Passing the first headland, a fine comprehensive view of the coast was obtained. As soon as the features of the landscape had been grasped the "Smugglers' Cave" was explored.

Passing onwards, the path by the shore was followed. The railway company has now built a pathway leading round the foot of the Gobbins cliffs. This path has been carried round the foot of the headland well above high-water mark along the ledges of basalt, and where walls of rock used to meet the traveller in former visits he will now find short tunnels cut through the solid rock. Where a gaping chasm yawned there is now a hanging bridge constructed of bearers of rolled iron joists, with a footway of solid plank. The party was conducted by Mr. B. D.

Wise round this path till we reached the first of that great series of caves that are to be found at the foot of the Gobbins cliffs. An inspection revealed ferns and liverworts of many varieties. Mr. Wise, the Engineer of the Northern Counties Railway Company, explained the intention of the company to carry the path further round the cliffs to reach some more of these famous caves, and ultimately they hope to provide access to the group of seven caves further along the coast. The general opinion of the party was that in the dealing with the problem of opening up this district Mr. Wise deserved great credit for his treatment of the subject. In no case is the natural beauty destroyed. What has been done is in keeping with the natural harmonies of the place. It is, however, the geologist that can best gain an idea of the beauty and grandeur of the place. But the interest is not confined to past history; the banks and fields are gay with flowers. Bird life is abundant among the crevices of the cliffs; the Peregrine Falcon and the Herring Gull find a home in the fastnesses of the rocks. Butterflies, too, are in abundance through the fields, one member noting the rare Peacock Butterfly *Vanessa io*.

## OBITUARY.

### Eleanor A. Ormerod.

Miss E. A. Ormerod, the renowned authority on economic entomology, passed away, at her home, St. Albans, England, on July 22nd, aged 74 years. We feel it due to join in the universal tribute to her memory, since her work on many occasions was of the most direct benefit to Irish agriculture and industry. Many inquiries on injurious insects were sent to her from this country, and all were dealt with in her characteristically painstaking and thorough style. Of her the customary saying is no empty compliment—she leaves a vacant place that cannot be filled.

### Martin F. Woodward.

As we go to press we learn with the deepest regret that a boat accident at Ballinakill, Co. Mayo, has caused the untimely death of this brilliant young zoologist, the son of Dr. Henry Woodward, of the British Museum, and Assistant to Prof. G. B. Howes, at the Royal College of Science, London. Mr. Woodward had been spending his vacation helping the research work carried on under the direction of the Inspectors of Fisheries. Returning with two companions on the night of the 15th September from Inishbofin, a squall struck the boat just at the entrance to Ballinakill Harbour, and she capsized. While the other two in the boat succeeded in reaching land, nothing has been seen or heard of Mr. Woodward. He has closed a career that promised to enrich zoology by much valuable morphological research by laying down his life in the cause of Irish industry and Irish science.

## SOME NORTH-EAST IRELAND RUBI.

BY REV. W. MOYLE ROGERS, F.L.S.

As bramble referee for the Watson Botanical Exchange Club, I have had dried specimens of Co. Down *Rubi* sent to me for annotation annually since 1893, the collectors being the Rev. C. H. Waddell and the Rev. Canon Lett—to both of whom I am very greatly indebted for help given me in the preparation of this paper. The majority of their specimens have caused me little or no difficulty, as they obviously belonged to familiar British forms; but in all of the packets in recent years there has been no inconsiderable admixture of unfamiliar-looking forms, which I only very gradually learnt to sort with any confidence. I was especially glad, therefore, of an opportunity of seeing the living bushes, over a fairly extensive area, under Canon Lett's guidance last July, while his guest for ten days at Aghaderg, near the western border of Co. Down. As we were favoured with exceptionally fine weather, we were able also to explore part of the contiguous north-east corner of Co. Armagh. These notes give the result. I have added brief remarks on some Co. Antrim *Rubi*, also seen growing in July last—partly by my son, Rev. F. A. Rogers, and partly by myself; and also a few earlier records for the three counties by other collectors, whose specimens I saw. But I have thought it best not to include the numerous additional records for the three counties, which were published from time to time in the *Irish Naturalist* and elsewhere, and are now embodied in Mr. Lloyd Praeger's recently issued *Irish Topographical Botany*.

For the counties visited I give the comital numbers suggested in *Irish Topographical Botany*, viz.—37, Armagh; 38, Down; and 39, Antrim. The living bushes were seen by me in every instance in which the locality is not immediately followed by the name of the collector. Glynn (near Larne), where I stayed for the few days I spent in Co. Antrim, is but poorly furnished with *Rubi*; but the Aghaderg, Banbridge, and Newry neighbourhoods (Counties Down and Armagh) are exceedingly rich in distinct forms as in individual bushes. The bushes, however, grow almost exclusively in hedges, and so present special difficulties to the student;—a circumstance which may to some

extent account for the difficulty at first experienced in naming some of them. But I now believe that in the vast majority of cases Irish brambles are practically identical with those of Great Britain. As usual an asterisk will be found prefixed in the case of new county records. Where the collector's name follows the locality given, the sign (!) is added as often as I have seen specimens:—

**Rubus Idæus**, Linn.—Appears to be generally distributed, though in some districts rather sparingly.

#### SUBERECTI.

**R. suberectus**, Anders.—38. Castlewellan Lake, *Stewart!* The only Irish *suberectus* that I have seen, except a Westmeath plant from Knock Drin. I have seen no *R. fissus*.

**R. Rogersii**, Linton.—38. Mill Hill Lane, Aghaderg; very local. Not yet found in any quantity in Ireland, but quite characteristic in this Aghaderg, locality,—as at Gilhall, Dromore (*Lett!*), and Saintfield (*Waddell!*), in other parts of Co. Down. I have also seen a Derry specimen collected by Mr. Druce at Lough Neagh.

**R. pilcatus**, Wh. & N.—Locally abundant. 37. Lane by Dublin road, Newry. 38. Anacloan; Banbridge. \*39. Ballymena; Cushendall; Giant's Causeway; but "not common," *F. A. Rogers*.

#### RHAMNIFOLII.

**R. Lindleianus**, Lees.—37. Lurgan; Armagh, *Praeger!* Raughlin, *Waddell!* and *Lett!* Lough Gilly, *Druce!* Scarva; abundant. Near Newry. 38. Aghaderg and neighbourhood; common. At Saintfield found only sparingly by Mr. Waddell. 39. Glendun, *Shoolbred!* Cushendall; Giant's Causeway ("not common"), *F. A. Rogers*. Glynn. In 37 and 38 usually very abundant and typical; but the form with roundish-cordate terminal leaflet referred to in my *Handbk. Brit. Rubi*, p. 28, as received from Canon Lett, is quite frequent in his neighbourhood, and in this one feature (the terminal leaflet of its stem-leaf), though not in other respects, it recalls the true *R. cordifolius* of *Rubi Germanici*.

**R. rhamnifolius**, Wh. & N.—37. Armagh, *Praeger!* Bushy ground near Newry. 38. Aghnadarragh, Saintfield, *Waddell!* Near Gilford, *Lett!* Aghaderg. 39. Cairncastle, *Stewart!* The ordinary British form. Apparently quite frequent.

Subsp. **Bakeri**, F. A. Lees. \*38. Dry banks by the sea, Killough, *Waddell!*

**R. pulcherrimus**, Neum.—37 and 38. Very abundant and characteristic. 39. Cushendall and Knocknacarry; Larne; Cave Hill, Belfast, *Shoolbred!* Near Giant's Causeway, *Bailey!* and *F. A. Rogers!* Glynn.

## VILLICAULES.

**R. Selmeri**, Lindeb.—37. Tanderagee, *Lett!* Scarva and near Newry; very abundant. 38. Saintfield, *Waddell!* Common at Aghaderg; Anacloan. 39. Cushendall; near Giant's Causeway, *Bailey!* and *F. A. Rogers*. Evidently as abundant and easily recognized through a great part of Ireland, as in most parts of Great Britain. Under this I now believe must come Canon Lett's Armagh (Tanderagee) and Antrim (Glendun) plants, for which I formerly suggested the name *R. gratus* Focke.

## DISCOLORES.

**R. argentatus**, P. J. Muell.—\*38. Aghaderg; local. Apparently rare in Ireland.

**R. rusticanus**, Merc.—37. Tartaraghan; Armagh, *Praeger!* 38. Annaghdroghal; Comber and Castle Espie, *Waddell!* Ballintaggart, *Lett!* Aghaderg; seen in two spots only, viz.—Mile Hill Lane and roadside towards Banbridge. 39. Common, and especially abundant near the sea.

[**R. pubescens**, Weihe.—38. Saintfield, *Waddell!* Doubtfully thus named by me, and in need of confirmation.]

## SILVATICI.

**R. silvaticus**, Wh. & N.—37. Field south of Newry, near the reservoir, *hb. Lett!* Apparently this, but needing confirmation here and in 38 (Milltown and Clonallen, *Lett.* Saintfield, *Waddell.*)

**R. myricæ** Focke, var. **hesperius**, Rogers. \*38. Lane north of Banbridge. Not seen in fruit, but clearly not distinct from Mr. Marshall's Mayo and Galway plant (*Journ. Bot.*, 1896, 504), though nearly eglandular in panicle, and so one step nearer to typical *R. myricæ*.

**R. macrophyllus**, Wh. & N.—38. Saintfield, *Waddell!* Aghaderg. Wall near the lough, quite in the open, for a good many yards; a conspicuous form with short roundish terminal leaflet, and very floriferous large-flowered panicle.

Subsp. **Schlechtendalii** (Weihe).—One of the most abundant and characteristic brambles of this part of Ireland. 37. Scarva. Near Newry. 38. Saintfield, *Waddell!* Aghaderg. Anacloan. Banbridge.

## VESTITI.

**R. micans**, Gren. & Godr.—\*37. Scarva. 38. Fairly frequent Banbridge, roadside near "Mutton Hill," a handsome highly glandular form. Aghaderg. Anacloan. Confirms previous uncertain record for Co. Down. \*39. Near Ballymena, about two miles on the Larne road; a very strong form, *F. A. Rogers!*

**R. hirtifolius**, Muell. & Wirtg.—38. Under this aggregate species must certainly come a plant of Canon Lett's from Aghaderg, which I have seen in the dried state more than once; and also one from Saint-

field collected by Mr. Waddell. They seem to go best with my var. *mollissimus*; as probably do the Westmeath (Knock Drin) plant, Linton!, Mr. Marshall's from Mallaranny, West Mayo, and Mr. Bailey's from Carnabridge to Portrush, Derry.

**R. pyramidalls,** Kalt.—37. Lurgan, *Praeger!* Lane and bushy ground near the reservoir on the Dublin road, Newry. 38. Saintfield, *Waddell!* Aghaderg, *Lett!* Abundant at Ballynanny, Anacloan. Reported by Mr. Waddell as "common at Saintfield, and in most parts of the county." 39. Cave Hill, *Druce!* Cushendall ("very little"), *F. A. Rogers!*

**R. leucostachys,** Schleich.—37. Lurgan, *Praeger!* Scarva. Near Newry. 38. Aghaderg. Anacloan. Banbridge. Apparently common, though often uncharacteristic, in 37 and 38. 39. Cave Hill, Belfast, &c., *Shoolbred!*

#### EGREGII.

This group, it will be seen, is more highly represented than any other.

**R. Lettii,** sp. (or subsp.) nov.—"*R. Gelertii*, Frider., *Lettii*, subsp. nov.," Wats. Bot. Exch. Club, 1900-1901 Rep., p. 14. *Stem high-arching* at first, *stout*, bluntly angled, striate, *glaucous*, *clothed with long fine shining hairs*; its *acicles very unequally scattered*, and *stalked glands very rare or absent*. *Prickles* mostly subequal and nearly confined to angles, *remarkably compressed and straight*, long, slender, nearly patent, hairy, occasionally gland-tipped. *Leaves* usually 5nate-pedate, concave, pale *greyish-green*, very soft beneath with close shining hairs, often greyish-felted at first; *petioles long*, with many unequal partly gland-tipped organs. Leaflets somewhat imbricate at first; terminal slightly obovate, with fairly long cuspidate-acuminate point, subcordate base, and compound teeth; basal shortly stalked. *Panicle* long cylindrical, lax below and usually only slightly narrowed at the top; about  $\frac{1}{3}$  ultra-axillary; *the lowest branches moderately long*, and nearly erect. *Rachis with very close grey felt under the long hairs*. armed like the stem though usually much more glandular and aciculate, with some of the long slender prickles gland-tipped; the prickles almost invariably straight, and mostly patent or subpatent. *Sepals* (like rachis and pedicels) remarkably grey-felted, *reflexed*, often long-pointed, usually quite unarmed and eglandular. *Petals* narrow, white or faintly pinkish. *Stamens* exceeding styles. *Young carpels* somewhat hairy. *Fruit* abundant and excellent.

While recalling *R. Gelertii* among the *Egregii*, and in earlier groups *R. Questierii* and *R. micans*, this seems most closely allied to *R. criniger*, Linton, from which it may, however, without difficulty be distinguished by the long remarkably compressed slender prickles, the somewhat obovate terminal leaflet with more finely pointed teeth and less gradually acuminate point, and the cylindrical panicle with stronger gland-tipped organs, shorter more ascending lower branches, and broader top. The extraordinary greyness of the whole plant is also a very marked feature.

Under Canon Lett's guidance I saw it in great abundance in Aghaderg, Anacloan, and Banbridge parishes along the western boundary of Co.



Down, and in Co. Armagh plentifully at Scarva, and more sparingly near Newry. Mr. Waddell has sent it to me from Saintfield, and he and Canon Lett are agreed in calling it "a very common Co. Down plant." I know nothing exactly like it in Great Britain, though the Rev. A. Ley has found a form which recalls it in Bolston Wood, Herefordshire.

**R. Boræanus**, Genev.—38. Aghaderg Glebe (locality now destroyed), *hb. Lett!* Probably this species, but if so, untypical in the scarcity of the stem-pricklets and in the rather prickly panicle.]

**R. cinerosus**, Rogers.—\*38. Caskum, Aghaderg; in one spot, rather abundant. This is the fourth Irish county in which this species has now been found.

**R. mucronatus**, Blox.—37. Armagh, *Praeger!* 38. Very local and variable. Saintfield, *Waddell!* Aghaderg, *Lett!* Edenderry (typical); Mile Hill Lane (a nearly eglandular form); Knock Iveagh (apparently this), *hb. Lett!* 39. Cave Hill, Belfast, *Druce!*

**R. Gelertii**, Frider.—\*37. Near the Dublin road, Newry. \*39. Glynn; in considerable quantity; a handsome exceptionally glandular form.

**R. anglosaxonicus**, Gelert.—37. Newry; Tartaraghan (form near subsp. *raduloides*), *Praeger!*

Subsp. **vestitiformis**, Rogers.—\*38. Anacloan; in one lane several bushes; a form with exceptionally long prickles. New for Ireland.

**R. Borreri**, Bell Salt.—37. Near Newry, *Praeger!* and *Lett!* Lough Gilly, *Druce!* Quite typical, and in great quantity at Scarva and by the Dublin road, Newry. \*38. Aghaderg. Anacloan. Locally abundant.

**R. Drejeri**, G. Jensen.—\*39. Glynn; hillside by limestone quarries. Typical, but seen only in small quantity.

Subsp. **hibernicus**, Rogers.—\*37. Scarva, very abundant. Near Newry; in no great quantity. 38. Common at Aghaderg and Anacloan, over a large area. Near Banbridge. Saintfield, *Waddell!* In wood-borders and hedges, with the next.

**R. dunensis**, sp. (or subsp.) nov.—*Stem* bluntly angled, *considerably hairy*, with scattered unequal armature, varying very greatly in amount, but *often quite Koehlerian in character*. Prickles mostly slender from stout base, and rather short. *Larger acicles and bristles often gland-tipped*. Stalked glands many, very unequal. *Leaves very broad, always yellowish, conspicuously concave*, opaque and thinly strigose above, at first softly hairy beneath, *with somewhat sinuate, sharply-pointed, compound teeth*. *Terminal leaflet roundish-oval, with long acuminate point, and cordate base; intermediate exceptionally long, and usually over-lapping the subsessile basal ones*. *Panicle with short close pyramidal top, and two or three distant lower racemose branches, remarkably brown in upper half*. Rachis slightly flexuose, with patent brownish hair hiding the crowded, short-stalked glands; gland-tipped acicles exceeding hair rather few; prickles weak, declining or patent. Flowers cup-shaped. Sepals very glandular, brownish; soon rising, and often remaining erect. Petals narrow, faintly pinkish or white. Stamens erect, exceeding styles. Carpels glabrous. Flowers

early, and fruits abundantly. Fruit excellent. One of the few earlier flowering and most abundant brambles in West Down and the adjoining parts of Armagh. Received also from Saintfield, East Down. Strongly recalls *R. Drejeri* and its two subspecies, but keeps quite distinct.

This is included under subsp. *hibernicus*, in *Handbk. Brit. Rubi*, p. 63 (as a strong form); but when constantly growing with it under like conditions it flowers a fortnight earlier, and can always be distinguished from it at some distance by its yellow-tinted concave leaves and peculiar brownish panicle, close-branched above and very lax below. The sinuation of the leaf-toothing is usually less marked than in *hibernicus*, but is still very unlike the shallow serration in *Drejeri* and the very even simple teeth in *Leyanus*. In *R. Drejeri* alone are the leaves chiefly 3-4nate, and the terminal leaflet roundish, with short point.

I am convinced now that the right place for *R. dunensis* is not (as I for a time supposed) among the *Kochleriani* near *R. cognatus*, but among the *Egregii*, after aggregate *R. Drejeri*. The four forms may be thus contrasted:—

#### I. Stem considerably hairy.

(1.) Leaves chiefly 3-4nate. Leaflets roundish, with rather short cuspidate point and shallow, irregular teeth. Panicle narrow, cylindrical.

*R. Drejeri*.—Stem fuscous, dull. Leaves flat, green. Prickles often falcate, especially on panicle.

(2.) Leaves usually conspicuously 5nate. Leaflets with long acuminate point and compound sinuate toothling. Panicle pyramidal.

*R. dunensis*.—Stem and leaves yellowish. Stem very prickly and aciculate. Leaves concave, thick, soft beneath, very broad, the long intermediate leaflets overlapping the basal. Panicle close above, with distant lower branches. Flowers early.

*R. hibernicus*.—Stem and leaves green. Stem with thinly-scattered prickles and acicles. Leaves soon quite flat, thin, comparatively narrow, rarely imbricate. Panicle long, lax throughout, with rigid upper branches. Flowers late.

#### II. Stem subglabrous and shining.

*R. Leyanus*.—Stem yellowish-brown, with very variable armature. Leaves mostly 5nate, green above, often grey-felted beneath, sharply evenly toothed. Panicle rather lax, much narrowed above, but with less formal outline than in *R. hibernicus*.

The existence of *R. Leyanus* in N. E. Ireland now needs confirmation; but I am still disposed to refer to it Mr. Marshall's plants from Wexford and Mayo (see *Irish Top. Bot.*, p. 105). Mr. Druce's records for 39 and 40 may also be right (as I thought at the time); but I no longer have his specimens to refer to.

## RADULÆ.

**R. radula**, Weihe.—Typical, or nearly so. 38. Newcastle, *Druce!* Lisnagade, Aghaderg, *Lett!* 39. Near Giant's Causeway, *Bailey!* Cave Hill, *Druce!*

Subsp. **echinatoides**, Rogers.—37. Tanderagee; Ballymore, *Lett!* Scarva, abundant; near Newry. 38. Aghaderg, in several places, but rather local. I am satisfied now that it was an exceptionally slender form of this subspecies that I named *R. rudis* Weihe for Canon Lett a few years ago (see *Irish Top. Bot.*, p. 106.) 39. Glenarm, *Lett* and *Druce!* Cave Hill, *Druce!* and *Waddell!* Less glandular than usual.

**R. echinatus**, Lindl.—37. Markethill, *Druce!*

**R. oigocladus**, Muell. & Lefv., var. **Newbouldii**, Bab.—\*37. Scarva. In great quantity near Newry. 38. Aghaderg Anacloan. Banbridge. Locally abundant, but very variable; the Newry plant especially going a long way towards var. *Bloxamianus* (Colem.), though on the whole, perhaps, best kept under *Newbouldii*.

**R. regillus**, A. Ley.—38. Gillhall demesne, *Lett!* A form less glandular than the Gloucestershire and Herefordshire type.

## SUB-KOEHLERIANI.

**R. Babingtonii**, Bell Salt.—37. Ferry Hill, *Lett!* Rather doubtful. \*38. Drumcrow, *Waddell* in *hb. Lett!*

**R. mutabilis**, Genev.—\*38. Lisnagade, Aghaderg; one clump; in shade, and so hardly typical, making some approach towards subsp. *nemosus* Genev. An imperfect specimen from this thicket was wrongly named by me *R. adornatus*, P. J. Muell., for the Watson Bot. Exch. Club. (See Report 1900-1901, p. 17, 2nd paragraph). New for Ireland.

**R. Bloxamii**, Lees.—\*37. Lane near Newry, in some quantity, nearly typical; but with exceptionally stout prickles and lax panicle.

## SUB-BELLARDIANI.

**R. scaber**, Wh. & N.—30. Lurgan, *Praeger!* 38. Aghaderg Glebe; fairly abundant locally, with leaves exceptionally large in shade, and mostly 3 nate.

## KOEHLERIANI.

**R. rosaceus**, Wh. & N., var. **hystrix** (Wh. & N.).—39. Glendun, *Shoolbred!* Also form near subsp. *infecundus* Rogers, near Maralin (38), *Lett!*

**R. Koehleri**, Wh. & N.—38. Newcastle, *Druce!* Aghaderg;—seen in two places only, (1) Mile Hill Lane, (2) Glebe field.

Subsp. **dasyphyllus**, Rogers.—37 and 38. Common; apparently the most abundant and generally distributed glandular bramble in N. Ireland, as in N. England.

## BELLARDIANI.

**R. saxicolus**, P. J. Muell.—38. Saintfield, *Waddell!* Apparently *R. horridicaulis*, P. J. Muell., the strong form which Dr. Focke associates with *R. saxicolus*.

## CÆSII.

**R. corylifolius**, Sm.—37. Armagh, *Praeger!* 38. Castlewellan, *Stewart!* Aghaderg, *Lett!* 39. Cairncastle, *Stewart!* Cushendall, *Bailey!*

Var. **sublustris** (Lees). 38. Lisdalgin, Saintfield, *Waddell!* Var. **cyclophyllus** (Lindeb). 37. Tartaraghan, *Praeger!* Ardmore, *Lett!* 39. Larne, *Shoolbred!* Widely distributed and variable. I saw no characteristic *sublustris* growing. As an aggregate, found by my son to be frequent from Larne to Giant's Causeway.

**R, cæsius**, Linn.—37. Scarva. 39. Larne to Giant's Causeway; "fairly common," *F. A. Rogers.*

West Bournemouth.

## IRISH SOCIETIES.

## ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Suricate, from Major H. Charasse; a Diamond Snake, from Mrs. W. de C. Duff; and two Crocodiles, from Dr. Egan.

## DUBLIN MICROSCOPICAL CLUB.

The Club met on Wednesday, 9th October.

Mr. F. W. MOORE showed flowers of a very minute Orchid (*Stelis* sp.) from Roraima Mountain. The flowers were not more than  $\frac{1}{8}$ -inch in diameter, and were covered with hairs on the inside of the segments, as well as along the edges. On the outside of the segments there were numerous glandular hairs, which gave a peculiar speckled appearance to the buds. Under a low magnifying power these flowers formed a very pretty object.

Mr. M'ARDLE exhibited *Lejeunea microscopica*, Tayl., in fruit, in which condition it is very rarely found. The delicate papillose perianth bearing at the apex the capsule and spores, and the oval antheridia singly enclosed in the leaf lobes, are beautiful objects.

It is frequent in the Co. Kerry, and is found growing on the leaves of mosses and the larger hepaticæ, always sparingly. Mr. M'Ardle showed the specimens as they were collected by himself and Canon Lett, on the bark of Alder, in a damp rocky wood near the shores of Lough Conn, at Pontoon—about three miles from Foxford, Co. Mayo—in May last. The plants cover the bark in neat strata, scarcely discernible to the unaided eye; there is no record that it has been found in Co. Mayo.

He also exhibited the rare *Cephalozia Francisci*, Hook., fertile, from the same locality. It was found on damp peat, among rocks near the shores of the lake. It is now known to be found in four counties in Ireland, viz.—near Bantry, Co. Cork (Miss Hutchins); Hill of Howth, Co. Dublin (D. M'Ardle); Mourne Mountains, Co. Down (Rev. Canon Lett); and Pontoon, Co. Mayo (M'Ardle and Lett, May, 1901).

## THE PUPARIUM OF THE GROUSE-FLY.

## ORNITHOMYIA AVICULARIA.

BY GEORGE H. CARPENTER, B.SC., F.E.S.

It is nearly 160 years since De Réaumur in his fascinating Memoir,<sup>1</sup> "Sur la manière extrêmement singulière dont naissent quelques espèces de Mouches à deux Aisles apellées Mouches Araignées," made known the remarkable mode of reproduction that characterises the "pupiparous" Diptera. He dwells at first on the marvel that would be aroused if "une espece de quadrupèdes dont la fémelle d'une taille égale à celle d'un bœuf ou d'un chameau, met au jour un animal aussi grand qu'elle-même." It would be judged incredible, he writes, "qu'il y a une espece de poules, par exemple, qui pond des oeufs d'où sort une poule ou un coq, qui dans le moment même où il paroît au jour ne cede aucunement en grandeur à la mere." He considers that the marvel would be neither increased nor diminished on account of the small size of any animal exhibiting such a mode of reproducing its kind, and announces that "l'histoire des insectes avoit un tel prodige à nous montrer."

To modern entomologists, familiar enough with the reproduction of the Pupipara, it is refreshing as well as instructive to see how the facts appealed to the first investigator of these insects. And our admiration for De Réaumur's philosophic grasp of his subject increases as we notice that, although throughout his Memoir he uses the term "oeuf" for the extruded puparium, he arrives at the conclusion that a complete transformation must be carried on within the body of the mother-fly. In this respect he, far more than Dufour, his successor in the study of these insects, anticipated the knowledge of to-day, for Dufour<sup>2</sup> emphatically denied the existence of a larval stage in *Melophagus*.

Since the works of De Réaumur, and Dufour, it is strange how little has been written on the puparia of these insects.

<sup>1</sup> De Réaumur. Mémoires pour servir a l'Histoire des Insectes. Tome VI., Memoire XIV. Paris, 1742.

<sup>2</sup> L. Dufour. Études anatomiques et Physiologiques sur les Insectes Diptères de la Famille des Pupipares. *Ann. Sci. Nat. (Zool.)* (3) iii., 1845 pp. 49-95, pls. 2-3.

The researches of Leuckart<sup>3</sup> and Pratt<sup>4</sup> have made known the details of internal transformation, and have shown that the abnormal process in the Pupipara is readily derivable from the ordinary metamorphosis of the higher Diptera. But the outer structure of the puparium seems well worthy of study, and I am glad to be able to contribute a few details on that of the "Grouse-fly," *Ornithomyia avicularia*.

It is now well known that the structure actually "laid" by the mother-fly is a mature larva, of which the hind-region surrounding the stigmata is already hard and chitinous, while the greater part of the body remains white and membranous. As the larval skin hardens to form the puparium the whole surface becomes firm and dark in texture. This process in *Hippobosca equina* is well figured in De Réaumur's "Memoir," and quite recently Miss Ormerod published a short description and drawing<sup>5</sup> of the newly-born larva of *Ornithomyia avicularia*. She contented herself, however, with indicating the general form of the body, and of the area around the stigmata.

In the spring of last year my friend, Mr. G. P. Farran, brought me from Templeogue, Co. Dublin, two females of *O. avicularia* which he had taken the previous evening from a dead Kestrel. The flies had been imprisoned in a glass tube during the night, and when examined in the morning this tube was found to contain two small shining black ovoid bodies, while the abdomens of the flies, greatly distended, so Mr. Farran told me, when taken from the host, had a shrivelled aspect. No doubt could be entertained that during the night the flies had brought forth larvæ which had already become completely changed to puparia. These were put on one side for future examination, and when I looked at them in the summer of this year I found that from one a fly had partly emerged, but had died without being able to extricate itself completely (fig. 7).

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<sup>3</sup> R. Leuckart. Die Fortpflanzung und Entwicklung der Pupiparen. *Abh. Naturforsch. Gesellsch. Halle*, vol. iv., 1858, pp. 145, 226, pl. 3.

<sup>4</sup> H. S. Pratt. Beiträge zur Kenntnis der Pupiparen. *Arch. f. Naturgesch.* Jahrg. lix., 1 Band, 1893, pp. 151-200, taf. 6.

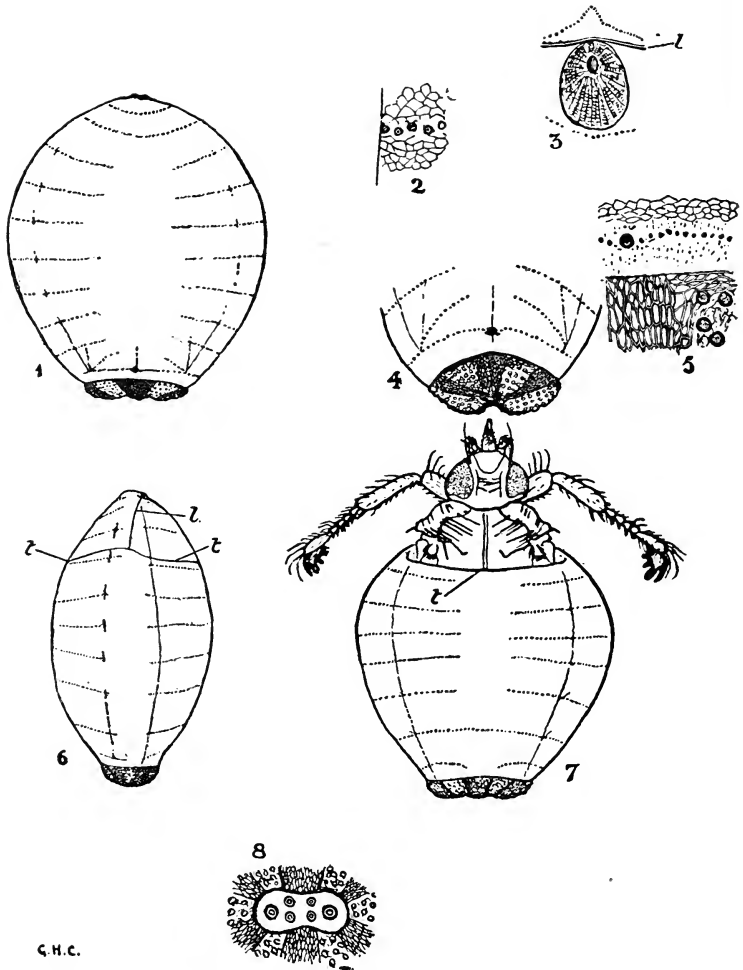
<sup>5</sup> E. A. Ormerod. Report of Injurious Insects, &c., 1899. London 1900 (pp. -63)

Of the puparium of *Ornithomyia* Dufour writes :—

“La pupe de l’Ornithomyie, deux ou trois fois plus petite que celle de l’Hippobosque, est noire, plus lisse, plus luisante et de la même conformation générale, mais sans échancrure en arrière. Son bout postérieur, un peu plus petit que l’autre, offre, en y regardant de très près, une empreinte linéaire circulaire, et deux très légères éminences séparées par une dépression en gouttière, où je n’ai pas pu découvrir le stigmate que l’analogie permet d’y supposer. On aperçoit au bout antérieur un vestige des deux sutures signalées dans l’Hippobosque.”

The brilliantly-black surface of the puparium is indeed remarkable; the general aspect is that of a Histerid beetle or an Oribatid mite. The shape of the puparium is ovate, the fore-end being the broader; it is flattened dorso-ventrally the lateral edges being sub-carinate (figs. 1, 6). Almost the whole surface is ornamented with fine lines, forming very small irregular polygonal areas (fig. 2), somewhat like those which adorn the integument of certain Water-mites. In addition to these there are series of punctures forming lines, of which ten sets, running transversely, appear to be arranged segmentally, while four others run lengthwise on both dorsal and ventral surfaces roughly parallel with the lateral margins; those on the dorsal surface being finer and more continuous than those on the ventral (figs. 1, 6, 7). The two foremost and the hindmost of the transverse lines are continuous on the ventral surface, while all the others are interrupted for a considerable distance in the middle. On the dorsal surface the hindmost line is interrupted centrally, the broken ends being turned backwards; the one next in front is continuous across the back, but all the others, except the foremost, are broken. Microscopic examination shows that the punctures forming these lines are not strictly regular in their arrangement, but that they pursue a slightly sinuous course (fig. 2).

On the ventral surface, the hindmost transverse line is interrupted in the middle where the position of the anus is marked by a small circular pit (figs. 4, 5). At the head-end of the body, a small oval area raised into a low papilla, grooved dorso-ventrally, surrounds the larval mouth, which is situated towards the dorsal or narrow end of the area. From the mouth opening a series of excessively fine wrinkles radiate (fig. 3).



C.H.C.

- Fig. 1. Puparium of *Ornithomyia avicularia*, ventral view.  $\times 12$ .  
 2. Small part of surface, showing markings and punctures.  $\times 60$ .  
 3. Mouth and surrounding area.  $\times 35$ , *l* lateral suture.  
 4. Hinder region of Puparium from beneath and behind.  $\times 16$ .  
 5. Edge of a small portion of the stigmatic area.  $\times 35$ .  
 6. Side view (dorsal aspect to right).  $\times 12$ .  
 7. Puparium with emerging fly. } *l* lateral suture.  
     Dorsal view.  $\times 12$ . } *t* transverse suture.  
 8. Stigmatic depression, showing stigmata.  $\times 35$ .



In addition to the lines of punctures, the lateral and transverse sutures (the "deux sutures" of Dufour and the "Bogennaht" and "Ringanht" of Leuckart and Pratt) along which the forepart of the puparium splits open to allow the escape of the imago, can be traced. The former appears as a simple furrow in the integument, while the latter shows as a very narrow band, distinctly lighter in colour than the surfaces that it separates; this appearance agrees with the microscopic structure of the cuticle and underlying skin as investigated by Pratt in *Melophagus*. The transverse suture ("Ringnaht") surrounds the puparium just in front of the fourth set of transverse puncture-lines (figs. 6, 7). The arched lateral suture ("Bogennaht") runs around the forward edge of the puparium, uniting the two opposite lateral points of the transverse suture, and passing close to the dorsal edge of the mouth-area where it undergoes a slight deflection (figs. 3, 6).

The most striking region of the puparium is the hinder end. For a short distance in front of, and a rather greater space behind the last transverse line of punctures, the fine lines forming polygons are absent, and the surface of the puparium exhibits only minute irregular wrinkles. Behind this comparatively smooth area comes the elliptical region, surrounding the deep central depression at the extreme tail-end, at the bottom of which are situated the six stigmata. This elliptical region is most regularly and exquisitely ornamented. It is divided into twelve radiating, wedge-shaped areas (figs. 1, 4, 8). Six of these, of which two are bisected by the central dorso-ventral plane of the body, exhibit a surface broken up into deep elongate polygonal depressions, separated by markedly raised ridges (fig. 5). The alternating six areas (whereof a pair are, of course, cut by the plane of the lateral edges of the puparium) are far less rugose, but are studded with a number of hemispherical tubercles. Strange and interesting in structure though the flies of the *Pupipara* are, no one has probably claimed admiration for them on the ground of their beauty. But the shining black puparium of *Ornithomyia*, its whole surface, as it were, cunningly wrought into the most delicate of tracery, appeals to the eye of the observer as strikingly beautiful. For the present at least we can but admire, and wonder what the meaning of all this ornament may be.

## SOME NOTES ON THE WEIGHT OF BIRDS' EGGS.

BY W. H. WORKMAN.

READING, some time ago, in Miller Christy's book on Birdnesting that it would be an interesting thing to have some record of the weights of eggs of our British birds, I thought I would make a start last season and get as many examples as possible which, I am sorry to say, are very few. In all, I got ten species. One living in town has very little chance of getting any but the very common eggs; but, next season, I may get more, and other observers who have more time on their hands might take the subject up. I used a pair of chemical balances weighing down to  $\frac{1}{2}$  grain; this, I should think, is quite low enough for ordinary purposes. Of course much finer and more expensive balances can be got. I have taken the greatest care in weighing and measuring the eggs given below, so as to make my statements as accurate as the means in my power would admit.

A great many people, in fact the majority by a long way, have no idea of the weight of eggs at all, still fewer know that there are great differences in the eggs of one clutch. I have come on some with as much as 10 to 21 grains difference in the one clutch, and, taking one nest with another, the differences will be found much greater. I have only come across one other paper on the weights of birds' eggs; it appeared in the *Zoologist* of this year. I give the length and breadth after each egg, as, of course, it has a lot to do with the weight, but not as much as one would expect, for, as will be seen, some eggs with the same, or nearly the same measurements, have very different weights. This may be due to a difference in the thickness of the shell, or perhaps the yolk in some cases may be heavier than in others, or the yolk may be larger and the little air bubble less. Another question arises here, which is the egg with the greatest weight? the one laid first or the one laid last; one would naturally say the first, but I have not been able this year to look into this question.

COMMON THRUSH (*Turdus nivicus*):—

	Grains.		Inch.		Inch.
(a) Weight	94½	Measurements	1'13	×	0'82
(b)	91½		1'12	×	0'82
(c)	91		1'08	×	0'82
(d)	86		1'06	×	0'78

The lightest Thrush's egg I got was 75 grains × 1'8 × 0'78, very much lighter than (a).

MISSEL THRUSH (*Turdus viscivorus*):—

	Grains.		Inch.		Inch.
(a) Weight	135½	Measurements	1'22	×	0'92
(b)	130		1'20	×	0'92
(c)	125½		1'17	×	0'91

BLACKBIRD (*Turdus merula*):—

	Grains.		Inch.		Inch.
(a) Weight	116	Measurements	1'23	×	0'84
(b)	113½		1'2	×	0'82
(c)	112½		1'21	×	0'82
(d)	110		1'19	×	0'82

The lightest one I found weighed 85 grains × 1'12 × 0'82. This one was pretty far on in incubation, but I am not sure whether that would have anything to do with it; I rather think not.

HEDGE SPARROW (*Accentor modularis*):—

	Grains.		Inch.		Inch.
(a) Weight	32½	Measurements	0'84	×	0'58

COMMON SPARROW (*Passer domesticus*):—

## Clutch I.

	Grains.		Inch.		Inch.
(a) Weight	42½	Measurements	0'87	×	0'6
(b)	42		0'85	×	0'51

## Clutch II.

(a)	30½		0'82	×	0'61
(b)	30		0'75	×	0'61
(c)	28½		0'82	×	0'61

There is a great difference in the weights and also in the dimensions of these two clutches.

SWIFT (*Cypselus Apus*):—

	Grains.		Inch.		Inch.
(a) Weight	36	Measurements	0'98	×	0'66

CHAFFINCH (*Fringilla caelebs*):—

	Grains.		Inch.		Inch.
(a) Weight	27½	Measurements	0·8	×	0·54
(b)	26½				broken.
(c)	25½		0·71	×	0·54
(d)	25½		0·76	×	0·56

GREENFINCH (*Ligurinus chloris*):—

	Grains.		Inch.		Inch.
(a) Weight	35	Measurements	0·83	×	0·58
(b)	34		0·81	×	0·58
(c)	33½		0·82	×	0·57
(d)	31		0·8	×	0·56
(e)	30		0·8	×	0·56

MAGPIE (*Pica rustica*):—

	Grains.		Inch.		Inch.
(a) Weight	198	Measurements	1·26	×	0·96
(b)	196½		1·24	×	0·96
(c)	193		1·24	×	0·95
(d)	187½		1·21	×	0·94
(e)	185½		1·22	×	0·95
(f)	180		—		—

I got only the weight of the last (e); it was quite rotten and broke, all the yolk having gone into a hard ball. This may account for its lightness, it had also lost nearly all its colour.

WATER-HEN (*Gallinula chloropus*):—

	Grains.		Inch.		Inch.
(a) Weight	314½	Measurements	1·69	×	1·18
(b)	294		1·68	×	1·17

Here we have a large difference in weight, and very little in dimensions.

Windsor, Belfast.

## NOTES.

## BOTANY.

## Salix herbacea in County Antrim.

Dean D'Arcy is not quite correct in stating (*I. N.*, x., 194) that *Salix herbacea* had not been observed on Slievenanee since Templeton's time, when he noted it there last summer. See "Irish Topographical Botany," p. 285.

R. LLOYD PRÆGER.

## Plants of Co. Antrim.

In the October number of the *Irish Naturalist* I have read a very interesting article on Glenariff. I desire to make a few observations. This district is not an unknown one to me, as I have known it and this neighbourhood and its plants since 1867. I cannot understand how the authors of the *Flora of N.E. Ireland* considered the Yew extinct in the glen in 1888. I have known it to be in the place where Templeton observed it, on the rocks on the north side, as long as I have known this part of the country, and all the plants which Dean D'Arcy observed. *Sedum rupestre* was planted by Miss Hassard many years ago; it was only the other day I was pointing it out to her brother, and said it would soon be considered native.

SAMUEL ARTHUR BRENAN.

Cushendun.

## Irish Rubi.

In August I spent a few days in Co. Wicklow and Co. Kerry; but I had little opportunity of botanising. At Killarney, near Ross Island, I gathered *Rubus plicatus*, a new county record; and about Muckross *Rubus mutabilis*, Genev., was seen, as also in another locality near Killarney. This is the second time the plant is recorded for Ireland, being seen this year in Co. Down by Rev. W. M. Rogers, and it is an addition to the flora of Co. Kerry. *Rubus pulcherrimus*, Newm., was also gathered near Killarney, a new county record; and *R. pyramidalis*, Kalt., occurred as a very hairy plant in Glendalough, Co. Wicklow, with a form of *R. leucostachys*, and another form of that plant grew at Killarney. *R. Schlechtendalii*, Weike, was frequent in Glendalough, Co. Wicklow. At Glendalough also occurred a plant which the Rev. W. Moyle Rogers (who has named all the above-mentioned *Rubi*) says is apparently *R. podophyllus*, but more complete specimens are required in order to make the identity certain; and the same may be said of another bramble, which is apparently *R. micans*, Gren. & Godr., the latter not yet recorded for Wicklow, and the former not known as Irish. Another distinct looking bramble from Muckross, Killarney, Rev. W. M. Rogers refers to *R. hemistemon*, P. J. Muell., but the leaves are harsher than usual and the outer stamens abnormally long. New to Kerry. At Killarney also grew a plant which is probably shade-grown *R. pyramidalis*. At Dalkey I got a plant which Mr. Rogers says "very strongly recalls *R. Questierii*, Lefv. & Muell., especially in panicle; but for that Genevier gives 'tige glaucescente verdâtre,' and though I have a Kent form of it with stem considerably hairy, that is still unlike this. So I think this Dublin plant must stand over for the present." *R. Questierii* is not recorded for Ireland.

G. CLARIDGE DRUCE,

Oxford.

### Sisyrinchium angustifolium on Lough Erne.

When inspecting a farm on 2nd August, 1898, in the townland of Derryvore, adjoining Upper Lough Erne, I observed a blue flower among the grass on the lake shore. I thought at first that it was a flax blossom, but on examination found that it was one which I had never seen before. Accordingly I brought home some of the plants. I brought a specimen shortly afterwards to Mr. F. W. Moore, who at once identified it as *Sisyrinchium angustifolium* (otherwise *anceps*, or *Bermudianum*). I brought growing plants to Mr. Moore the following spring, which, I believe, are at present in the Botanic Gardens at Glasnevin. I have some of the original plants still, which have flowered every year since. Derryvore is a promontory at the western side of Upper Lough Erne, near its southern end, and lies about five miles from and nearly due north of Belturbet. I was informed that this plant was as plentiful on the western side of the promontory, as it was on the eastern side where I found it. I am well acquainted with this locality, and know of no place from which *Sisyrinchium* would have been likely to reach Derryvore, which is in a very isolated situation.

W. A. BARNES.

Westland, Kells.

## ZOOLOGY.

### Monkfish in Belfast Lough.

On September 23rd my friend Mr. Arthur Hill Coates, of Bangor, brought me a specimen of *Squatina angelus*, which had been taken in a trawl on the Cultra ground of the lough by J. Lance, a Bangor retired coastguard, on 21st inst. None of the Bangor men knew it, and it was taken to W. Scott, the fishmonger there, who, not knowing it either, sent it on to me. This was only the third specimen I had ever seen, and the first local example. It was but a small one, 21½ inches long by 10¼ inches broad, and was much lighter in colour than the larger examples (from Portrush and Magilligan respectively) which I had seen before.

The latter of these two was sent on 9th June, 1893, by the proprietor of an important fishery there, who had never seen one before—another proof of the extreme rarity of the fish in North of Ireland waters.

R. LLOYD PATTERSON.

Holywood.

### Tawny Owl in Co. Antrim.

It may be of interest to record that another of the introduced Tawny Owls (see *Irish Nat.*, x., 24, 72) was shot at Dunmurry on October 1st. It had so annoyed the gentleman on whose ground it was shot, by its nightly hooting, that he offered a pound for its destruction—a contingency not anticipated by the introducer!

ROBERT PATTERSON.

Belfast.

### Rare Irish Birds in the National Museum.

Several of the unique or very rare specimens of Irish Birds hitherto in the Trinity College Museum of Natural History have now been deposited in the National Museum of Science and Art, where they are exhibited in the Collection of Irish Birds.

The birds referred to and their history are probably known to most of the Irish ornithologists, but it may interest those who will now see them for the first time to learn something more about them.

They are four in number, as follows :—

1. The GRIFFON VULTURE (*Gyps fulvus*) was caught alive in the autumn of 1843 on the rocks near Cork Harbour. This specimen is the only example of the Griffon Vulture which has ever been taken in the British Islands. Its nearest habitat to Ireland are the Pyrenees and the mountainous part of the Spanish Peninsula.

2. The SPOTTED EAGLE (*Aquila maculata*), shot near Youghal, Co. Cork, in January, 1845, is the only Irish specimen which has been preserved. It has occurred three or four times only in the British Islands.

3. The AMERICAN YELLOW-BILLED CUCKOO (*Coccyzus americanus*) shot at Youghal, Co. Cork, in 1825, is the first specimen obtained in Ireland. Another has since been secured, and is now preserved in the Queen's College Museum at Cork. It also has occurred several times in the British Islands.

4. The BELTED KINGFISHER (*Ceryle alcyon*) shot at Annsbrook, Co. Meath, in the autumn 1845, also an American species. Only one other Irish specimen of this bird has been obtained, and both are now in the National Museum. As no other instances of the occurrence of the Belted Kingfisher are known in Europe, it is generally supposed that these have escaped from confinement.

### Red-throated Pipit in Co. Mayo.

I learn that the Pipit described by Mr. F. Coburn (*Zoologist*, 1901, p. 264) as having been shot by him on 26th May, 1895, in Co. Mayo, has been examined by Messrs. Howard Saunders, Bowdler Sharpe, and Ogilvie Grant, and that it is a true specimen of *Anthus cervinus*. I understand that it is otherwise with regard to the Co. Donegal specimen, concerning which Mr. Coburn will doubtless publish further information.

R. J. USSHER.

Cappagh, Co. Waterford.

### Foxes in Co. Donegal.

I am informed by Henry Musgrave, Esq., that this year Foxes have been remarkably numerous in S.W. Donegal, and interfered largely with shooting. On his estate alone between thirty and forty Foxes were trapped or shot *in four weeks* this autumn, and he heard of ten other

captures on the neighbouring estate. Not content with grouse, ducks, and geese, they killed a number of lambs, and did a lot of damage. Several times while shooting, the dogs found grouse half-eaten and buried in the ground for future use. Has any increase in the number of Foxes been noticed in other parts of Ireland? Perhaps the dry spring and summer favoured the cubs.

ROBERT PATTERSON.

Belfast.

## REVIEW.

### FLATWORMS AND NEMERTEANS.

**A Treatise on Zoology.** Edited by PROF. E. RAY LANKESTER, LL.D., F.R.S. Part IV. The *Platyhelminia, Mesozoa and Nemertini*. By W. B. BENHAM, D.Sc., M.A. London: Adam and Charles Black, 1901; pp. vi. + 204. 15s. net.

Another volume of Professor Lankester's treatise on Zoology, Part IV., has just been issued. To those still immersed in reading the last volume, the title, *Platyhelminia*, sounds rather strange, as Mr. Bourne in his article on the Ctenophora always referred to them by the name of "Platyhelminthes." Besides dealing with the group of "Flatworms" or *Platyhelminia*, to which the tape-worm belongs, the volume treats of the Mesozoa (an aberrant group of minute parasitic forms), and of the Nemertini.

It is unfortunate, as the Editor points out, that Dr. Benham, the author of the present volume, had his part already in print three years ago, when he left England for New Zealand. At the same time the Editor is satisfied that no important omissions due to this fact occur in the book. However, when we come to examine the chapter on the Nemertini—a very interesting group of elongated worms characterised by the possession of a muscular eversible proboscis—we find a few rather serious omissions. Thus we fail to notice any mention of the genus *Planktonemertes*, described by Woodworth in 1899, or of the more recently described remarkable *Baicalonemertes*—a fresh-water genus which is supposed to form a link between the meso- and the metanemertines.

Again, in the chapter on the Turbellaria, such genera as *Böhmigia*, *Mesocastrada*, and *Diplopenis*, all of which were described in 1898 and 1899, have been left out.

We notice "the Mesozoa," prominent on the title-page; but the chapter which treats of the group is headed "Rhinobozoa" and "Orthonectida," and only a passing reference to the term Mesozoa occurs at the end.

The illustrations, as in previous volumes, are mostly excellent while the type is good and practically free from misprints. Though the volume before us is somewhat disappointing after the two previous ones referred to in last year's *Irish Naturalist*, yet it cannot be denied that it is the best work on the subject which has yet been written.

R. F. S.



NOTES ON IRISH TOPOGRAPHICAL BOTANY,  
WITH SOME REMARKS ON FLORAL DIVERSITY.

BY NATHANIEL COLGAN, M.R.I.A.

It is hardly possible within the limits of the few pages to which ordinary reviews are restricted to do full justice to a work of such magnitude as Mr. Praeger's *Irish Topographical Botany*. Some of the features of the book have consequently received but scant discussion in the reviews hitherto published, so that the following supplementary notes suggested by a leisurely study of the volume may, it is hoped, be found helpful towards a better appreciation of its merits.

In the first place, Mr. Praeger's treatment of that attractive but difficult subject, the soil relations of plants, deserves special commendation. Man has been defined as a generalising animal; and there are few fields of inquiry in which the free indulgence of the bent towards generalisation is more likely to lead him rapidly and profoundly astray than this of the soil affinities of plants. Here, in an eminent degree, a little knowledge is a dangerous thing. The inductions which appear amply justified by the study of a parish flora may be completely upset by the botanical survey of a county or even of a barony. And, indeed, a very wide knowledge of plant distribution—an intimate acquaintance with the flora of a whole Irish province—is not enough to guard the investigator against serious error. Your table of *calcicole* and *calcifuge* plants, based perhaps on the labour of years in the Leinster counties, may suffer some rude shocks when confronted with the flora of the "crags" in Burren or in East Galway; and as your field of view widens you will come to regard many of the cherished inductions of your earlier stage as the dogmatisms of half-knowledge. Every reader of Mr. Praeger's work must recognise how close a study he has made of this difficult subject, and how completely the wide range of his observations and his appreciation of the complexity of the factors which operate in plant distribution, have enabled him to avoid anything approaching to crude generalisation. The section of his Introduction which deals with "Plant Groups dependent on Soil or Moisture" and the many remarks on

soil relations scattered through the text, make without doubt one of the most interesting and valuable features of his book.

Even the severest of reviewers might condone a good deal of incompleteness in a work of such magnitude and intricacy as *Irish Topographical Botany*; but there is really nothing of this kind to call for indulgence. The work has been not only rapidly done but thoroughly done, so thoroughly, I believe, as to surpass the results achieved in Great Britain in a similar field of inquiry by the labours of many botanists spread over a period of fully twenty years. The first edition of Watson's *Topographical Botany* was completed in 1874, the second appeared in 1883, and the ninth edition of the *London Catalogue*, showing the latest published statistics of comital plant distribution for Great Britain, appeared in 1895. This last edition of the *London Catalogue*, then, presents us with the fruits of some twenty years of field work by British botanists, and a comparison of this catalogue with Mr. Praeger's book would seem to warrant the conclusion that his five years of skilfully planned work in Ireland have accomplished more than twenty years of desultory effort in Great Britain.

In endeavouring to estimate the comparative thoroughness of the botanical surveys of Great Britain and of Ireland we may take as basis the number of species ascertained to occur in all the comital or vice-comital divisions of each of the two areas to be compared. It appears from Mr. Praeger's very lucidly arranged Table of Distribution, that out of a total Irish flora estimated by him at 1,020 species, 260 are ubiquitous, that is to say, known to occur in all forty divisions of the island.<sup>1</sup> The question then becomes, how many species out of the total British flora, taken at 1,500, should we expect to find recorded as ubiquitous if the botanical survey of Great Britain were as well done as that of Ireland?

The problem is by no means reducible to a case of the Rule of Three, since the proportion of ubiquitous species to the total flora must vary with the variation of several conditions

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<sup>1</sup> The number of species actually ubiquitous in Ireland, though not yet shown to be so, is no doubt much larger than this, since it appears from the Irish Distribution Table that some 45 species are at present on record for 39 out of the 40 divisions.

which affect plant distribution. Perhaps the most potent of these conditions, at least for areas of considerable extent in latitude, is temperature, as any large variation in this condition must limit the number of ubiquitous species by constituting mutually exclusive northern and southern floral groups increasing in size with increase in the difference of the regional temperatures. Other things being equal, temperature varies with latitude, and the range in latitude of Great Britain being twice that of Ireland, we have in the consequent wider range of temperature alone good reason for expecting a much smaller proportion of ubiquitous species in the larger than in the smaller island. A further reason for such an expectation will be found in the far greater number of divisions in Great Britain than in Ireland, since the risk of a particular species failing to find in all divisions the precise conditions of soil and surface which it demands, increases with the increase in the number of divisions.

If we assume then for the purpose of the comparison it is desired to make here, that the proportion of ubiquitous species to the total flora in Great Britain should be only half the proportion of such species to the total flora in Ireland, we can hardly be charged with undue severity toward British field botanists. To remove, however, the smallest suspicion of any such severity, let us reduce the number of British vice-counties from 112 to 109 by excluding the three purely insular divisions of the Orkneys, the Shetlands, and the Outer Hebrides, as, quite apart from climatic considerations, many of the ubiquitous species of a mainland may fail to reach an adjacent insular area. Ireland, it may be noted, has no comital divisions purely or even largely insular. Taking then as ubiquitous for Great Britain such species as occur in not less than 109 of its vice-comital divisions, and assuming that the per-centage of such species in the British flora should be one-half of the per-centage of such species found in the flora of Ireland, we are in a position to compare the results of British and of Irish research in matters of topographical botany.

From Mr. Praeger's Table we find that the percentage of ubiquitous species in Ireland is 25.5 of the total flora, or 260 out of 1,020, so that, on our assumption, the British flora should

yield 12.75 per. cent. of such species, or 191 out of a total of 1,500. But an examination of the ninth edition of the *London Catalogue* shows that in 1895, after twenty years' work in this field of inquiry, British botanists had ascertained the occurrence of only 179 ubiquitous species in Great Britain, while we may fairly assume the disparity in the areas of the two islands to have been counterbalanced by the greater number of competent workers in the larger. These considerations will, it is hoped, enable students of *Irish Topographical Botany* to appreciate the really wonderful amount of sustained and skilfully directed energy which its author has brought to bear on the botanical exploration of Ireland.

A discussion on ubiquitous species naturally raises the whole question of what may be called floral diversity, a term which requires some explanation. It is almost an axiom in distribution that perfect identity in the floras of two distinct areas cannot occur. This is true even if the areas be contiguous and of no larger extent than a parish, or even a townland; it is true *a fortiori* if the areas compared be large and widely separated. Should the number of species in one area happen to be precisely equal to the number in the other, yet the species of one will not be always those of the other; each area will have some species peculiar to itself as compared with the other. This greater or less departure from identity of species in the floras of two distinct areas is what is meant here by floral diversity; it is simply an expression of the varying intensity and complexity of the influences which operate in plant distribution.

The existence of such a book as *Irish Topographical Botany* enables us to discuss this interesting question in greater detail than was possible with the data supplied by the second edition of *Cybele Hibernica*. In such a discussion, it is first of all necessary to fix on some uniform method of expressing these floral dissimilarities, of calculating, in short, an index of diversity for each pair of areas to be compared. It seems to me that the most satisfactory index will be found in *the ratio which the total of species not common to both areas bears to the total flora of the two areas combined*. By this method total floral diversity, such as exists, say, between the Co. Dublin and a strip of virgin forest on the Amazons, would be represented

by 1, lesser degrees of diversity being indicated by fractions receding further and further from this maximum as the floras approach more and more nearly to identity of constitution.

A few instances drawn from Mr. Praeger's Table of Distribution and from his estimates of the total floras of the various divisions, will serve to show the application of this method of comparison. First, let us take two divisions which *a priori* might be expected to yield the highest index of diversity for Ireland, No. 1, South Kerry, situated in the extreme south-west, and No. 39, Antrim, in the extreme north-east. Of the 680 species in the flora of South Kerry, we find that 78 are peculiar to that division as compared with Antrim, that is to say, do not occur in the latter division. Deducting these peculiar species from the total flora of South Kerry, we have 602 species common to both South Kerry and Antrim, and deducting the number of these common species from the Antrim total, 777, we leave 175 as the number of peculiar species in Antrim. The total of distinct species, then, for the two divisions combined will be obviously the common species plus the peculiar species, that is,  $602 + 78 + 175$ , or  $602 + 253 = 855$ , and the index of diversity for South Kerry as compared with Antrim will be  $\frac{253}{855}$ , or .296.

The diversity just shown may be taken as largely, perhaps mainly, climatic in its origin, since the physical features of the two divisions are not very dissimilar. To a like origin we should chiefly attribute the diversity for the extreme south-west as compared with the extreme north-west; but the degree of this diversity we should expect to be less than in the case of the south-west and north-east divisions, since, while the physical features are fairly similar, the climatic difference between South Kerry and West Donegal (35) is less than that between South Kerry and Antrim. This expectation is justified by the Table of Distribution. Comparing the floras of the two divisions, 1 and 35, each being estimated by Mr. Praeger at 680 species, we find that of the South Kerry species 92 are peculiar, leaving 588 common both to South Kerry and to West Donegal. The floras of the two divisions being equal, West Donegal, too, must have 92 peculiar species; so that the total flora

of divisions 1 and 35 is  $588 + 184$ , or 772, and the index of diversity is  $\frac{184}{772}$ , or .238, as against an index of .296 already shown for South Kerry as compared with Antrim.

Taking now the extreme south-east and extreme north-west divisions, Wexford (12) and West Donegal (35), we should expect to find these yielding a higher index than that just shown for the extreme south-west and north-west divisions; and here again the statistics justify the expectation. The total flora of the two divisions is 818, the total of peculiar species 267, and the index .326, the diversity here being an expression of dissimilarities, both of climate and of physical features. Again, as another instance of diversity between north and south, let us take Wexford (12), in the extreme south-east, and Antrim, in the extreme north-east. The total flora for the two divisions is 860, and the total of peculiar species 254, yielding an index of .295, very slightly lower than that shown for the extreme south-west and north-east. And, finally, before passing from the maritime divisions, a comparison of east and west diversity with north and south diversity may be of interest. Taking Dublin (21) and West Galway (16), both lying in the same latitude, but separated by the whole breadth of the island, we find that the total flora for the two divisions is 845, and the total of peculiar species 275, giving as index .328. This, it will be seen, is a considerably higher diversity than that between South Kerry and Antrim; a somewhat unexpected result if we take only climatic influences into account. But these influences are strongly reinforced in this case by dissimilarity of physical features and the unequal operation of human agency.

To touch briefly now on the diversities of some inland divisions. Fermanagh and Roscommon, lying close together, and with floras of almost equal richness, have a diversity index of .25; Westmeath and Queen's County, separated only by the breadth of King's County, and having also, like the counties just mentioned, nearly equal floras, yield the higher index of .272; while North Tipperary and Kildare, whose surface conditions, relatively the one to the other, are fully as diverse as those of Westmeath and Queen's County, yield the much smaller diversity index of .237, which is yet almost as large as the index for such widely separated divisions as South Kerry and West Donegal.

Those who are interested in questions of distribution can readily apply this method to the various other botanical divisions of Ireland, bearing in mind, however, that trustworthy results can only be looked for in the case of areas which have been fairly well explored. Unfortunately, the materials are still wanting for the working out of such indices for Great Britain, where the variations in the conditions are often much wider than in Ireland. The weakest point in this statistical method is obviously the uncertainty of the data as regards introduced species. There are many instances in which perhaps no two botanists would agree on the question whether a given alien plant has so far established itself in a given area as to deserve enumeration in its permanent flora. Where, however, the data for the various areas compared are selected by one authority, as is the case in *Irish Topographical Botany*, this uncertainty is of less moment, as we may assume that the severity or laxity of judgment has been applied to all divisions with a fair approach to uniformity.

It may be asked how the results just deduced from an examination of Mr. Praeger's book would compare with those to be drawn from the second edition of *Cybele Hibernica*. A little reflection will make it clear that no very close correspondence between the diversity index for any pair of the *Cybele* Districts and for any pair of the included comital divisions need be expected. Floral diversity depends largely on diversity of physical features in the areas compared. If one area be flat and the other mountainous, if one be rich and the other poor in lakes and rivers, if one have large tracts of limestone and the other have none but primitive rocks, these diversities will inevitably find expression in the floras. But since physical differences tend more and more to disappear as the areas increase, the index of diversity for two *Cybele* Districts should, as a rule, be less than that for a pair of the included counties. And for the same reason, wherever climatic influence is preponderant, that influence should more clearly express itself in the index of Districts than in the index of included comital divisions.

An instance or two will serve to illustrate this. Taking as data for the Districts the Distribution Table of the second

edition of *Cybele Hibernica*, written up to the opening of the present year, we find that the index for Districts I. and XII. is '221, as against '297 for the divisions of South Kerry and Antrim which are component parts respectively of I. and XII. Similarly, comparing East with West, Districts V. and VIII. give an index of '255 nearly, as against '328 for the component divisions, Dublin and West Galway. Again, Districts IX. and X. give an index of '225, while the components, Roscommon and Fermanagh, give '25. And, finally, to take the two most truly inland districts, III. and VII., we find that they yield an index of '205 as against '272 for the components, Queen's County and Westmeath.

Having followed patiently this rather tedious discussion on floral diversity, the reader may grow querulous. He may ask what is the good of your index, and what does it prove? To be quite candid the index proves nothing; it demonstrates no new truth. Yet it may be claimed on its behalf that it serves some humbler uses. It not only gives a simple and uniform method of expression for complex groups of facts, but may also be applied in some sort as a touchstone for the detection of error. If, for instance, in the case of two areas subject to closely similar conditions as to physical features, climate, geographical position, and the various other factors which affect plant distribution, we find the statistics giving a higher diversity index than is yielded by two other areas where the conditions are obviously and widely dissimilar, we immediately infer some grave error or defect in the statistics. The data are more closely scanned; we find, perhaps, that the flora of one of the areas has been explored by a judicially minded botanist accustomed to the weighing of evidence, while the investigation of another has fallen to the lot of an uncritical enthusiast who has charitably given asylum to a host of aliens and casuals. And thus the index has served as a critical instrument. It is perfectly true that it has but led us indirectly to results that might have been directly gained by a study of the statistics themselves. But how confusedly these results glimmer through lengthy catalogues of plant-names, when compared with their clear and condensed expression in a few decimals.

Sandycove, Co. Dublin.



## THE NATURAL HISTORY OF IRISH BATS.

BY N. H. ALCOCK, M.D., AND C. B. MOFFAT.

THE LONG-EARED BAT,  
*Plecotus auritus*, Linnæus.

THE subject of the present paper is, perhaps, the best known of our Irish Bats, and the species is unmistakable even to the most casual observer.

Dobson's measurements are:—

Length: Head and Body.	Tail.	Head.	Ear.	Tragus.	Forearm.	3rd Finger.	5th Finger.	Tibia.	Foot.	Calcaneum.
1'8"	1'8"	0'65"	1'4" × 0'65"	0'6" × 0'2"	1'5"	2'65"	2'1"	0'7"	0'35"	0'7"

The most interesting peculiarity is the enormous length of the ear, which almost equals that of head and body together! Yet when the animal is asleep the ear is nearly invisible, being folded back and covered by the wing-membrane. The inner earlet, or tragus, is at such times liable to be mistaken for the true ear.

The fur is dark at the base of the hairs, a light shining brown at the tips on the dorsal surface, pale ash or dirty white on the ventral; it is long, and beautifully fine in texture. Two observers have recorded albino specimens (Baring, xxxiii.; Oldham, xxxiv.) As noted by Jameson, there is a buff-coloured example, of Irish origin, in the Dublin Museum.

In treating of the habits of the Long-eared Bat, it is necessary to discard much that has been previously written, as the particular observations on which general statements have been founded are not on record; and some of the general statements

are strikingly at variance with the results of our own personal investigations. For instance, Lydekker ("Handbook of British Mammals," pp. 23-24) begins his account of the habits of this bat by stating, that it is "essentially an inhabitant of the open country, and not resorting to the neighbourhood of trees and plantations." From all that we have been able to ascertain by frequently watching this species on the wing in Ireland, we are obliged to adopt the diametrically opposite conclusion from Mr. Lydekker's—namely, that the Long-eared Bat is a *peculiarly arboreal* species, and one which, when flying, practically escapes the notice of observers, because the foliage of the trees amid which it seeks its prey effectually screens it from view.

In some of its favourite haunts at Ballyhyland it can be seen among Ash-trees every evening from June to September, and the observations dealing with its habits of flight contained in the present article are based on what has been noted in that locality.

To observe this bat on the wing, it is a good plan to wait at dusk under some tree whose foliage is not too dense to be seen through—an Ash is probably the best that can be selected—and watch for its appearance amongst the branches overhead. From about thirty-two or thirty-five minutes after sunset, its figure may, almost any summer evening, be thus detected against the sky, gliding and hovering in a stealthy manner among the outer sprays of the tree. It threads its way with a beautiful facility among the twigs and leaves, often seeming rather to swim than to fly, so slight is the visible movement of the wings. Poising, at times, like a humming-bird, it appears to be picking something from the leaves; at other times it suddenly plunges into the middle of a spray, and remains for several seconds clinging to the twigs, no doubt securing or eating some insect. It is not uncommon to see one Ash-tree occupied at the same moment by five or six of these bats—though each comes and departs by itself—all gliding in the same noiseless and lemurine fashion among the leaves, and all, to the casual by stander, practically invisible. The long ears are often thrown forward so as to resemble a proboscis, and may be distinctly seen if the observer is posted immediately below the bat.

When one of these bats leaves a tree, if its object is merely to pass to another quite near at hand, it darts through the air with a swift arrowy flight; but when a longer expedition is contemplated the mode of quitting the tree is different. The bat plunges headlong to within an inch or two of the ground, and then skims away in jerking zigzag fashion—much as a Nightjar does—over the surface of the field. The swift plunging descent taken on these occasions is very remarkable, and renders it a difficult matter to keep the animal longer in sight.

In early May, when trees, as a rule, are still sparsely clad, we have seen this bat hunting in Oak-woods; and in April it visits, as many observers have noted, the catkins of various willows (*Salix Caprea*, *S. cinerea*, &c.), on which small moths are at rest. Tomes (xvii., pp. 76–7) describes having seen it on one occasion in the morning twilight, “actively engaged around the sprigs of a Spindle-tree,” which was “in bloom at the time, and was surrounded by a cloud of minute microlepidoptera on which the bat was feeding.” The writer adds, that “with scarcely an exception, the moths were picked from the leaves while resting there, only one or two being taken on the wing.” This accords exactly with what has been observed of the bat’s habits at Ballyhyland, where, even when hovering round the outskirts of trees, it seems invariably to fly with its face pointing to—and almost in contact with—the foliage.

From all the foregoing observations it is not difficult to infer that the Long-eared Bat feeds chiefly on those insects which it can seize at rest. In short, it plays among the trees by night, much the same part as birds of the “leaf-warbler” group (Chiffchaff, Willow-wren, &c.) do by day; while the Pipistrelle rather emulates the part of the Swallow, and catches its prey almost exclusively on the wing. We need not, however, suppose that trees are absolutely necessary to the Long-eared Bat, since it seems also to hunt low over the ground, probably for such insects as lurk in—or fly very near—the grass.

This animal has often been seen to attack a Pipistrelle, which has ventured too near its feeding-grounds. The latter, on such occasions, nearly always beat a rapid retreat.

As regards the time and duration of the Long-eared Bat's flight, there is still much to be learnt by exact observation; but a certain number of facts may be stated.

This bat is decidedly later than the Hairy-armed in appearing on the wing. In August, 1900, the time of its first appearance about a favourite Ash-tree was noted on nine consecutive evenings, with the following result:—

August	4th.	Long-eared Bat first seen	26 minutes after sunset.		
"	5th	"	36	"	"
"	6th	"	36	"	"
"	7th	"	33	"	"
"	8th	"	34	"	"
"	9th	"	32	"	"
"	10th	"	33	"	"
"	11th	"	37	"	"
"	12th	"	34	"	"

Thus, in eight evenings out of nine the first appearance was between thirty-two and thirty-seven minutes after sunset. On May 2nd, 1901, a female was caught in the act of leaving her sleeping-place—a hole in a Beech-tree—twenty-eight minutes after sunset. Another example was timed emerging on April 13th—also from a hole in a Beech-tree—fifty-one minutes after sunset. We may, therefore, conclude that some individuals are much later than others in coming out, but that few emerge earlier than half-an-hour after sunset. By what mental process the bats ascertain the time is not clear.

Having once started on its nocturnal flight, there is good reason to conclude that this animal does not return to its sleeping-place until the following morning, about an hour before sunrise.

That the Long-eared Bat flies all night was the opinion of Tomes, who writes (xvii., p. 75) of having heard its "shrill chatter" in the fields "at all hours, through the dead of the night, and in the darkest nights"; and who, as we have seen above, had also observed it feeding before sunrise in the morning. At Ballyhyland this bat has been identified on the wing at midnight, as well as at 1.30 a.m., and in the morning twilight. The specimen which was identified at midnight was in the habit of flying in and out of a conservatory, at frequent intervals, in quest of moths. By watching until it was seen fly

in at 12 o'clock, then shutting the door and lighting a candle in the conservatory, the fact of its being *Plecotus auritus* was clearly ascertained. The identification at 1.30 a.m. was effected in the same manner. Both observations were made during the third week of August, when the duration of night in the south of Ireland is between nine and ten hours.

As a rule, this species probably retires very early in the morning, since few are seen at that time. Of some that were watched flying about a group of Ash-trees on the morning of June 9th, 1901, the latest disappeared from view sixty-eight minutes before sunrise. We have occasionally recognised stragglers later—up to about forty-five minutes before sunrise—but the majority seem to seek their hiding-places while the morning light is still dim.

The present is thus a typically nocturnal bat, while the Hairy-armed Bat is essentially crepuscular, the habits of the two types being very distinct in this respect.

Like all our bats, this species sleeps during winter. The earliest date on which we saw it flying in 1900 was April 18th; the earliest in 1901, April 13th. In both instances it was observed hovering about a small willow-tree, which at the time was in flower.

In autumn there are repeated records of its capture in November; one sent to Mr. Barrington had been caught at the Tearaght Lighthouse on November 17th, 1891. There is, however, a dearth of available data as to the time at which hibernation normally commences. By the middle of October the bats have ceased to frequent the Ash-trees at Ballyhyland, but this may be due to other causes than the commencement of hibernation. On the other hand, the occurrence of individuals in November affords no proof that torpidity has *not* commenced; for the winter-sleep of the Long-eared Bat—despite some statements to the contrary—is liable to be broken at all seasons by a moderate degree of warmth. Some evidence on this subject may be presented here.

On December 21st, 1900, a bat of this species was found hibernating at Ballyhyland, in a convenient position for observation *in situ*. The sleeping-place was a hole in a Beech-tree, 5½ feet above the ground. On the insertion of a finger the Bat snarled savagely enough; but when let alone it soon relapsed into an apparently profound slumber.

On the next day (December 22nd) it was gone, having evidently flown during the night. This desertion must in fairness be ascribed to its having been disturbed, and slightly alarmed, on the previous afternoon. The remainder of December, and the first two nights of the ensuing January, were characterised by cold and frost, and during this period the hole continued unoccupied.

The night of January 3rd was mild; the thermometer until nearly midnight remained at  $46^{\circ}$ , and the Pipistrelle was seen flying. On the morning of the following day the Long-eared Bat was found to have returned to its hole in the Beech-tree.

For about three weeks from the above date this bat was looked at every day, and often with a lantern during the night. From January 4th to 11th the observer detected no change of attitude; but on some of these days, when the temperature was as high as  $44^{\circ}$ , the little creature fidgetted slightly during sleep. On January 12th, at a temperature of  $46^{\circ}$ , it became very restless; and after sunset crept out of its hole, and sat for about three hours in an exposed position on the trunk, with its eyes open, but its ears still folded back beneath its wings. A high wind was blowing, which probably prevented the bat taking flight. On the following night—during a great storm, and at a temperature of  $49^{\circ}$ —the animal was again found outside its hole, this time with one of its ears unfolded and protruded in front of it, while the other was still tucked below the wing. Though the bat's eyes were wide open, and it seemed in attitude ready to fly, it manifested no concern at having the lantern held over it. Flight in such a storm would at any rate have been impossible, and before 9 p.m. it was back in its hole. During the next seven evenings it was invariably found asleep in its den at whatever hour visited; and on the night of the 21st of January it was still there at 6 p.m., one and a-half hours after sunset, though the temperature was high ( $51^{\circ}$ ) and the wind light. Next day, however, the hole was empty. A long spell of cold weather immediately set in, and the bat was not seen again until March.

It returned for a few days about March 17th, during the observer's absence from the locality, and deserted again on the 25th. On April 10th it was once more in possession.

By this period of the spring one might have supposed that its hibernation was over; but the Bat's conduct proves the reverse, for during the next three nights—April 10th, 11th, and 12th—it did not fly at all. On the 10th it was visited with a lantern at 7.35, 9.5, and 11.5 p.m.; on the 11th at 8.45 p.m.; and on the 12th at 8 and 10.30 p.m.; and on all these occasions was seen sound asleep. On the evening of April 13th, however, it quitted the hole at 7.45 p.m., and did not again return. On the same night, as already noticed, a bat of this species—probably not the same individual—was seen flitting round a willow.

The respective temperatures for the four nights of April 10th to 13th, taken about 8 p.m., were 43°, 41°, 43°, and 45°.

Other observers have recorded similar facts. Mr. C. Oldham informs us that he has found individuals of this species in winter in the caves at Alderley Edge, and that these repeatedly shift their quarters. Many similar instances can be adduced. So that hibernation in the case of the Long-eared Bat, at any rate, is not as profound or as unbroken as was at one time supposed, but is repeatedly interrupted; and, apparently, this is liable to occur whenever the thermometer rises above 46° F.

In the cases just mentioned we have instances of the Long-eared Bat passing the winter and early spring in a solitary condition. On May 2nd, 1901, another solitary specimen was found, also inhabiting a hole in a Beech-tree, 8 feet above ground. This animal is not, therefore, of universally gregarious habits. It is, however, frequently found in enormous colonies; and it would be of great interest to ascertain under what conditions it is respectively a solitary or gregarious bat.

The haunts of the largest and best-known colonies are generally in the roofs and towers of churches. Jameson (x.) instances Kilmore cathedral (Co. Cavan), Charlestown church (Co. Louth), Castlemacadam church (Co. Wicklow), and Cappagh church (Co. Waterford), as abodes of large colonies; we may add, also, Rosdroit church (Co. Wexford). Where dates are given, these places seem generally to have been explored in summer; but there is no evidence that they are deserted, even partially, by the bats in winter. Smaller colonies, or "swarms," of this species occur from time to time

in stables, cow-houses, and barns. These gatherings are chiefly noticed in summer, and seldom remain more than a few weeks. In two consecutive years, 1898-1899, a space between the woodwork and wall of the farm-stable at Ballyhyland was occupied by a swarm of Long-eared Bats during the first fortnight of August, which disappeared soon after the middle of the month. In the second year of their visit (1899) particular pains were taken not to disturb them, but by August 20th none remained. In August, 1900, there was a swarm over the doorway of a neighbouring forge, of which not a trace could be found in September; and in July, 1901, a smaller assemblage took possession, for one or two days only, of a space between two beams in the roof of an old mill. This last-mentioned swarm probably consisted of females, with new-born young; for an infant specimen, with eyes still unopened, was found on July 11th crawling on the floor immediately below the crevice in which the adult Bats were at the time visible. Since these swarms are so much more frequently noticed in July and August than at other seasons; and since there is also evidence (as in the instance last cited) that they are not composed exclusively of the young of the year, it seems natural to infer that the social instincts of this species are strongest in summer, and that individuals which have lived solitary lives during the rest of the year become, at that season, gregarious.

The shrill "thin" chirping cry of this bat is somewhat celebrated, owing to the fact that a good many persons, not otherwise deaf, are unable to hear it. It is generally assumed—perhaps with too much confidence—that only the Long-eared species possesses this very shrill note. It is uttered both on the wing and at rest, and a young individual, only a few days old, when in captivity used this piercingly shrill but faint cry at frequent intervals, apparently as a sign that it wanted food. On summer nights, we often hear a similar cry from some fixed spot in a tree, repeated at intervals of about a second (or sometimes faster) for many minutes together. This is heard at nearly all hours of the night, and most frequently from about the end of July to the first or second week of September. It probably proceeds from bats of the present species, perhaps from young specimens not sufficiently practised in flight to spend the whole night on the wing.



This species is readily kept in captivity, and many accounts are given of its habits. At first it is generally very wild and shy, but soon becomes tame. All observers find that the Long-eared Bat shows much more intelligence than other kinds; for instance, Mr. C. Oldham notes that his specimens picked up meal worms that they had dropped on the table, while the Whiskered Bat did not. We have often observed the Long-eared Bat fly round a room; in this case the ears are always carried forwards.

The food of this bat when at large is not confined to any particular species of insect. Mr. G. H. Carpenter, examining fragments in the droppings, found remains of Coleoptera, Lepidoptera, and Diptera; he named definitely the Common Blue-bottle, *Calliphora erythrocephala*. Mr. O. V. Aplin (i.) found remains of the Yellow Underwing moth, *Triphæna*, the Silver Y, *Plusia gamma*, and the Buff Ermine, *Spilosoma lubricipeda*, under the haunts of this bat. Mr. Harting (ix.) has observed it to feed on species of *Tæniocampa*, while our own observations recorded above also point to Lepidoptera as a favourite prey.

In most parts of its ascertained range it appears to be rather abundant. Observers in Kerry, Cork, Carlow, and Westmeath consider it more common in their districts than the Pipistrelle, and in Leitrim and Monaghan it has been pronounced about equally plentiful with that species. In Mayo, however, Mr. Warren reports it as somewhat rare. Comparison as to relative frequency with the Pipistrelle is difficult, and may be misleading, because, as Thompson long ago remarked, the Long-eared Bat is the more easily found in its hiding-places, and the Pipistrelle oftener seen flying about.

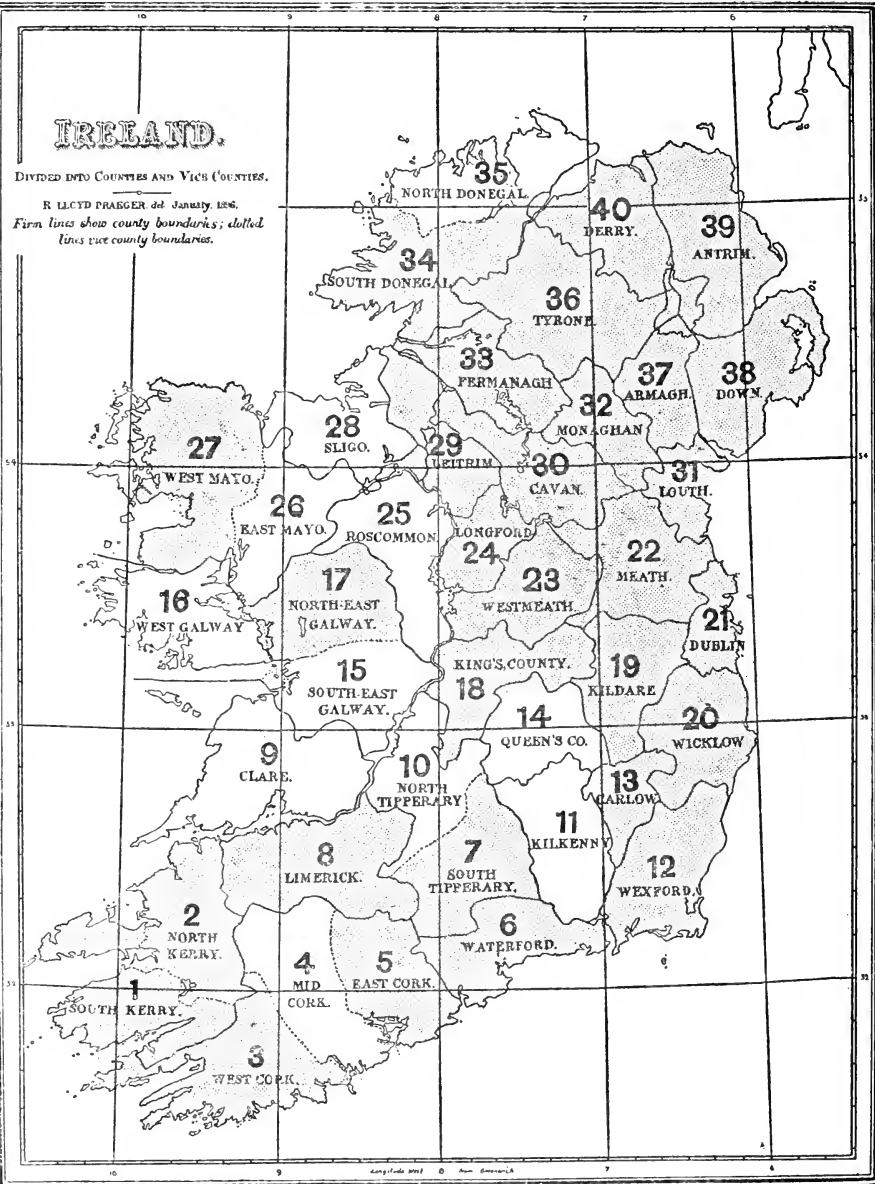
The Long-eared Bat has been found throughout Ireland, with few exceptions, and in the accompanying map the counties where it has been observed are shaded. It is evident that this method of considering the distribution is most imperfect; no account can be taken of the small "migratory" movements recorded above, still less of the considerations that induce the bats to reside in one place rather than another. Many other objections to the plan we have adopted can be urged with justice. Nevertheless as our knowledge of the whole subject is so fragmentary, we have judged it well to continue these so-called "records."

**IRELAND.**

DIVIDED INTO COUNTIES AND VICH COUNTIES.

R. LLOYD PRAEGER del. January 1886.

Firm lines show county boundaries; dotted lines vice county boundaries.



DISTRIBUTION OF THE LONG-EARED BAT IN IRELAND.

Most of the references will be found in Jameson's paper (x). W. F. de V. Kane (xxxii.) has found the Long-eared Bat in South Kerry and Leitrim. Barrett-Hamilton (xxxii.) has recorded it from St. Mullins, which is commonly stated to be in Kilkenny, but is really in Carlow. District-Inspector Hill, R.I.C., has observed this species in some numbers at Mullingar, Co. Westmeath, while we possess additional records in the counties already known, not of sufficient interest to quote.

AUTHORS QUOTED (continued from vol. viii., p. 174) :—

- xxxii. KANE, W. F. de V. *I. Nat.*, vi., p. 88. 1897.  
 xxxiii. BARRETT-HAMILTON, G. E. H. *I. Nat.*, ix., p. 134. 1900.  
 xxxiiii. BARING, A. H. *Zoologist* (4), ii., p. 261. 1898.  
 xxxv. OLDAM, C. *Zoologist* (3) xiv., p. 349. 1890.

## REVIEWS.

### ORNITHOLOGY MADE EASY.

**A Ready Aid to distinguish the Commoner Wild Birds of Great Britain.** By DAVID T. PRICE. London: Gurney & Jackson. Pp., 60. Price, 1s. 6d. net.

The type of student for whom this booklet is written may be imagined from the author's closing words on the Peewit: "Do not mistake this SHORT-TAILED bird for the long-tailed MAGPIE." To save this sort of person the "trouble," a trouble which to every intelligent novice is a pleasure, of consulting some rational work on natural history, Mr. Price has constructed a catalogue of common birds, grouped according to their sizes—"larger than a Thrush," "size of a Thrush," "smaller than a Thrush and larger than a Sparrow," &c., &c.—with a cross-grouping according to the haunts in which they are likely to be found. We venture to think that the beginner who needs (or imagines he needs) this kind of "ready aid" might as well remain in the state of ignorance which has hitherto sat so easily upon him. Even if the plan of the book were otherwise commendable, it would be spoilt for use in Ireland by the omission of many birds frequently met with in this country—amongst others the Siskin, Lesser Redpoll, Twite, Crossbill, Snow Bunting, Brambling, Chough, Long-eared Owl, Peregrine Falcon, Gannet, Red Grouse, Golden Plover, Redshank, Oyster-catcher, and Razorbill. The author makes some blundering statements; the worst, in his assertion (given in large letters) that the Meadow Pipit never perches on trees. The fact that it frequently does so should be well known to everyone with the slightest pretensions to ornithological lore.

C. B. M.

**A NEO-LAMARCKIAN.**

**“Use-Inheritance,** illustrated by the Direction of Hair on the Bodies of Animals.” By WALTER KIDD, M.D., F.Z.S. London: A. & C. Black, 1901; 8vo; pp. 47. Price 2s. 6d. net.

In this little volume, hardly more than a bound pamphlet, Dr. Kidd has given a popular account of his researches on the distribution of the body hair of Mammals, and the conclusions they have led him to; and we must congratulate him on the admirable way in which he has introduced the general public to facts hitherto veiled in the learned pages of the *Journal of Anatomy and Physiology* and the *Proceedings* of the Zoological Society. It has been known that the slope of the hair is displayed in the fœtus before birth, since Eschricht described and figured it in 1837. Our author has investigated this point in a large number of animals, and found great constancy in each group, with only such differences as indicate problems to be solved. For purposes of description it is necessary to have a proper nomenclature, and the terms chosen are readily comprehensible. A *whorl* is a group of hairs radiating from a given point, and usually forming a diverging spiral. A *feather* is a short tract which has its hairs diverging obliquely, feather-like, from a median line, and usually starts from a whorl at one end. A *crest* is a line bounding two diverging sheets of hairs; usually a feather, which starts at a whorl, terminates at a crest, and, indeed, at its sides, is bounded by a pair of crests. This relation may well be studied on the face of the horse, short hair, of course, giving the most typical appearances. A whorl is obvious in our own heads, as in those of the apes, towards the point of the lambdoid suture, whence the hair radiates to front, sides, and back, and the special reason for this appears to be that with long hair on a convex spheroidal surface, some such arrangement is necessary. With the other whorls, this explanation will not serve, and Dr. Kidd regards their appearance in all other regions as the expression of dynamical causes, for:—1. They all occur where opposing traction of underlying muscles is found. 2. They never occur over the middle of a large muscle, and seldom in a place where there is not a hollow or groove in the superficial anatomy. 3. They are most uniform and most marked in animals with very strong muscles, and those that are actively locomotive. 4. Their constancy appears to depend upon range of action and activity of function of the muscles in the part and individual animal affected.” The formation of whorls under these conditions is compared with that of dimples in the human face.

As the muscles whose action is involved have not yet come into use at the time when the slope of the hair follicles, inducing the slope of the hairs, is decided in the embryo, we have to choose between the assumption that this slope is sufficiently important to have “selection value,” and to have decided for each group the survival of those that possessed it, or else to admit the author’s thesis, that the arrangements are due to “use-inheritance.” Such a book as this is calculated, at least, to give pause to the Weismannians. Dr. Kidd has broken ground in a commanding position, and we are anxious to see how his attack can be met.

MARCUS HARTOG.

## IRISH SOCIETIES.

### ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Peregrine Falcon from Col. G. T. Plunkett, a Parrot from Mr. J. Purdy, a Zebra Cow from the Earl of Kilmorey, a very large Chacma Baboon from the Officers of the North Cork Rifles, and a Marmoset from Capt. Gill. A Serval, two Ringtailed Coatis, three pairs of Flamingoes, an Australian Ibis, a pair of Golden Eagles, and a pair of Laughing Kingfishers have been bought.

### DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 5TH.—The Seventeenth Winter Session of the Club was inaugurated with a *Conversazione*, held in the rooms of the Royal Irish Academy, Dawson-street, which was largely attended by members and visitors. Several representatives of the Belfast Field Club were also present, and two of them, Messrs. Welch and Orr, contributed interesting exhibits. The President, Mr. Greenwood Pim, formally opened the meeting, and after a few words of welcome to the visitors, called on the Hon. Sec. to read the judges' reports on the collections sent in for the Club prize competitions. The awards were then announced as follows:—Flowering Plants—Miss Dorothy Herdman; Freshwater and Marine Mollusca—Miss Massy; Pleistocene Fossils—Mr. Hinch. The Hon. Secretary, Mr. Seymour, then gave an account of the Club's excursion to Sligo last July, the narrative being illustrated by means of a large number of lantern transparencies from photographs taken during the three days' visit to the neighbourhood. The remainder of the evening was spent in examining the numerous scientific exhibits shown by members. Amongst these the collection of Irish Birds' Nests shown by Mr. R. J. Ussher, of Waterford, was much admired, as was also the very interesting collection of plants from the Botanic Gardens, exhibited by Mr. Moore. The various collections sent in in competition for the Club prizes were of very distinct merit, and deserve special mention also. The following is a list of the more important exhibits, besides those already referred to:—G. H. Carpenter, B.Sc.—Some Irish Spiders with their nests and webs, including photographs by R. Welch; Prof. G. A. J. Cole and T. Crook—Modes of occurrence of Metallic Ores; Dr. A. H. Foord—Unpublished illustrations of Irish Carboniferous Fossils, and specimens of *Goniatites*; J. de W. Hinch—Collection of Shells from Glacial deposits; Professor T. Johnson, D.Sc.—The Potato Blight (*Phytophthora infestans*) causing a Tomato disease; G. W. Lamplugh—Remains of *Lepidurus (Apus) glacialis*, from a post-glacial lake silt deposit in Scotland; D. M'Arde—Microscopic slides of rare Irish Mosses and Liverworts; Miss A. L. Massy—Shells of *Helix Busbii*, peculiar to North Island, New Zealand; A. R. Nichols, B.A.—Some examples of Albinism in Irish Birds; H. L. Orr (B.N.F.C.)—Collection of Land and

Freshwater Shells; Dr. G. H. Pethybridge, B.Sc.—Photos of Botanical subjects; Greenwood Pim, M.A., *President*—Some lantern slides; R. I. Praeger, B.A.—Rare plants recently found in Ireland; Dr. R. F. Scharff—Collection of the remains of the Irish Bear; F. U. Sellens—Micro examples of pond life; H. J. Seymour, B.A., *Hon. Sec.*—Specimens of Mineral Ores from University College Museum; R. Welch (B.N.F.C.)—Collection of Land and Freshwater Mollusca, and Floating Bricks made from the Bann diatom earth; E. Williams—American Pectoral Sandpiper, *Tringa maculata*; the Sooty Shearwater, *Puffinus griseus*; the Great Shearwater, *Puffinus gravis*; Mealy Redpolls, *Linota linaria*; and Wood Sandpiper, *Tetanus glareola*, all recently obtained in Ireland; W. B. Wright, B.A., and H. J. Seymour, B.A., *Hon. Secs.*—Album of photographs taken on the Sligo excursion.

Four nominations for membership were announced at the meeting.

## NOTES.

### ZOOLOGY.

#### Notes on the Hedgehog.

On September 23rd a female Hedgehog in my possession gave birth to four young ones. They all died in an hour or two; whereupon the mother proceeded to devour one, biting it in two and sucking the blood. I then took them away for examination. They were born blind, and the teeth did not protrude above the gums. Their ears hung down slightly, and their snouts were short and round—very unlike the adult form. They weighed  $\frac{3}{4}$  of an ounce each, and were  $2\frac{1}{2}$  inches long. The spines were soft, white, very small, and lay close down on the back. There was no trace of hair on any part of the body, but the claws on both hind and fore-feet were sharp and well-developed. There was a deep and narrow groove down the centre of the back from head to tail. The upper surface was grey-blue coloured, under surface flesh-coloured, head flesh-colour tip of nose grey. The general shape was remarkably like a pig. The end of September seems to me to be very late for such small and helpless young to be born; and it is difficult to see how they could have lived through the winter. I always understood the female produced her young quite early in summer, and would be glad if this note elicits information on this point from readers of the *Irish Naturalist*. On September 15 I skinned a male Hedgehog, and I was struck by the thick layer of fat I found underneath the skin. The fat was fully a quarter of an inch thick over the entire upper surface, and reminded me of the "blubber" on a Dolphin I skinned earlier in the year. Does the Hedgehog draw on this store of fat during its winter sleep? Perhaps, someone who has skinned a Hedgehog in early spring will tell us if this layer of fat was noticed then.

ROBERT PATTERSON.

Belfast.

### Sirex gigas in Co. Waterford.

I have read with interest my friend Mr. L. H. Bonaparte Wyse's note on the above insect (*ante*, p. 203). It occurs in most seasons in this neighbourhood, but I cannot say that it is common. A fine living specimen was given to me this year by a constable of the Royal Irish Constabulary. He caught it in his house at Portlaw, on 19th August.

WILLIAM W. FLEMING.

Coolfin, Portlaw.

## BOTANY.

### New Records and Stations for Cybele District IV.

I was botanizing for a few weeks this autumn around Rosslare, Wexford, and found *Atriplex laciniata* and *Lemna polyrhiza*, both first records for the above district.

*Atriplex laciniata* grows plentifully for half a mile immediately to the southward of Rosslare Coastguard Station. It also occurs for about a dozen yards at Rosslare Harbour; and possibly occupied at one time the intervening mile or two of coast—for the sea seems to be encroaching on the land at this place, and has reached, and is attacking, the base of the clay cliffs. This is a great southward extension of the species, as no station south of Dublin is given in "Cybele."

*Lemna polyrhiza* grows plentifully in a wayside pool on the western side of Lady's Island Lake, near a farm called Reedstown on the Ordnance Map. I also found it sparingly in a pool near an old windmill about half a mile south of Broadway, and in fair plenty in a ditch near the sea, close to the little village of Carnabout two miles north of Carnsore Point.

I also noted the following plants in new stations:—

*Salix Hoffmanniana*.—Near Rosslare Harbour Station and near Lady's Island Lake, but evidently planted.

*Lemna gibba*.—In great abundance in a pool on the western side of Lady's Island Lake, and plentifully in a pool near an old windmill about half a mile to the south of Broadway.

*Polygonum maculatum*.—In fair plenty, and very typical about the south-western corner of Lady's Island Lake.

*Cuscuta Trifolii*.—Grows on the bar separating Lady's Island Lake from the sea. It extends eastwards along the coast, and occurs sparingly at Carna on the east coast.

*Potentilla procumbens*.—This plant is quite common in hedge-banks south of Rosslare Harbour Station, and it also grows on the Rosslare sandhills.

*Glyceria Borreri*.—Very sparingly on the edge of a salt-marsh pool in the extreme south-western corner of Wexford Harbour.

*Achusa officinalis* and *Lycium* still hold their ground at Rosslare Point, and *Marrubium* is in process of naturalization there.

CECIL P. HURST.

Recess, Connemara.

## GEOLOGY.

### Exploration of the Keish Caves.

On behalf of the Committee appointed to explore Irish Cave-deposits, Dr. Scharff communicated to the recent meeting of the British Association at Glasgow an interim report. He stated that the Committee selected for the first operations a series of caves on the slopes of Keishcorran Mountain, Co. Sligo. Owing to the unsettled state of the weather, the excavation of the caves could not be commenced until the middle of May, 1901, though a preliminary survey was made early in April by Dr. Scharff and Mr. Praeger.

After careful measurements were taken a deep trench was dug across the mouth of one of the caves, so as to expose a section of the various deposits, which were as follows from above downwards:—

1. *Black earth*, containing bones of domestic animals, charcoal, and human implements (similar to those found in crannoges), with a depth of from 6 inches to 1 foot.

2. *Breccia*, consisting of limestone blocks fallen from the roof in a tufaceous deposit. This appeared as a natural arch in the section varying from 1 foot in the centre to 3 feet at the sides, and contained numerous remains of land shells and bones of small mammals.

3. *Brown clay*, containing large blocks of limestone and numerous bones of small and a few of large mammals. At a depth of 6 feet from the surface a much waterworn block of limestone was found, indicating proximity to the floor of the cave.

As the excavation in this cave was carried to the interior it became unpromising and unsatisfactory owing to the difficulty of removing the large masses of limestone. It was, therefore, decided to abandon it. Datum levels having been carefully marked on the sides of the cave, it will be possible to resume work and complete the excavation should the results obtained in the other caves render it desirable.

A second cave was then opened in a similar manner, proceeding from the mouth inward, with very satisfactory results so far. Mr. Ussher, who was left in charge of the work, reports that the upper stratum of this cave contained much charcoal and bones of domestic animals—broken for the marrow—and a Red Deer's antler. With these were associated a stone celt, bronze pins, and portion of an iron saw of ancient pattern. Beneath the above another stratum, consisting of cave-earth, was found, in which were various remains of Bear and Deer, besides human teeth and charcoal. The collections have been deposited in the Dublin Museum, and are at present being worked out by the staff.

The Committee has been re-appointed by the British Association, with a renewed grant for the presentation of their researches.











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