THE IRISH NATURALIST.

A Monthly Journal

OF

GENERAL IRISH NATURAL HISTORY,

ORGAN OF THE

Royal Zoological Society of Ireland; Dublin Microscopical Club;
Belfast Natural History and Philosophical Society;
Belfast Naturalists' Field Club; Dublin Naturalists' Field Club;
Cork Naturalists' Field Club; Limerick Field Club;
Ulster Fisheries and Biology Association.

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AND

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VOLUME XV.

A CONFERENCE ON VEGETATION STUDY.

BY R. LLOYD PRAEGER.

In the *Irish Naturalist* for April last, some account was given of the formation of a committee for the survey and study of the vegetation of the British Islands, and of its preliminary deliberations. I had an opportunity of being present at the third meeting of the committee, held in Liverpool on November 18–19, and believe that some notes of what was said and done at this conclave may be of interest to Irish botanists.

The committee cannot be accused of indolence. The last members to arrive (Dr. Pethybridge and myself) reached Liverpool at 3 p.m., and the first to leave (the London members) left at 4 p.m. next day. In the interval we sat for ten hours—from 3.30 till 10.0 p.m. on the 18th, with an hour off during which we dined together, and from 11.0 till 3.30 on the 19th. The first session was held at the Exchange Station Hotel, the second, by permission of Prof. Harvey Gibson, in the Botanical Department of the University, where we had the advantage of a lantern, black-board, and so on. Out of a committee of ten members, seven were present—namely, Prof. F. W. Oliver, D.Sc., F.R.S., and A. G. Tansley, M.A., of University College, London; W. G. Smith, B.Sc., Ph.D., of Leeds University (Secretary of the Committee); F. J. Lewis, F.L.S., of Liverpool University; C. E. Moss, M.Sc.; and the two Irish representatives already referred to. Of the three absent members (Messrs. Rankin, Hardy, and Woodhead) two were abroad, so the meeting was nearly as full a one as was possible. Prof. F. E. Weiss, D.Sc., of the University of Manchester, who is secretary of the British Association Botanical Photographs Committee, was also present by request.

After the minutes had been read and signed, Prof. Weiss brought forward the suggestion that the work of collecting, registering, and indexing of such botanical photographs as fell within the scope of the Vegetation Committee's work, should be handed over to them by the British Association Committee. The Committee agreed to take over this work, subject to the condition that two prints of each negative be obtained, one for inclusion in the Association's reference set, the other for inclusion in a lendable set in the hands of the Committee.

Dr. Smith next read a communication from T. W. Woodhead, who reported, as delegate from the Committee, on the work of the recent Botanical Congress at Vienna. As regards the classification of plant associations, it was stated that Schroeter's suggestions had met with general approval; and it was agreed that some description of his classification be published in the "New Phytologist" as soon as possible.

As regards field meetings of the Committee, Dr. Smith reported that the proposed meeting in Ireland last summer fell through, as when the time arrived every member of the Committee proved to be fully occupied with field work already, in England, Scotland, Ireland, or France. It was agreed that if possible a field meeting lasting for a week should be held next August in Yorkshire, on the close of the British Association meeting at York.

Next, correspondence was read in reference to grants for botanical surveys from the Government Grants Committee of the Royal Society. The suggestion has been made that the Vegetation Committee should act in an advisory capacity with regard to applications made to the Royal Society for grants for vegetation-mapping and ecological studies. After discussion, Prof. Oliver, Dr. Smith, and R. Ll. Praeger were appointed a sub-committee to confer with Board E of the Royal Society on the matter. Arising from the discussion on this question, the advisability of Government publication of vegetation maps was considered at some length. The publication of coloured maps is an expensive work for any journal or society to undertake. Following a recent Irish example, it was agreed to approach the Board of Agriculture with a view of securing publication of vegetation maps under their auspices.

A. G. Tansley described the quadrat method of large-scale vegetation surveys as introduced by Dr. F. E. Clements of the University of Nebraska, dealt with surveying by this method recently carried out by himself and Prof. Oliver in France, showed examples, and advocated the adoption of the method by the Committee. After discussion, the Committee agreed to recommend the plan as a suitable one for large-scale surveys.

After dinner C. E. Moss described the vegetation of the limestone dales of Derby and Somerset, illustrating his remarks with a series of 6-inch vegetation maps. Ash and Hazel scrub dominate the steep sides of the valleys, with grass heath giving way to Calluna heath above. The question of the occurrence of heath on limestone, thus raised, was discussed at some length.

Dr. Smith dealt with the difficulties of preparing vegetation maps on small scales—say less than a $\frac{1}{4}$-inch to the mile—with special reference to the preparation of a map of the district surrounding York, for publication in the forthcoming British Association Handbook. An interesting discussion ensued, mainly on the question of actual and reconstructed vegetation maps—*i.e.*, those which show the vegetation as it actually exists at present, and those which attempt to restore the vegetation so as to show the natural vegetation as it existed prior to human interference, and would again exist if man's influence were withdrawn. The difficulty was emphasized of ensuring the contemporariety of the various parts of a reconstructed vegetation, and it was agreed that, if restorations be shown on a vegetation map, they should at least be indicated by dotted boundaries.

Resuming next morning in the botanical lecture-room at the University, the writer was called upon for an account of recent mapping work on the Dublin Mountains. Fortunately the final proof of the coloured map had arrived a few days before, so I was able to show it in illustration of my remarks. I drew attention to the "Scirpus moor" and "Racomitrium moor" which are characteristic of the Dublin hills, and which apparently replace the "Eriophorum moor" so largely developed in the areas surveyed in the North of England. F. J. Lewis stated, in the course of discussion, that he had found

these identical types last season prevalent in the west and north of Scotland.

Dr. Pethybridge showed 6-inch vegetation maps of the coast from Dublin to Rogerstown, and described especially the zones of the salt-marsh and sand-dune vegetation of that region. In the discussion which followed, A. G. Tansley referred to the vegetation of an estuary in Brittany, where he and Prof. Oliver had worked last summer. The mode of formation of the numerous "pans" or muddy hollows was discussed, and also the distribution in detail of the leading plants.

F. J. Lewis followed with a most interesting account of the investigations into the peat-bogs of Scotland. He finds that on the southern uplands, 800-1200 feet, the following succession of beds recurs constantly :—

1. Recent peat.
2. Scots Pine, or Birch (*B. alba*), with Ling.
3. Sphagnum peat.
4. Cotton-grass.
5. Arctic plants (*Salix reticulata*, *S. herbacea*, *Loiseluria procumbens*, with much *Empetrum*.)
6. Cotton-grass.
7. Sphagnum peat.
8. Birch (*B. alba*), with Ling.

The last three zones are inter-glacial : that is, they underlie the plants of the last phase of arctic condition, and rest on glacial drift. In the Highlands, owing to ice having covered the ground, the beds under the arctic plant zone are missing, and the succession, in Inverness for instance, is :—

1. Recent peat.
2. Scots Pine.
3. Sphagnum peat.
4. Birch (*B. alba.*)
5. Empetrum.
6. Betula nana.
7. Salix ? sp. (alpine or arctic.)

An excellent discussion followed on various points raised, and Mr. Lewis was highly complimented on the completeness of his investigation.[1]

[1] The first part of Mr. Lewis's results has been recently published, *Trans. Roy. Soc. Edinb.*, vol. xli., no. 28, 1905.

A. G. Tansley followed with a good description of the Heath formation of the Lower Greensand in the south-east of England. Special attention was paid to the regeneration of vegetation on surfaces disturbed by quarrying, and the various stages were carefully traced.

Prof. Oliver came last with diagrams (quadrats and transects) and photographs illustrating the vegetation of the Breton salt-marsh at which he and Mr. Tansley had worked last summer. He dealt especially with the growth and distribution of *Salicornia* and *Suæda*.

A vote of thanks to Prof. Harvey Gibson for allowing us to meet in his department brought our meeting to a close.

Dr. Pethybridge and I returned much pleased with this little conference. It is seldom that one has the opportunity of sitting on a committee of which every member is actively and practically engaged on the work which forms the subject of the committee's deliberations. The Central Committee for the Survey and Study of British Vegetation is thoroughly in earnest, and we may look forward to some useful results arising from its labours in the new and as yet not generally understood field of ecology.

Dublin.

NEWS GLEANINGS.

Richard Kearton in Dublin.

The Irish Society for the Protection of Birds is to be congratulated on the success of its first public appearance. On December 5 Richard Kearton lectured, under its auspices, on "Wild Nature's Ways," and we have never seen a larger audience in the Royal Dublin Society's theatre, which was packed from floor to ceiling. The fact that Mr. Kearton held his audience for over an hour and a half, and that most of them came away wishing for more, speaks volumes for his discourse and lantern illustrations, and points, we trust, to a general interest in real natural history.

PAPERS RELATING TO IRISH GEOLOGY.

PUBLISHED DURING THE YEARS 1903, 1904, AND 1905.

BY HENRY J. SEYMOUR, B.A., F.G.S.

Irish Trilobites.

In Mr. F. R. Cowper Reed's paper (*Q.J.G.S.*, vol. lviii., p. 74, 1902) on the genus Lichas, reference is made to the *Lichas hibernicus* of Portlock. From an examination of the type specimen the author considers that the head shields attributed by Portlock to this species, really belong to another distinct species, for which Mr. Reed proposes the new name *Lichas kildarensis*.

Irish Carboniferous Cephalopoda.

The concluding portion of Dr. Foord's important monograph on the Carboniferous Cephalopoda of Ireland is now published (*Pal. Soc.*, vol. lvii., 1903) and available for workers in palæontology. In this final volume the families described belong to the Glyphioceratidæ and Prolecantidæ. In an appendix some additional species which have been examined since the earlier portions of the monograph were written are described, including a fine specimen of *Temnocheilus coronatus*. A useful synopsis of the families, genera, and species of Cephalopods is given at the end, and a glance through this reveals the fact that no less than forty-eight new species are described for the first time. Dr. Foord is to be heartily congratulated on the completion of this standard work of reference.

Irish Minerals.

A supplementary list of minerals occurring in Ireland, additional to those mentioned at the British Association meeting at Belfast (Report, p. 598), is given by Mr. H. J. Seymour in the Report (p. 671) of the British Association Southport meeting, 1903. This list includes some species, many of which were omitted from the previous list owing to lack of sufficiently authenticated records or otherwise. The

occurrence of those now mentioned has been verified by the author, and the number of Irish species of minerals is accordingly raised to 127.

In this connection may be mentioned the occurrence of Dopplerite, described by Mr. Moss (*Sci. Proc. R. D. S.*, vol. x., p. 93). This substance, consisting mainly of carbon and oxygen, with some hydrogen, was found by Mr. R. Bell in a peat bog at Sluggan, Co. Antrim. In the literature on this material, quoted by Mr. Moss, we note the omission of a previous Irish record, viz., that of the late G. V. Du Noyer, who described the occurrence of this substance in a bog cut through by the M.G.W. Railway near Cloncurry, Co. Kildare. (*J. G. S. D.*, vol. xviii., 1847, p. 253).

Geology of the Porcupine Bank.

An examination of the rocks dredged from the floor of the Atlantic off the West coast of Ireland was undertaken by Professor Cole and Mr. Crooke, with a view to determine if they threw any light on the nature of the region now covered by the sea. Their results published (in Appendix IX., *Rep. of the Inland and Sea Fisheries, Ireland, for* 1901) in 1903 seem to show that the floor of this region is made up of similar rocks to those constituting the "Dalradians" of the neighbouring land, the exception being the Porcupine Bank itself. This would appear to consist of a mass of gabbro, which the authors are inclined to refer to the Carboniferous period rather than to the Tertiary. It may, perhaps, be pointed out that undoubted tertiary rocks occur as far west as Bunowen, south-west of Clifden, Co. Galway.

Banded Gneisses.

In continuation of similar researches in Southern Donegal, Professor Cole discusses the origin of the banded gneisses of Tirerrill and Drumahair, Cos. Sligo and Leitrim (*Proc. R.I.A.*, vol. xxiv., sect. B., pt. 4, 1903), and again finds evidence that these gneisses also owe their production to igneous flow and absorption of previously consolidated material. He notes that the banded structure is usually more pronounced in the places where inclusions are most abundant. These gneisses are

stated to belong probably to late Archæan times, and to have reached their present position as a result of earth-movements in early Devonian times. In some of the fluidal aplites the bands are made up of garnets, which Professor Cole considers indicative of the absorption of originally solidified material. We have a very distinct recollection of seeing a well developed crumpled structure, accompanied by step shearing, or faulting, in the banded gneisses in the vicinity of Lough Derg, Co. Donegal. One would like to know if this "pressure structure" is exceptional in the district?

The Ox Mountains.

In his report on the Ox Mountains (*Proc. R.I.A.*, vol. xxiv., sect. B., pt. 4, 1903) Mr. A. McHenry brings forward evidence that in this region pressure is the dominant factor in the production of "secondary" structures. He regards the rocks of this interesting region as being mainly metamorphosed Lower Silurian sediments, a small area (Croagh Patrick) being Upper Silurian. The highest beds are quartzites, and in descending order come the "Boulder-bed" limestone, black shales (Llandeilo) and pebbly grits. Many of the large quartz pebbles in the latter are intensely sheared, and proof of this shearing is brought clearly before the reader in the form of numerous sketches made in the field. Basic and acid intrusions are sheared by the same movement, but much later granite intrusions are also present in the series. Referring to the "Boulder-bed," it is interesting to note that Mr. McHenry thinks it probable that it represents a Palæozoic glacial boulder-clay marking a break between the Lower and Upper Silurian formations in this part of Ireland.

Carboniferous Lamellibranchiata.

At the end of 1904 the final portion of Dr. Wheelton Hind's monograph on the above was published by the Palæontographical Society. Opportunity is taken to add in an appendix a description of additional species of interest, and amongst these we note a detailed description of a new genus *Nothamusium*, the precise systematic position of which is not as yet determined. One species of two referred to this genus, and called

N. radiatum, was found in the Carboniferous limestone of Little Island, Co. Cork. An extremely useful table of synonyms is given, which will be of inestimable value to museum curators, and enable them to bring the nomenclature of this portion of their collections up to date.

The Pendleside Series.

In an account of the distribution of the Carboniferous Lamellibranchs in the foregoing, Dr. Hind directs attention to the fauna of the Pendleside beds, which he regards as homotaxially superior in position to the Yoredale series. In a second paper (*Geol. Mag.*, Aug., 1904) Dr. Hind gives us his views as to the areas occupied in Ireland by his Pendleside series. These in Co. Dublin succeed the Carboniferous Limestone near Skerries. He points out that in the south-west of Cork, as in Devonshire, there is a passage from Devonian to Carboniferous without a stratigraphical break. With regard to the Coomhola grits which were regarded by the Survey as Carboniferous, Dr. Hind considers the fauna in them to be essentially Devonian. In a more recent paper on the same topic (*Proc. R.I.A.*, vol. xxv., sect. B, no. 4, 1905), and entitled "On the beds which succeed the Carboniferous Limestone in the West of Ireland," we are given the results of his investigations in the Counties Clare and Limerick. He states that the Pendleside beds (some eighty feet thick in Clare) are well represented, and constitute the Upper Limestone shales of the Survey, the fossils being identical with those found at Chokier in Belgium, and in the English Midlands. The characteristic fossils of the lowest beds of the Pendleside series have, however, not been yet found in Clare. The olive grits which overlie the Upper Limestone shales are equivalent to the Millstone Grits, and are largely marine. The paper will be of considerable help towards working out the zoning of the Irish Carboniferous rocks.

Age of the Igneous Intrusions of S.E. Ireland.

Mr. J. V. Elsden (*Q. J. G. S.*, vol. lix., p. 604, 1905), refers incidentally in his paper on the igneous rocks between St. David's Head and Strumble Head (Wales) to the age attributed

by Messrs. Reed, McHenry, and Kilroe to the igneous rocks of S.E. Ireland, viz., Old Red Sandstone, and while disclaiming any first hand knowledge of the evidence in the case of the Irish rocks is inclined, from a consideration of the similarity of rock types in both countries, to agree with it as representing the period of intrusion of the Welsh rocks with which he is dealing.

The Growth of Hornblende.

In a paper on the growth of crystals in the contact zone of granite and amphibolite (*Proc. R.I.A.*, vol. xxv., sect. B, no. 5, 1905), Prof. Cole directs attention to the great size of certain hornblende crystals near the contact zone. This increase in size is attributed to the continuous transference of heat "which maintains the rock attacked in a favourable condition, and promotes the growth of certain mineral species."

Recent Changes of Sea Level.

In a paper on Aran (*Journ. Galway Arch. and Hist. Soc.*, vol. iv., 1905), Mr. J. Dillon Lawson directs attention to the presence of a submerged peat bog, with trunks of oak, etc., in Galway Bay near Salt Hill. Incidentally he quotes G. H. Kinahan as to the origin of Galway Bay, the explanation being, we confess, new to us, viz.—"The Bay of Galway appears originally to have been a Granite mountain shattered and swallowed during a great convulsion" (*l.c.* p. 27). Dr. R. J. Anderson also contributes a note of several pages in which a number of classical fluctuations of sea-level are mentioned. We regret to notice references to "numerous interglacial periods" in Dr. Anderson's contribution.

Irish Caves.

The first report of the Committee appointed to explore Irish Caves was published in September, 1903 (*Trans. R.I.A.*, vol. xxxii., sect. B., pt. iv.). This report deals with the exploration of the Kesh Caves, Co. Sligo, under the immediate direction of Mr. R. J. Ussher, and records many facts of the highest interest. Chief amongst these was the discovery of remains of the Arctic Lemming, which is now recorded for

the first time as an Irish animal. The caves originated in pre-glacial times, but only show evidence of having been much frequented by man in comparatively recent times (8th to 11th century onward).

Mr. R. W. Evans, LL.B., in the *Journal of the Cork Historical and Archæological Soc.* (vol. xi., 1905), gives an interesting account of the Castle Pook caves near Donerail, Co. Cork, together with a sketch plan of the various passages and chambers. In this cave, as the result of excavations by Mr. Ussher, the remains of the Hyæna, Mammoth, Bear and other Mammalia have been recently discovered.

MISCELLANEOUS.

It may be convenient to briefly refer here to a number of papers bearing on Irish geology, which, on account of their having been published in the *Irish Naturalist*, or reviewed therein, have not been specifically dealt with in the foregoing notes.

Amongst these, Mr. W. B. Wright's paper on "Montpelier Gap" (*Sci. Proc. R.D.S.*, vol. ix., p. 575) deserves notice, as one of the first publications in this country pointing out and explaining the peculiar type of valley known as a dry-gap.

Messrs. Wright's and Muff's paper on the "Pre-glacial Raised Beach of Southern Ireland" (*Sci. Proc. R.D.S.*, vol. x., 1904, p. 250), is a most important contribution to the geology of Ireland, as is also the paper by Messrs. Coffey and Praeger (*Proc. R.I.A.*, vol. xxv., 1904, sect. C.) on the "Larne Raised Beach."

Mr. G. C. Gough has contributed to our knowledge of the fauna (foraminifera) found in glacial sands (*I.N.*, Nov., 1904), and discusses also the formation of "Iron Ore in Lough Neagh" (*I.N.*, April, 1904). Amongst recent publications, the "Geological Survey Memoirs" and "Drift Maps" of the Dublin, Belfast, and Cork Districts should be mentioned. The two former have been reviewed in the *Irish Naturalist.* Mr. R. Kidston (*I.N.*, April, 1903) furnishes some notes on the Coal-measure plant remains collected by Mr. J. Ryan from the Arigna mines. He considers them to be essentially characteristic of Lower Carboniferous Rocks.

Geological Survey Office, Dublin.

NOTES.

BOTANY.

The Numbering of the Botanical County-Divisions of Ireland.

The new Catalogue of British Hepaticæ, with their distribution in the county-divisions, which is practically a new edition of the "London Catalogue," has just been published. Mr. Praeger's enumeration has been adopted for the Irish county-divisions. When I sent my note last July to the *Irish Naturalist* and the *Journal of Botany*, I had hoped it would have been possible to find out the general opinion of those interested in the matter before printing. Without some general agreement I would not press the adoption of my scheme, since an inconvenient system which all agree to use is preferable to a better one, which meets with only partial support. As time pressed it was decided therefore for the present, at any rate, to use Mr. Praeger's scheme.

In the present catalogue I. has been used for Ireland as in the "London Catalogue," and placed before the series of Irish county-divisions, "e.g., *Fossombronia angulosa* (Dicks) Raddi 1, I., 1, 2, 3."

In quotations and general use I. should be repeated before *each* Irish number 11., 12, as Mr. Praeger suggests, and I am sorry a note to this effect was not appended. This seems all that can be done conveniently to prevent confusion. Mr. Praeger's term *county-division* seems to me preferable to Watson's *vice-county*, and C.D. would be a convenient contraction for it.

I am glad that my remarks in the *Irish Naturalist* for September have led to so much discussion, but I am sorry that we have only had the views of those whose studies have been limited to distribution in this island, so that the matter has been regarded from the Irish, and, as I conceive, narrow point of view. If their work had been in a larger field they would, I am convinced, have experienced the inconvenience of which I complain, and been more inclined to accept my ideas. If, as Mr. Colgan thinks, it is a question for Irish botanists alone, and to be settled to suit their convenience, irrespective of those who study the distribution of the fauna and flora of the British Isles as a whole, then, of course, I have no standing ground. Mr. Colgan objects to the use of the word British as an adjective for British Isles, and supports it by political and financial reasons into which I cannot follow him in these pages. There is ambiguity in the use of the adjective. Would he have me use "Great-British" and British? I am content to follow the use of the many British Floras, which include Irish plants, and of the London Catalogue of British Mosses and Hepatics, of which the present work is an enlarged edition. Towards the end of his note he writes "British Isles Catalogue." Surely the old and tried form will commend itself to most people.

This discussion has brought out one point, which is new to me and probably to others, which I have not seen stated in print before, "that Mr. Praeger's scheme is now accepted by Irish botanists." Irish botanists may have silently adopted it, but, as was pointed out in the September number of this journal, it was not adopted in several recent works. My chief object has been to find out the views of others, and I think the result of this discussion will be useful. If Mr. Praeger's scheme is adopted by British botanists I hope it may be followed universally, in spite of what I consider its inconvenience in one detail.

C. H. Waddell.

Saintfield.

May I add a word of explanation to Mr. Waddell's note? I am exceedingly glad to hear that Mr. Praeger's scheme of Irish county divisions has been adopted in the new Catalogue of Hepaticæ, and I wish, as one whose study of faunistic problems has not "been limited to distribution in this island," to protest with all courtesy against the suggestion that advocacy of Mr. Praeger's scheme is the outcome of any "narrow point of view." An English naturalist who settles in Ireland learns quickly that from the standpoint of biogeography Ireland is not an appendix of Great Britain, still less of the Shetlands, and from a general survey of the life of Western Europe he objects to any scheme that implies such an assumption, as unscientific and misleading The chief use of a set of numerals for the indication of distribution is to enable the student to grasp rapidly the range of any species. The first thing he wants to know, when investigating distribution in the British Isles, is whether the species occurs in both Great Britain and Ireland, or in one only of them. The answer to this question is seen immediately from a scheme which gives Ireland an independent set of county numbers, while it is obscured by any scheme with consecutive numbers for the whole of the British Isles.

Incidentally Mr. Waddell raises the interesting question of the proper use of the word "British" in natural history writings. At present it is used by some writers so as to include, by others so as to exclude, Ireland. Clearing our minds from all political, financial, and sentimental considerations, we must admit that whenever we discuss the distribution of plants or animals in the United Kingdom, an adjective to express "belonging to Great Britain" is badly wanted. I should like to repeat here a suggestion which I put forward two years ago in conjunction with my friend Mr. W. Evans, F.R.S.E. (*Proc. R. Phys. Soc., Edinb.*, vol. xv., p 219). We have two adjectives in current English speech—"British" and "Britannic" to which naturalists might easily attach definite geographical meanings. Why not agree to use "British" in biological writings in a sense exclusive of Ireland, and "Britannic" when we wish to include the whole archipelago?

Geo. H. Carpenter.

ZOOLOGY.

A New Genus and Species of Irish Crustacean.

In the *Ann. and Mag. Nat. Hist.* (7), vol. xiv., pp. 274-283, pl. viii., Mr. W. F. de Vismes Kane referred to his discovery of *Niphargus kochianus*, Bate, in Lough Mask. The occurrence of this blind Crustacean in an open sheet of water is of considerable interest, since it had previously only been obtained in a well near Dublin.

Among 130 specimens discovered by Mr. Kane, three had well-developed pigmentation in the region of the eye, while a fourth had a cloudy shading. Fortunately, he sent a selection of his specimens to Prof. Vejdovsky, of Prague, who agreed with Mr. Kane's determination of all the specimens except the four referred to. These he pronounced to belong to a new genus, which he called *Bathyonyx*. Professor Vejdovsky, wishing to honour the discoverer, intended to call it after Mr. Kane, but failed in identifying his surname, so that the new species stands as *Bathyonyx de Vismesi* ("Veber einzige süsswasser-Amphipoden," *Sitzungsber d. K. böhm. Gesellsch. d. Wissensch.*, 1905). It may be mentioned that on the Continent the last of a series of names which have been invented to identify a person by no means always represents his surname. Hence Prof. Vejdovsky's error.

The new genus stands between *Gammarus* and *Crangonyx*, but differs from the absence of the secondary gills, and by the possession of a forked telson. The eyes especially are peculiar in *Bathyonyx*, as they are not ordinary composite organs as in *Gammarus*, but such with varying number of crystalline cones, which form an irregular spot on each side of the head. Prof. Vejdovsky followed up his observation on *Bathyonyx* by some remarks on *Niphargus kochianus*.

Pæderus caligatus at Wexford.

Among some beetles sent to me by my friend, Mr. J. H. Johnston, from the vicinity of Wexford, I found a specimen of *Pæderus caligatus* Er. This is an addition to our Irish List, and we have now records of all the four species of *Pæderus* found in the British Islands.

W. F. Johnson.

Acton Glebe, Poyntzpass.

Sagacity of the Herring Gull.

The following incident in bird life, witnessed at Skerries, Co. Dublin, in July last, may be of general interest to readers of the *Irish Naturalist*, since it raises the question of the nature and extent of the reasoning faculty in the lower animals. I was one of a party of three crossing on

foot the wide expanse of level sands, which at low water makes it possible to pass almost dry-shod from Skerries beach to the tidal island, known as Shennick's Island. Far out near the water's edge a straggling troop of Herring Gulls on the wing flapped to and fro a few yards above the sands, on the look-out for toothsome jetsam. As we drew near one of the birds was seen to swoop down, lift something, apparently a large shell, from near the tide margin, and mounting rapidly almost straight upwards for about 50 feet, let the object fall to the ground. The action struck us all as peculiar, and we approached to have a clearer view. As we did so the bird swooped down rapidly, seized the shell again; we were near enough now to see that it was a large univalve shell, apparently a great whelk (*Buccinum undatum*), and mounting rapidly a second time into the air to an obviously greater height than on the first occasion, suddenly let his burden fall to the ground a second time. When we saw the bird thus repeat his peculiar action we felt strongly tempted to set it down as intentional, as designed, in fact, to dislodge the body of the whelk either by fracturing the shell or loosening the animal's hold. We approached more rapidly the scene of operations, and as we did so the gull swooped down again, lifted the shell (we were now sure of its being a whelk) for the third time, mounted straight up with it, and, as it seemed to us, to a still greater elevation than before, and for the third time released the shell.

There was hardly any doubt in my mind now as to the nature of the gull's action. Nevertheless I hastened towards the water's edge, thinking to capture the shell, and make sure that it contained the animal. But I was too late. The gull swooped down a fourth time, snatched up the shell once more, and swept off with it in an almost horizontal path to the distant rocks of Shennick's Island. Though I failed to capture the shell it may be fairly assumed that it did contain the animal. A full grown Herring Gull is not likely to play with an empty shell as an imaginative young terrier sports with a make-believe rat in the shape of a rag or a rope's-end.

There are three theories admissible as to the nature of the bird's action on this occasion: (1) The release of the whelk in mid-air was involuntary or accidental, (2) it was instinctive, or, to avoid the use of that ambiguous word, was part of the traditional wisdom of the species *Larus argentatus*, commonly called Herring Gull, and (3) it was reasonable, *i.e.*, founded on this particular gull's deduction from his own personal experience in dealing with refractory whelks.

To a sceptic in the matter of animal sagacity the first theory would seem the most acceptable. The whelk, he would say, was too heavy for the bird or too awkward in shape to be firmly grasped by its bill, or the bird was frightened by the advent of that hostile species, *Homo sapiens*, or was attacked or threatened by its comrades, so that for one or other of these reasons the release of the shell was involuntary. And, he would add, the increasing height of each successive upward flight was probably imaginary, or if real was undesigned on the

part of the bird. In answer to these suggestions I would point out that although there was a threatening movement made by the comrade gulls when the whelk was first captured, there was no actual attack then; and in the second and third upward flights no interference whatever took place. And if the bird were frightened by human intruders why, it may be asked, did it not fly off horizontally with its prey, as it ultimately did, to the rocks of Shennick's Island. As for the second theory, that the action of the bird was, roughly speaking, instinctive, that I must leave to the consideration of those who are well versed in a delightful lore of which I am lamentably ignorant, the manners and customs of sea-birds. Our ornithologist can tell us whether this method of smashing shells is as much part of the traditional wisdom of the Herring Gull as is the smashing of snail shells on a stone with the Thrush.

If neither the first nor the second theory fit the facts then we are apparently forced to the conclusion that the Skerries gull by a course of philosophical experiment attained to a very fair practical knowledge of the laws of gravity.

N COLGAN.

Sandycove.

Quail in Co. Louth.

I notice in the December number of the *Irish Naturalist* mention of Quail in Co. Waterford and Co. Londonderry. It may interest some readers to know that when shooting with Mr. Lionel Hartop, of Belrobin, near Dundalk, about the 20th October, we killed two Quail, a male and female. These were the first living Quail I had ever seen in Ireland, though I have once or twice heard them. I hear of two other Quail being shot here this season, and last year Mr. Maxwell Boyle, of Blackrock, Dundalk, killed several. I have no doubt that the two birds we shot in October were bred here during the very favourable present season, but I am surprised that they remained so long with us.

ALLAN P. SWAN.

Dundalk.

Whiskered Bat in Co. Carlow.

On November 7th last a bat flew into the house here, which, on examination, I identified as *Vespertilio mystacinus* (kindly confirmed for me by Dr. Scharff). This bat has not, I believe, been recorded before from this county, though it has been taken in the neighbouring county of Wexford.

DENIS R. PACK-BERESFORD.

Fenagh House, Bagnalstown.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Monkey from Mr. E. Curzon, a Goldfinch and a Canary from Mr. Beers, a Chacma Baboon from Mr. A. M'Clintock, a Gevet from Mr. R. M. Byrne, a Ring-Snake from Mr. N. Cromwell, a Sparrowhawk from Mr. D. Quillian, and a Squirrel from Mr. N. Cannon. A pair of Siamese Cats deposited by Surgeon Lentaigne have been placed on view in a large cage in the Monkey House. The Rhesus Monkeys in the open air "Aviary" continue to enjoy excellent health, and suffered no harm from the frost and snow of November.

DUBLIN MICROSCOPICAL CLUB.

October 18.—The Club met at Leinster House.

Mr. F. W. Moore showed hairs from the leaf of *Chrysophyllum macrophyllum*. This plant is very rare, and is a native of tropical Africa. The backs of the large leaves are of a beautiful "old gold" colour, the colour being given by a thick coating of hairs These hairs are remarkable in shape, being curiously forked.

Mr. D. M'Ardle showed sections through the male receptacle of *Conocephalus conicus*, Neck., one of the largest of the frondose Hepaticæ. These receptacles arise from the midrib, near the apex of the frond, are hemispherical in shape, immersed in the cavity of the frond, free, and united at a central point beneath. The upper surface is rough, showing a few well-marked apertures through which the antheridia escape. The sections showed six antheridia contained in linear oblong antheriferous vesicles, immersed in the fleshy disk. Mr. M'Ardle also showed sections through a capsule freeing the muriculate spores, which are of a dark-brown colour, variously shaped, with a well-marked echinate border. The elaters are copious and bi-trispiral. This is one of the few liverworts in which the first division in the germinating spore takes place while the spores are still within the sporogonium. The plant differs from all others in the frondose section, on account of the reticulated epidermis, and the numerous stomata, which are white, and occur in lines on the green frond, and can be observed by the unaided eye. Fruit is borne in spring. The whole plant has a remarkable aromatic smell; it is common on damp banks of streams, abutments of bridges etc., and has a geographical range through Europe, Asia, Japan, and North America. The male plant, which is separate, is rarer or overlooked, which often happens in dicœcious hepatics.

November 8.—The Club met at Leinster House.

Mr. F. W. Moore showed sections through parts of the flower of *Bulbophyllum bisetum*, a new species recently described. The sections showed the delicate fringe of curiously-marked hairs which occurs on the labellum.

Prof. HENRY H. DIXON exhibited sections of the leaf of *Dendrobium Beckleri*, showing siliceous spherules in the cells on the outside of the bundle-sheath. The spherules are deposited in small cubic cells, which, as the siliceous mass grows, lose their nucleus and cytoplasm. The spherules are fairly uniformly distributed over the outside of the bundle-sheath throughout the leaf, but are not found below the absciss-layer. This distribution holds good in all the orchids in which the spherules have been observed.

Prof. G. H. CARPENTER showed two new species of Collembola—an Isotoma and a Cryptopygus—collected by the members of the Scottish National Antarctic Expedition, under the leadership of Mr. W. S. Bruce, on the South Orkney Islands. The Cryptopygus is closely allied to *C. crassus*, Willem, from the shores of Gerlache Channel, Graham's Land, while the Isotoma shows an unexpectedly close relationship to the Arctic species, *I. Beselsii*, Packard.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

DECEMBER 5.—Mr. W. F. de V. KANE lectured on "Prehistoric Man in Southern France."

DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 11.—EXCURSION TO THE SLADE OF SAGGART.—In spite of the inclement weather a number of members and visitors left Terenure for Brittas by the 12.15 tram. On arrival the party walked through the Slade under the conductorship of F. O'B. Ellison, B.A. (Hon. Sec.). The object of the excursion was the study of mosses and liverworts, of which many specimens were obtained. After having tea at Brittas Bridge, the party returned to Dublin by the 5.30 tram.

NOVEMBER 14.—R. M. BARRINGTON in the chair. Prof. G. H. CARPENTER, B.Sc., read a communication on *Lohmannia insignis*, an Oribatid mite new to Ireland. This communication has been published in full in the *Irish Naturalist* for December. W. F. de V. KANE, M.A., delivered a lecture on "Prehistoric Man in Southern France," which dealt with the remains left by palæolithic man in the stations of Le Moustier, La Madelaine, Les Eyzies, etc., in the Dordogne. The lecture was illustrated by a series of lantern slides, and by a collection of flints. The following members took part in the discussion:—R. Ll. Praeger, R. J. Ussher, Prof. Carpenter, Miss M. C. Knowles, and C. Wilcox. R. Ll. PRAEGER exhibited *Euphrasia Salisburgensis* from six Irish botanical divisions. Miss M. Paxton, B.A., and Messrs. Bruce, Stewart, and Wilcox, were elected members of the Club.

BELFAST NATURALISTS' FIELD CLUB.

OCTOBER 17.—The winter session was inaugurated by a conversazione held in the Exhibition Hall. The guests, who numbered upwards of 400, included representatives of the Dublin and Dungannon Field Clubs. Tea was dispensed from seven to eight o'clock.

At the business meeting Mr. W. H. Phillips (President) occupied the chair, and in the course of a brief speech he reviewed the work of the Club during the past year. He said the seven excursions held during the summer months had been well attended, the average number present being sixty. The clubroom at the Museum had been largely availed of for the Wednesday night meetings, and it was hoped that similar success would distinguish these gatherings during the coming winter. The membership of the Club was now over 400. This year they had to lament the deaths of three of their members, including Mr. John Anderson, J.P., who was connected with the Club for nearly forty years; Sir James Haslett, M.P., and Mr. C J. Lanyon. Proceeding, he said he would like to call the attention of the members to the effort that was being made to obtain funds for the better equipment of Queen's College, a movement which he earnestly trusted they would do their best to promote.

After the election of four new members limelight views of localities visited were exhibited and explained by Messrs. Robert Welch, M.R.I.A.; W. J. Fennell, M.R.I.A.; T. E. Farrington, N. H. Foster, Geo. Donaldson, and W. A. Green,

The following is a list of the exhibits which were on view during the evening:—

BOTANY.—N. Carrothers—Some rare plants from Down and Antrim, collected in 1905. C. M. Cunningham—Specimens illustrating growth of *Himanthalia lorea* or Sea Strap. J. H. Davies—A brick covered with a rare moss, *Weisia calcarea*. G. Donaldson—Plants of North America (from Compositae). W. Gray, M.R.I.A.—Microscopical sections of plants W. H. Phillips—Varieties of *Polystichum angulare*. R. Ll. Praeger, B.E.—Some rare plants collected last season in Clare, Mayo, Leitrim, Cavan, and Monaghan. J. Strachan—Specimens of fungus *Peziza adae*. Rev. C. H. Waddell, B.D.—Mosses and Liverworts from Co. Down.

GEOLOGY.—R. Bell—Liassic Fossils. C. Bulla—Ores and minerals from Laxey mines; rocks from Carlingford. G. C. Gough—Various limestones under the microscope; fossils, minerals, &c. J. L. S. Jackson—Lepidodendron. De Witt Hinch—Shells from high level glacial beds, Co. Dublin. J. Strachan—Dendrites and micro-crystals.

ZOOLOGY.—S. S. Faussett—Tropical bird-skins from Australia. Rev. G. Foster—Collection of Irish butterflies and moths made during past season. N. H. Foster, M.B.O.U.—Down from nests of *Anatidæ* (12 species). W. H. Gallway—Snakes from Singapore; Mongoose. W. A. Green—Badger and Stoat mounted by exhibitor; butterflies and moths. J. N. Milne—Land and fresh-water shells; moths. H. L. Orr—Butterflies, moths, beetles, and shells. Miss Steele—Marine shells from Malahide. A. W. Stelfox—Land and fresh-water Mollusca from W. Donegal.

Prof. Gregg Wilson, D.Sc —Living marine animals; microscopic preparations. R. Welch, M R.I.A.—Land and fresh-water Mollusca, including carinated *Buccinum undatum.* J. Wright, F.G.S.—Foraminifera from Rockport, Belfast Lough.

MISCELLANEOUS —Thomas Brown—Amethyst from Achill Island, mounted and unmounted. Ballycastle Toy Industry—Toys, &c., made by peasant children. R. A. Dawson, A R.C.A. (Lond.)—Specimens of clay and gypsum from Co Antrim, and specimens of simple pottery suitable for local industrial development. F. C. Forth, A.R.C.Sc.I.—Meteorological charts; model of tubular bridge at Gobbins. C. Hilland (of Dundalk)—Punch bowl of Dundalk Volunteers, 1782. J. L. S. Jackson—Old wooden water pipes recently dug up in Donegall Street. Mrs. Letts—Penal candlesticks; model of a Ship "The Neptune," made by French prisoners in Nelson's time, &c. Sharman D. Neill—Replicas in silver of old Irish cups, methers, &c., showing Celtic ornament. W. H. Milligan—Casts of Crumlin and Middlesbro' meteorites. Miss J. Moore—Toys made by Cushendall peasants. H. M. Robb—Peat, &c., from the Irish Peat Development Company, Maghery. W. H. Robinson—Some scarce Irish coins. R. Welch, M.R.I.A.—Natural history photographs.

NOVEMBER 21.—The President (W. H. PHILLIPS) gave an address, which was illustrated by limelight views, on "Reproduction of Ferns." There was a fair attendance. After dealing with the ordinary mode of reproduction, and tracing the history of ferns, the lecturer concluded with a description of some of nature's short cuts in propagation of ferns by bulbils on the fronds and rhizomes, by buds, and by apospory and apogamy.

R. WELCH, M.R.I.A., showed sections of, and described the raised beach, now exposed by road-widening operations for the electric tram at Mount Vernon, Shore Road. This paper will appear *in extenso* in our pages at an early date.

Several new members were elected into the club.

NOVEMBER 29.—N. H. FOSTER, M.B.O.U., gave a talk on "Bird Watching." For the pursuit of this study the only requirement, in addition to our eyes and ears, was a good field-glass, by the aid of which birds could be closely observed at a considerable distance. Correct identification was imperative if the observations were to be of any value; size, shape, colour, characteristic actions, sound emitted, as well as the physical features of the bird's habitat, applied singly or collectively, were the main aids to identification in the field. Many a rare wanderer to this island undoubtedly escaped notice, and the lecturer urged the importance of having every bird which the capturer might consider rare submitted to a local expert, with full particulars as to when and where it had been obtained.

ROBERT PATTERSON mentioned some extraordinary results of watching bird migration off the West Coast of Scotland this autumn, that hitherto very rare visitor, the Lapland Bunting, having been obtained in large numbers. G. C. GOUGH, H. L. ORR, W. H. GALWAY, and R. MAY continued the discussion.

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BELFAST NATURALISTS' FIELD CLUB,
DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
LIMERICK FIELD CLUB,
ULSTER FISHERIES AND BIOLOGY ASSOCIATION.

EDITED BY
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AND
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EDWARD WILLIAMS.

BORN 8TH MAY, 1848. DIED 15TH DECEMBER, 1905.

Edward Williams—what lover of birds is not intimate with this simple name, and what Irish ornithologist is there unfamiliar with the quiet earnest features of this exceptionally gifted naturalist, whose handicraft has unquestionably raised the standard of the taxidermist's art?

Like his well-known brother Alexander Williams, R.H.A., Edward was a true artist, and this faculty, combined with an exceptionally accurate knowledge of birds in their native haunts, resulted in those beautiful and instructively mounted specimens which not only delight the public in our National Museum, and the private collector in his study, but are of real service to science.

Handcock of Newcastle-on-Tyne, an accurate and well-known ornithologist and taxidermist, became famous in England half a century ago for his wonderfully life-like specimens; and this at a time when our national collections were little more than an assemblage of odd and unnatural-looking stuffed birds. Possibly Handcock had more imagination than Williams, and it would be difficult to surpass the mounting of his favourite Greenland Falcons, but in the mounting of Gulls, Waders, and Hawks, and the young and tender nestlings of all birds, Williams had no superior, and in the resuscitation, so to speak, of a rare and much-damaged specimen, or in the skilful imitation of the natural coloration of fish, he had no equal.

William Williams, Edward's father, was a hat maker in Drogheda, and for generations his ancestors had been felt makers in Monaghan. He was no ordinary man. Exceedingly fond of natural history, he also gained prizes for proficiency in geology. In 1850 he became acquainted with Mr. R. J. Montgomery, afterwards assistant secretary to the

Royal Zoological Society of Ireland, in whose company he collected many birds on the Boyne. In 1878 he read a paper before the Royal Dublin Society on "*Cervus Megaceros*," and in the same year contributed another to the British Association on this extinct mammal in its relation to the lacustrine deposits of Ireland.[1] He learnt the rudiments of taxidermy from a Mr. Evatt of Mount Louise, Co. Monaghan. Edward became an apt pupil to his father, and at the age of 10 could set up small birds in a "kind of way."

In 1860 Mr. Williams, senior, left Drogheda and moved to Westmoreland Street, Dublin, and soon became a member of the old Dublin Natural History Society. My first acquaintance with his son Edward was in 1867 or '68, when a notice appeared in the press that *Harelda glacialis*, the Long-tailed Duck, had recently been shot at Ringsend and was on view at Mr. Williams', Bachelor's Walk, where the business was then carried on. At that time there was really no one in Dublin capable of preserving a bird decently. Richard Glennon of Suffolk Street was dead, and Glennon at his best was not within a measurable distance of young Williams, who quickly made a name for himself. Specimens of his artistic skill were exhibited in the shop window side by side with his father's hats. One could readily perceive that Mr. Williams, senior, while proud of his son's achievements, was most reluctant to permit his own occupation to be interfered with, for Edward was anxious to banish the hats and fill the window with birds.

Shortly after 1868 No. 3 Dame Street was taken, and here the struggle between hats and birds was renewed, with the result that there were two windows, one for hats, another for birds. Gradually, however, the birds crossed the frontier, and in the early seventies (fortunately for Irish naturalists) the birds, assisted by the beasts and fishes, swept their enemies the hats away altogether, and when another change of residence was made to the adjoining premises, No. 2 Dame Street (where the business is now carried on)[2] the entire front was

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[1] Printed *in extenso* in *Geological Magazine*, 1881.

[2] And will be continued by Edward Williams' younger brother and co-partner, Mr. W. Williams.

filled with interesting and attractive specimens so life-like and natural that their novelty in Dublin arrested the attention of many foot passengers, and a small group was always collected on the pavement outside the window. It is unusual for a competition such as I have described to terminate so conclusively in favour of natural science.

It has been correctly observed that with few exceptions "the remuneration obtained for stuffing animals has not been sufficient to secure the services of persons trained to produce high class work," but Edward Williams, like all true artists, laboured not for pecuniary remuneration but for love. The pleasure it gave him to do a thing well would have been (had he possessed independent means) sufficient reward in itself. This fact, combined with the sustained encouragement given him by Mr. A. G. More, was the keynote of his success. Williams was an invaluable ally to More when recruiting for the National Museum, for the former had exceptional opportunities of knowing the whereabouts of the rarities the latter wished to procure, since practically every Irish specimen passed through his hands. Edward Williams and More were mutually helpful. "Did you notice that case at Williams'?" More would say—"it is wonderfully good; you will never see its match anywhere—*buy it.*"

When Mr. J. G. Millais, son of the famous President of the Royal Academy, and author of many recent and valuable volumes written chiefly for sportsmen, was quartered at Beggar's Bush barracks, he was a frequent visitor at 2 Dame Street, and his admiration for Edward and his work was keen and genuine. An excursion to the great breeding station of the Black-headed Gull near Tullamore, undertaken by Williams, Millais, and myself, was a delightful experience; nor shall I ever forget the enthusiasm of my old friend, when we two journeyed westward in 1904, and saw for the first time the Red-necked Phalarope breeding in Ireland.

A worker rather than a writer, the many short notes and papers contributed to the *Zoologist*, and the *Irish Naturalist*, a list of which appears at foot, give little conception of his varied knowledge, being for the most part simply notes of the occurrences of rare and interesting specimens.

It is to be deplored that his hardworking life left him neither time nor opportunity to put on record much which would have been of lasting value. That two such naturalists as More and Williams, with whom all knotty points in identification and in Irish field natural history were discussed, should have left unwritten a large proportion of the special information they possessed as to the distribution and habits of birds, beasts, fishes, and plants, in Ireland, is lamentable.

A keen eye, a quick musical ear, and a retentive memory, grafted on to a cautious and truthful nature, free from any tendency to exaggeration, made Williams an almost ideal field naturalist, but the physical health and strength, so necessary for prolonged or adventurous excursions, was lacking, and he was thus prevented taking advantage of numerous invitations and opportunities for observing nature in her wildest aspects. This deficiency was partly constitutional, and partly due to the constant strain of an occupation, the success of which depended in a special degree on his own handicraft, and his personal attention to the detailed and minute requirements of his individual clients. Often, when urged to take holidays, he would reply "You cannot understand the fascination my work has for me; I love it."

In private, his amiable and retiring disposition, his talent, and his absolute freedom from conceit, endeared him to all. Without being "religious" in the ordinary sense, he was filled with reverence towards the great Creator and Architect of all things. His Sunday mornings were frequently devoted to walks in the country, his evenings to public worship or to hymns sung at his own fireside. His sudden and painless death was probably just such as he would have desired, but its unexpectedness emphasised his loss both to his friends and relatives. When Edward Williams' mother was being buried, the ground deep in snow, a Redbreast alighted on the edge of the grave and sang for a short while. This incident appealed forcibly to one whose life had been devoted to the study of nature, and Edward expressed a strong desire to be buried where the birds could sing over his grave. His wish has been gratified.

Richard M. Barrington.

Fassaroe, Bray.

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1878. Black Hare in Ireland, p. 434; Sabine's Gull in Ireland, p. 437; Early arrival of the Snow Bunting, p. 437.

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1887. Rare Birds in Ireland, p. 75.

1889. Golden Eagles in Co. Galway, p. 31; Pectoral Sandpiper in Ireland, p. 32; Solitary Snipe and Sabine's Snipe in Ireland, p. 33; Pallas' Sand Grouse in Co. Clare, p. 34; Crossbills in Ireland, p. 76; Night Heron in Ireland, p. 110; Curious variety of the Woodcock, p. 153; Bee-eater in Ireland, p. 229; Loxia curvirostra var. rubrifasciata, p. 266; The Scops Owl in Co. Waterford, p. 313; Varieties of Red Grouse and Land-rail, p. 393; A Breeding-place of the Black-headed Gull in the Queen's Co., p. 396; Spoonbill in Co. Kerry, p. 455.

1890. Great Spotted Woodpecker in Ireland, p. 24; Varieties of the Hare in Co. Dublin, p. 70; Green Sandpiper in Ireland, p. 138; Hawfinch and Brambling in Ireland, p. 138; Montagu's Harrier in Co. Wexford, p. 275; Black Terns in Co. Wicklow, p. 275; Honey Buzzard in Co. Wexford, p. 355.

1891. Sabine's Snipe in Ireland, p. 112; Parrot Crossbill in Ireland, p. 112; American Bittern in Co. Kildare, p. 218; Golden Oriole in Co. Galway, p. 318; Wilson's Petrel in Co. Fermanagh, p. 428; Fork-tailed Petrel in Ireland, p. 469.

1892. Red-necked Phalarope in Ireland, p. 28; Spotted Redshank in Co. Dublin, p. 35; Ruddy Sheldrake in Co. Dublin, p. 359; Bee-eater in Co. Wicklow, p. 428; Honey Buzzard in Co. Wexford, p. 428.

1893. Ferruginous Duck in Ireland, p. 106; Serin in Ireland, p. 108; Waxwing in Co. Wicklow, p. 109; American Red-breasted Snipe in Ireland, p. 433; Solitary Snipe in Co. Mayo, p. 434.

1894. American Golden Plover in Ireland, p. 428.

1897. Hybrids in Stephen's Green Park in Dublin, p. 329.

1901. Variety of the Shag, p. 354; Puffin off the coast of Kerry, p. 355.

1902. Glossy Ibis in Ireland, p. 467; a curious Water-rail, p. 467.

1903. Great Bustard in Ireland, p. 153; Snow Goose in Ireland, p. 459; Little Crake in Co. Kildare, p. 460.

1893. Montagu's Harrier in Ireland, p. 253; White-winged Black Tern in Ireland. p. 253.

1894. Snowy Owl in Co. Mayo, p. 24; Chiffchaff in Rathgar, December, 1893, p. 24; Spotted Redshank in Dublin Bay, p. 224.

1896. Irish Bird Notes, p. 55.

1899. Rose-coloured Pastor in Co. Donegal, p. 230; Wood Sandpiper in Co. Waterford, p. 231; Montagu's Harrier in Co. Wexford, p. 232; The Occurrence of the Sociable Plover in Ireland, p. 233.

1900. Montagu's Harrier in Co. Wicklow, p. 21; Ospreys in Ireland, p. 22; Rose-coloured Pastor in Co. Mayo, p. 22.

1901. Turtle Dove in Co. Dublin, p. 204; Wood Sandpiper in Co. Dublin, p. 205.

1903. Breeding of the Red-necked Phalarope in Ireland, p. 41; Hoopoe in Co. Wexford, p. 111; Rough-legged Buzzard in Co. Tyrone, p. 111; Glossy Ibis in Ireland, p. 112; Eider Duck at Malahide, p. 112.

1905. Occurrence of the Greenland and Iceland Falcons in Ireland during the spring of 1905, p. 201.

REVIEWS.

THE DISTRIBUTION OF SCALE-MOSSES.

Moss Exchange Club. Census Catalogue of British Hepatics, compiled by Symers M. Macvicar. Pp. 24. York, 1905.

The publication of this catalogue will be a great boon to workers at Hepaticæ. It gives, in a very condensed form, a list of the Scale-mosses of the British Islands, with the distribution of each. For Great Britain, Watson's county and vice-county numbers are employed. As regards Ireland, the question of the numbers to be used was the cause of a recent discussion in our pages. As already announced by Mr. Waddell, Praeger's sub-division and numbers have been adopted, but we notice a discrepancy in this connection, for whereas the Preface states that the scheme of "Irish Topographical Botany" is followed, the list which exemplifies it embodies Praeger's preliminary scheme of 1896. These two plans differ, inasmuch as, on the representations of H. C. Hart, the sub-division of Donegal was changed in the later work. The importance of the present list is greatly enhanced by the fact that, at the expense of much time and trouble, a large amount of revision of naming of the more critical species, including both old and recent work, has been done by Mr. Macvicar, who is one of our first authorities on these plants.

As bearing on the discussion in these pages already referred to, the following extract from a letter from Mr. Macvicar to the writer may be of interest, as embodying what Mr. Waddell regretted the absence of—namely, the opinion of an extra-Hibernian botanist:—"I sympathise with the view which considers it inadvisable to continue the Irish numbers in succession to Shetland. . . . . This matter must be left to Irish naturalists to settle in the manner they think best. In my opinion, English naturalists must adopt the numbers which are generally agreed upon as satisfactory by those in Ireland, when giving the British Isles as one botanical or zoological region."

R. Ll. P.

DRIFT SURVEY WORK IN THE SOUTH.

The Geology of the Country around Cork and Cork Harbour. Explanation of the Cork colour-printed Drift Map. By G. W. Lamplugh, F.G.S., J. R. Kilroe, A. McHenry, M.R.I.A., H. J. Seymour, B.A., F.G.S., W. B. Wright, B.A., F.G.S., and H. B. Muff, B.A., F.G.S. Pp. 8+135. Six plates. H.M.S.O., 1905. Price 3*s*. And coloured Map, 1*s*. 6*d*.

It would be impossible within the compass of a short review to do justice to the valuable memoir which has lately been issued with the drift map of the environs of Cork.

The map itself, which shows evidence of most extensive and painstaking work, should be of the highest utility to all interested in the surface formation of the land around the City and Harbour of Cork.

The scale is one inch to the mile, and the size 18 inches by 12. The ground covered includes portions of four sheets of the regular one-inch Ordnance Map, the town of Passage marking approximately the middle point of the area.

A section is shown through the central portion of the district, cutting the transverse ridges at right angles, and consequently running nearly north and south.

The Memoir occupies 126 pages, and is divided into three sections. The first or "General Description" deals with the wider and deeper geology of the area, including the form of the ground and descriptions of the main formations, viz., the Old Red Sandstone, the Carboniferous rocks, and the Post-Tertiary or superficial deposits (49 pp).

The writers adhere to the original theory of Jukes with regard to the peculiarities in the direction of the rivers of the district, and reject, for reasons which they give, the later suggestions of Prof. E. Hull and Mr. J. Porter, B.E.

The following passage from the chapter on the Carboniferous Rocks may be of melancholy interest to those who still dream of coal mines in South Cork:—"In the original survey . . . . . two or three small tracts

"of black slate in the south-western part of the present sheet were "separated out and distinguished as 'Coal-measures,' but, as will be "shown in the context, there is now strong reason to doubt whether "these beds should be regarded as Coal-measures."

In the chapter on the superficial deposits an interesting account is given of the discovery of "an ancient shore line of earlier date than the glaciation of the district."

Part II. is occupied with a detailed description of the superficial deposits, and comprises 59 pages of closely printed matter of very great value.

Part III. gives in 18 pages an account of the "Economic Geology" of the area under the heads of Building Stone, Slates, Bricks, Silica Clay, Sand and Gravel, Road Materials, Water Supply, and Agricultural Geology. The latter includes useful notes on soils and subsoils, with a table showing their localities, nature, depths, and the petrological character of their contents.

There is a good index and an appendix containing a list of papers on the geology of the Cork district. The memoir is illustrated by several instructive figures in the text, and by six beautiful photographic plates by R. Welch.

T. F.

ALIENS, DESIRABLE AND UNDESIRABLE.

Alien Flora of Britain. By STEPHEN TROYTE DUNN, B.A., F.L.S. Pp. 16 + 208. London: West, Newman, and Co. 1905. Price, 5*s*.

Before leaving England for Hong Kong in 1903, Mr. Dunn issued a "Preliminary List of the Alien Flora of Britain" This was a list only. Now, owing chiefly (so he tells us) to the industry of his wife, he has been enabled to publish an interesting little book on the same subject, in which each of nearly a thousand species has appended to its name a note varying in length from a few lines to half a page. These notes give the original home of each plant, and state or suggest its mode of origin in these islands, but they are a little disappointing in usually not giving any indication of the British localities. "*Trigonella arabica*, Delile.—An Oriental weed, once recorded in England among grain aliens," does not, after all, convey much more information than was given by the inclusion of the bare name in the "Preliminary List." But this does not much detract from the value of the book as a record of alien immigration and casual introduction.

Quite the most interesting feature of Mr. Dunn's book is the introduction, in which the questions of true nativity, of degrees of naturalization, of sources of introduction, and of the evidence to be employed in fixing the standard of plants, are excellently dealt with. We would like to see this essay read and taken to heart by every field botanist.

R. LL. P.

A VISIT TO MITCHELSTOWN CAVE.

BY ERNEST A. BAKER, M.A.

[PLATE I.]

Mitchelstown Cave, the largest ever discovered in the British Isles, is not situated at the town of that name, in county Cork, but ten miles away, in Tipperary, on the road to Cahir. Its entrance is in a small limestone hill in the broad vale of the Blackwater, midway between the Knockmealdown Mountains and the sandstone ridges and tables of the Galtees. The cave was laid open in the course of quarrying operations in 1833, from which time to the present the work of exploration has gone on progressively, if at long intervals, and may, perhaps, continue until the extent of the passages known is considerably enlarged. It seems now to be entirely forgotten that the spot has been famous from time immemorial for a wonderful stalactite cavern. In October, 1777, Arthur Young was taken into a cave, known as Skeheenarinky, after the townland, but the old Irish name of which was Oonakareaglisha. "The opening," he says, "is a cleft of rock in a limestone hill, so narrow as to be difficult to get into it. I descended by a ladder of about twenty steps, and then found myself in a vault of a hundred feet long, and fifty or sixty high: a small hole, on the left, leads from this a winding course of, I believe, not less than half an Irish mile." He goes on to describe the beautiful scenery of the cave, which, he says, is much superior to the Peak Cavern in Derbyshire, "and Lord Kingsborough, who has viewed the Grot d'Aucel in Burgundy, says that it is not to be compared with it."[1] The odd thing is that the very existence of this cavern seems to have been forgotten since the discovery of its much finer neighbour. Yet the trees and brushwood guarding its mouth are in full view of the well-frequented entrance to the other cave; and Dr. Lyster Jameson, who was with Monsieur Martel on his visit in 1895, told me some years ago that an opening had been pointed out to him into a lower

[1] Arthur Young's Tour in Ireland; ed. by A. W. Hutton. 2 vols. Bell 1892. See pages 464–5, vol. I.

series of caves, which I have little hesitation in identifying with Young's cavern and the cave-mouth I allude to.

Dr. C. A. Hill and I visited the spot in August, 1905, intending to go through all the accessible parts of the huge series now known collectively as Mitchelstown Cave, and also to examine the series referred to by Dr. Jameson, who had been unable to undertake their exploration. Our impression was that little or nothing was known of the latter series, and it was not until after our return from Ireland that we were startled and puzzled by turning up an account in "The Post-chaise Companion," (1805 ed., p. 301–2) of a cave in this place already known and celebrated thirty years before the discovery of the Mitchelstown Cave. The explanation probably is, that the guides find one cave a more profitable investment than two. To show the second (or rather the first, since the other is the usurper) would involve twice as much labour, but would hardly bring in twice the income. Since 1833, then, the original cavern has been suppressed, so successfully that even the omniscient Baddeley never suspects that there are two series, although he has read Young's description and confused it with the other. Dr. Hill let me down a few feet into the old cave-mouth, just such a narrow slit as Young depicts; but we found that the rock was cut away immediately beneath, and without more hauling power, the only way to get down was to use a long ladder, and this we could not obtain. The guide told us that the hole led into nothing of any interest, and that the entrance had been used as a receptacle for deceased dogs and other excreta. This effectually took away any wish to pursue our researches in that direction for the present. Still, the old cave ought not to be lost sight of; and we propose, if no one else undertakes the work, to explore the lower series on some future visit to Ireland. The unscientific explorers of a hundred years ago may have left discoveries to future workers as important as those which remained for so many years after the early explorations in the neighbouring great cave.

What was done in the latter during the first year after the discovery may be read in an article by Dr. Apjohn, in the *Dublin Penny Journal* for December 27, 1834, an article reproduced from the *Dublin Geological Journal*, vol. I. Dr.

Apjohn carried out a most elaborate and painstaking survey to points considerably beyond the second great cavity, now known as the "House of Lords," but failed to reach "O'Leary's Cave," the key of the further ramifications, or to explore the tunnels connected with "The River." His plan, worked out to scale, and showing the differences of level with great minuteness, remained the only map of the cave until M. Martel's survey in 1895. Meanwhile, various adventurers had got to more distant points, particularly to the long chain of caverns running east to Brogden's, at the end of which M. Martel's chart stops. The French explorer does not seem to have broken any fresh ground; but his plan, which appeared in this Journal, April, 1896, with an account of his visit, was a brilliant achievement, especially when the short time at his disposal is considered, six hours for the whole of the cavern. Parts of this chart were only hastily sketched in, either from a rapid survey or from information supplied by the guide, as M. Martel explained to me in a conversation a few weeks ago, and errors of detail were, under these conditions, unavoidable. For instance, "O'Leary's Cave" is much larger than appears on the plan, and the "Chimney" is not situated at the far end of a passage, but actually opens in the floor of "O'Leary's Cave." The caves running east, again—O'Callaghan's and Brogden's—are not such a simple series of straight passages as they seem on the chart; our guide had considerable difficulty in threading his way among the various bifurcations. As will transpire later, there is a mystery connected with the name of "Cust's Cave," the real Cust's being in a totally different part of the series, and a different chamber altogether in shape. Unfortunately, we did not go prepared to carry out any survey, believing that all this had been done; so that we can at the most point out some places where the existing plans are at fault. We were also unfortunate in not being prepared to take a large number of photographs, the accounts we had read not leading us to anticipate the actual grandeur and extent of the scenery. M. Martel compares the Mitchelstown Cave with such famous continental caverns as those of Adelsberg, Padirac, Dargilan and Han-sur-Lesse, and it comes off but poorly in such a comparison. I have seen his lantern slides of these caves, and after exploring all the most

beautiful caves discovered as yet in England, I venture to say there is not one English cave that would not come off badly if set beside any of these. Compared, however, with other British caverns, that of Mitchelstown can hold its own easily; though individual chambers may be surpassed, there is nothing like the same extent of brilliant subterranean scenery anywhere else in these islands.

The tourist portion of the cavern, a fraction of the whole, but yet a considerable extent of underground passages, is deservedly much frequented. The spacious vault, nicknamed the "House of Commons," vies in dimensions and dignity with those in the Peak of Derbyshire, but it is far surpassed by the "House of Lords." Seventeen massy columns of pure white stalactite, surmounting enormous cones of terraced stalagmite, tower from floor to roof of this impressive dome, some 140 feet in span and 70 feet high. The grandeur of its height is lost somewhat through the mountain of fallen blocks that rises from the entrance almost to the apex of the roof. Behind this vast accumulation a sort of ambulatory runs round under the walls, opening here and there into side chapels and irregular cavities, all bountifully adorned with the fairy-like work of the limestone carbonate. The so-called "Tower of Babel" is a majestic pillar rising from the summit of a pyramidal mass of stalagmite, forty feet in circumference, that being also the measure of its total height. A crowd of other limestone freaks, some aptly and some incongruously nicknamed, and many extremely beautiful, are found in this chamber.

The cavities and passages that lie to the north-east of the first great chamber are not often visited. They start from "Sadlier's Cave," which is not large but bewilderingly picturesque, and contains a superb pillar, "Lot's Wife," almost of the prodigious size of the "Tower." The "Kingston Gallery" is a straight rift, nearly 300 feet long, but only two or three feet wide, with sheets of snowy white sweeping down the walls, and breaking into whole garlands of scrolls and pennons and curtains, which in places have been thrown right across the gallery, dividing it into lofty cells. The "Garret Cave" is a huge vault with a gorgeous roof, that has fallen in at the end. Hard by the entrance to this and the Kingston

series, a nameless succession of grottos and tunnels meanders down towards the insignificant lakelet called "The River," and contains some wonderful examples of cave scenery on a miniature scale. It is possible, we learned, to reach the easternmost series of caverns by this route, which also takes one into the square cavity designated as "Cust's Cave" on M. Martel's chart. We chose the other way, that is, through the passage from the "House of Lords" to the "Cathedral."

In the tangle of contrary passages into which this leads we lost ourselves several times, in the absence of the guide, and only recovered the thread by careful observation with the compass. Eventually we found the way into "O'Leary's Cave," which struck us as one of the most impressive chambers in the whole cavern. It is not only much larger than is shown on the plan, but different in shape. Apparently, it is the most recent of all in formation, although this may be only an appearance caused by the falling in of the roof. Unlike the other parts, where every bit of debris is sealed down by a glistening layer of stalagmite, this great cavity is heaped high with loose fragments, as free from incrustation as if the ceiling had collapsed yesterday. We spent some time vainly searching for the horizontal tunnel supposed to end at the "Chimney," and before the guide joined us were lucky enough to hit upon a string of chambers that seem never to have been entered before. These run, so far as we could make out without actual measurement, right over the O'Callaghan series. In fact there were openings in the floor which we might have explored but for the aggressive and tenacious clay bedaubing everything, apparently leading down to these nether passages. Brilliant draperies swept down to the bold masses of stalagmite below the walls, and long crystalline wands hung from the roof in thousands, so that we could not move without committing havoc in this pendulous forest.

Conducted by the guide, we now descended the "Chimney" into the tortuous passages leading to the "Scotchman's Cave," which lies under O'Leary's. It is a small but very beautiful chamber, giving one the idea that it has been hollowed out in a mountain of Parian marble. Now we struck into the long series running east through "O'Callaghan's Cave" to the

furthest point yet reached. This was one of the principal channels by which the ancient waters descended, from openings now unknown and inaccessible, to the labyrinth of forsaken waterways we had left behind. Our guide, who astonished us by the rapidity with which he got over difficult ground, was unable to make very speedy progress here. The ramifications are extremely hard to unravel, and he had only been in this part twice before, in 1895 with M. Martel, and twenty-five years earlier, as a boy, with his father. Eventually, after many wanderings, we reached "Brogden's Cave," where hitherto all direct progress had stopped. On the south side (not on the north as shown in the chart) is the "Chapel," which M. Martel rightly described as the most beautiful thing in the whole cavern. It is an arched recess, canopied with stalagmite of the purest and most delicate lustre.

Whilst my companion rested, I joined the guide, who was hunting for the passage to a cave where his father had taken him thirty-five years ago. We discovered the opening at last, and after wriggling and squirming round innumerable twists and corners, we dropped over a low cliff, beyond which a short wriggle brought us into a long and lofty cave, magnificently walled and pillared with snowy calcite. Floor, walls and roof were a spotless white, wrought into intricate reliefs and embroideries by the flow of the freakish stalagmite. The guide stated that this was "Cust's Cave," and the one beyond, where our progress stopped, he called the "Demon's Cave." M. Martel's chart shows a "Cust's Cave" of a totally different shape and size, near the "River"; and, as there is no mention extant of any cave beyond Brogden's, I take it that this, the real Cust's, was unknown to him. Unfortunately, I had followed the guide without bringing the plan or a compass, unaware that we were going so far from the known parts of the cavern; and now, to my disgust, the guide was unable to find the way back, and for more than half-an-hour we were completely lost. The ball of string, carried for emergencies like this, had also been left in the rucksack, so that we had a pretty bad time before we got back to our puzzled comrade. It is impossible through these oversights to give more than an approximate idea of the lie of this cave, which is somewhere to the south-east of Brogden's, and at a distance of several hundred feet.

The guide brought us back to the "House of Lords" by a short cut, and we were glad to return to daylight after an arduous day underground. The day before had been spent chiefly in photography; but, as we had not anticipated so much fine scenery, we had but a handful of flashlight plates with us, so that the results were meagre. We did not take the camera into the eastern caves, where there is a splendid field for the cave photographer. The whole of this portion wants to be re-surveyed very carefully; and I am not at all satisfied that nothing is to be found beyond the "Demon's Cave," although we had to take the guide's statement to this effect on trust.

I am indebted to Mr. R. Lloyd Praeger's invaluable "Bibliography of Irish Glacial and Post-glacial Geology" for several of the entries in the following list, and for much help in unravelling the perplexity as to the existence of two caves at Mitchelstown.

ACCOUNTS OF MITCHELSTOWN CAVES.

I.

The Original Cave.

YOUNG (Arthur).—A Tour in Ireland in the years 1776-9. Lond., 1780. Ed. A. W. Hutton. Bell, 1892; i., pp. 464-5.

The Postchaise Companion; or Traveller's Directory through Ireland. 3rd ed. Dublin, 1805. Columns 301-2.

II.

The Cave found in 1833.

Kingston Cave. *Dublin Penny Journal*, ii., No. 61, 65-6; Aug. 31, 1833. [Discovery and description of Mitchelstown Cave.]

APJOHN (Dr. J.).—On the newly-discovered cave situated between Cahir and Mitchelstown. *Journal of the Geological Society of Dublin*, i., (1833-8), pp. 103-111 (read in 1834), 1838; reprinted with illustrations in *Dublin Penny Journal*, iii., No. 130, Dec. 27, 1834. [This is the fullest and best account of the early explorations, and, with Martel's, forms a fairly complete account of the larger cave.]

NICHOL (A.).—[Letter describing Mitchelstown Cave.] *Dublin Penny Journal*, iii., pp. 202-3, Dec. 27, 1834.

CHATTERTON (Lady).—Rambles in the South of Ireland during 1838. Lond., 1839, ii., pp. 1-14. [Account of a visit, with one illustration.]

WRIGHT (Edward Perceval).—Notes of a visit to Mitchelstown Caves. *British Association Report for* 1857, Sections, 108-9. 1858. [Abstract.] Also *Natural History Review*, iv., pp. 231-241, 1857. [Present fauna.]

MOORE (Rev. Canon Courtenay).—The Mitchelstown Caves. *Journal Cork Hist. and Arch. Soc.*, iii., pp. 1-5. 1894. [Description, with reproduction of Dr. Apjohn's map.]

CARPENTER (G. H.).—Animals found in the Mitchelstown Cave. *Irish Nat.*, iii., 25-35, plate 1, 1895. Partly reprinted in *Spelunca; Bulletin de la Société de Spéléologie*, i., 1, Paris, 1895. The Collembola of Mitchelstown Cave. *Irish Nat.*, vi., 1897, 225-233, 257-8, pl. 2. On the Insect Fauna of some Irish Caves. *Rep. Brit. Assoc.*, 1902, pp. 757-8. [Account of the present fauna, several examples of which were believed to be found nowhere else, until their identity with various cave insects with a wide European distribution was established. Specimens of some were obtained by Dr. Lyster Jameson in the Speedwell Cavern, Derbyshire, in 1900.]

MARTEL (E. A.).—Irlande et Cavernes Anglaises. Paris, 1897. Chap. xi.—La caverne de Mitchelstown, pp. 177-185. [Martel's visit in 1895.] A translation appeared in the *Irish Naturalist*, vol. v., 1896, pp. 101-5, pl. 2.

Liscard, Cheshire.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include three Goldfinches, three Canaries, two Redpoles, a Bullfinch, and a Grey Linnet from Mr. W. J. Mills. A Great Ant-Eater has been purchased; this fine specimen of an uncommonly interesting species has been placed in the inner room of the Monkey house, in a cage often occupied by our anthropoid visitors. A Tiger-cub from the Maherajah Gooch Behar is on its way from India.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 13.—The Club met at Leinster House.

Dr. R. F. SCHARFF exhibited a jaw of the Arctic Fox (*Vulpes lagopus*) which had recently been discovered in a cave near Ennis, in Co. Clare, and pointed out the character of the teeth by means of which this rare species is distinguished from the Common Fox. The Arctic Fox had not been previously known to have lived in Ireland. It is another addition to the Arctic mammalian fauna which once inhabited Ireland and of which only the Irish Hare has survived to the present day.

Prof. G. H. CARPENTER showed preparations of the head and jaws of the small millipede, *Polyxenus lagurus*, demonstrating the presence of a pair of maxillulæ comparable to the structures already known to exist

in the apterous insects and in Scolopendrella. The existence of these maxillulæ, together with the probable origin of the gnatho-chilarium from two pairs of maxillæ, tends to bring the segmentation of the diplopodan head into correspondence with that of the insectan head, and to prove a somewhat near relationship between millipedes and insects—an opinion supported by the exact correspondence in the number of trunk-segments between Polyxenus and a primitive insect. An account, with figures of the maxillæ and maxillulæ of Polyxenus, together with a general discussion on the segmentation and phylogeny of the Arthropoda, has recently been published by the exhibitor (*Quart. Journ. Micr. Sci.*, vol. xlix. 1905, pp. 469–492, pl. 28).

D. M'Ardle exhibited fertile specimens of *Cephalozia leucantha*, Spruce, which he collected in a plantation near the shore of Lough Conn, at Pontoon, Co. Mayo, in 1901. The plant is minute, fragile, and pellucid, bearing a remarkably large perianth for such a small plant, which, like the leaves and stem, is almost white, and hence the specific name *leucantha*, "white-flowered."

He also showed *Cesia obtusa*, Lindberg, one of a curious genus of which we have three species in Ireland. They are often difficult to define in the field, on account of the upright stems with closely imbricated leaves and compact growth, not unlike some species of Lichen. The specimens shown were collected many years ago by the late Dr. Moore on Mweelrea Mountain, Co. Mayo.

These two liverworts have a very interesting geographical distribution. In Ireland *Cephalozia leucantha*, so far as we are aware, has only been found in the extreme west of Kerry and Co. Mayo; in Great Britain we have it recorded from near Portach, in Aberdeenshire. *Cesia obtusa* was found in Co. Mayo, and, northwards, through the Mourne Mountains, Co. Down, and is not uncommon in North Wales, Langdale in Westmoreland, and in West Inverness, Scotland. Both these plants are reported in Professor Alexander Evan's "Notes on the Hepaticæ collected in Alaska by the Harriman Expedition," as being found there—a copy, with figures of *Cephalozia leucantha* and salient parts of *Cesia obtusa*, being also shown. (*Proceedings Washington Academy of Sciences*, vol. ii., 1900, pp. 287–314. Plates xvi., xvii.)

W. F. Gunn exhibited spiral fibres from the skin of a bulb of *Amaryllis Belladonna*. In the dry investing membranes of this bulb there is a very extensive development of these spiral structures, which are placed so close together, in parallel rows, as to constitute a complete "coat," and as the number of layers is considerable they provide a very efficient protection against evaporation. In its native country the plant is subjected to an extreme of dry heat during its resting period, and the manner in which these spiral fibres, which usually serve as strengthening structures, have been combined and made to serve as protecting coverings, forms an interesting example of the adaptation of an organ to a function quite different from that with which it is usually associated.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

JANUARY 4.—Professor J. W. BYERS lectured on "Ulster Sayings and Folk Lore."

BELFAST NATURALISTS' FIELD CLUB.

DECEMBER 13.—Professor GREGG WILSON, D.Sc., F.R.U.I., gave a lecture on "Birds' Nests," the Vice-President, R. Patterson, F.Z.S., in the chair. The audience being too big for the club-room, where these meetings are usually held, the lecture was given in the large room of the Museum. It was illustrated by a large number of very fine lantern slides, mostly prepared by a former pupil of the lecturer.

The Vice-President, N. H. Foster, W. H. Workman, and C. M. Cunningham made remarks on the subject of the lecture, and especially on the excellence of the slides shown. Dr. Wilson having replied, the proceedings closed.

DECEMBER 19.—The President (W. H. Phillips) in the chair. FRANCIS JOSEPH BIGGER, M.R.I.A., lectured on "A Week on Innismurray" to a large audience, chiefly dealing with the antiquarian remains and the legends of the island. Numerous and excellent lantern views were shown.

DUBLIN NATURALISTS' FIELD CLUB.

DECEMBER 9.—EXCURSION TO THE ZOOLOGICAL GARDENS.—A large number of members and visitors were conducted through the Gardens during the afternoon by Dr. R. F. Scharff, Hon. Secretary of the Royal Zoological Society of Ireland, who showed the rarer animals, and explained the different methods of treatment used in keeping them in a healthy condition.

DECEMBER 12.—GEO. H. PETHYBRIDGE, PH.D., in the chair. R. LL. PRAEGER, B.A., presented "Additions to Irish Topographical Botany during 1905," which is published in the present number, p. 47. H. K. GORE CUTHBERT showed a series of lantern slides, dealing with natural history subjects. The following exhibits were displayed during the evening:—Miss M. C. KNOWLES, rare Irish roses; Miss M'ARDLE, collection of Irish plants, illustrating new county and district records during 1905; W. CRAMPTON WALKER, Ringed Plover, immature plumage. The following were elected members of the Club—J. B. Butler, B.A. Mr. Denning, Ireton Jones, H. E. Wilkins. Miss Kathleen Bateman was elected an Associate.

IRISH FIELD CLUB UNION.

REPORT, 1905.

The year has been devoid of incident. Two inter-club lectures were arranged and carried out, R. Ll. Praeger lecturing before the Cork Club (on "The Sligo Conference and its results"), on February 9, and Miss Knowles before the Limerick Club (on "The Flora of the Barony of Shanid"), on November 22.

The usual committee meeting was held on the occasion of the Dublin Club's annual conversazione on October 31, and was attended by representatives of the Belfast and Dublin clubs.

ACCOUNTS, 1905.

RECEIPTS.	£	s.	d.	EXPENSES.	£	s.	d.
To Balance, 1904,	5	17	0	N. H. Foster, attending Committee,	0	11	9
Affiliation Fees—				W. H. Phillips, do.	0	11	9
D.N.F.C., 1904,	1	0	0	R. Ll. Praeger, Lecture in Cork,	1	17	6
B.N.F.C., 1904-5,	2	2	0	Miss Knowles, Lecture in Limerick,	1	13	6
L.F.C., 1905,	0	19	2	Postage,	0	1	0
C.N.F.C., 1905,	0	7	10		4	15	6
				By Balance,	5	10	6
	£10	6	0		£10	6	0

Audited and found correct.

J. DE W. HINCH,
Hon. Sec. D.N.F.C.

11th January, 1906.

R. LLOYD PRAEGER,
Hon. Sec. I.F.C.U.

LEICESTER LITERARY AND PHILOSOPHICAL SOCIETY.

VISIT TO ANTRIM COAST.—The Geological Section of the Leicester Literary and Philosophical Society, under the leadership of their Chairman, H. A. Roechling, M.I.C.E., F.G.S., paid a visit to the Antrim Coast last Whitsuntide. The general outlines were suggested by R. Ll. Praeger, and the Belfast Naturalists' Field Club appointed a sub-com-

mittee—R. Bell, G. C. Gough ,F.G.S., and R. Welch—to arrange the details. G. C. Gough prepared a route programme in book form illustrated with half tone blocks and a geological map by A. M'Henry, M.R.I.A., this containing also descriptive notes on the localities to be visited. He also gave little talks at the most interesting points on the geological features, these being much appreciated by the visitors. The hotel and car arrangements were left to R. Welch, who, owing to a long acquaintance with the district, acted as general guide. The party numbered about nineteen in all, and crossed over by the Midland route *via* Heysham, leaving Belfast in a specially reserved saloon carriage. Larne Harbour was reached in time for breakfast at the Olderfleet Hotel. Before starting to walk round the Bankheads, where Trias, Rhætic, and Lias were passed on the way to the cars at Waterloo, the party visited the Larne gravels section at the Aluminium Works, where numbers of the Larne type of rude flint implements were collected. Mounting the cars at the *red* Greensand section, the various cliff and other sections at Ballygally, Ballyrudder, Glenarm, and especially the "slipping village" of Stridkilly were examined and photographed by several of the visitors, some of whom are well known experts in geological photography. Reaching Garron Tower—now a hotel—in time for afternoon tea, the time before and after dinner was spent either examining the fine oak-carvings in the main rooms or strolling about the shore and paths in the woods on the head. Next day the drive was continued past the fine cliffs of Garron Point to the Vale of Glenariff, and the many pot-holes and waterfalls in the canõn in miniature at its head. After tea in the Châlet the drive was resumed, this time down the north side and through the arch at Red Bay, where some little time was given to the old sea-caves in the Triassic conglomerate. Some members visited also the jasper veins in porphyry at Limerick Port, while the remainder went on ahead to the Glens of Antrim Hotel, the stopping-place for the night, On Sunday, the 11th June, a later start than usual was made at 9.30 a.m. in wagonettes sent overnight from Ballycastle the next stage on the journey. A short time was spent at the Old Red conglomerate caves at Cushendun, some of the more active members leaving the vehicles well above the viaduct, and tramping across the mountain flank to the road again near the watershed above Loughaveema. The lough had unfortunately too much water in it to show the whirlpool exit into the underground channel. After lunch at the Antrim Arms Hotel, that favourite head-quarters for the Irish Field Clubs on their north Antrim visits, some of the party rested quietly or strolled down to the strand, a few others visiting Kenbane Head, castle and that delightful little sea-glen—Plantation Port. On Monday all were astir early, some visiting the harbour Chalk quarries before breakfast. Fair Head was the main objective for the day, the cars driving as far along the colliery road as possible, where the party divided, some driving to Murlough Bay direct, while others walked or scrambled as best they could along the remains of the road left after the 1894 cyclone and the heavy cloud-burst of 1902.

Ascending the head at Carrickmore Port, the cliffs, Rathlin Island, and the lough on the head with its fine stone crannoge, received attention. The Grey Man's Path, and its formation along a fault plane was described by the guide, the party making their way down the rift in the cliffs above M'Cary's farm into Murlough Bay. After tea at Miss Clarke's cottage, she kindly showed the ladies the carding and spinning of wool. Most reluctantly all took their farewell of Murlough—the more active members climbed to the cliff sections, the others taking the path up through the woods and glen to the cars. On Tuesday an early start was made to enable those who wished to return home that night to do so *via* Portrush. Carrick-a-rede was seen from the road, Mr. Gough pointing out the interesting geological features, and the party descended to the shore at Ballintoy harbour for the caves, Whitepark Bay, and the kitchen-middens. Here the party broke into two, the majority returning to Ballycastle for an extra day or two, during which they again visited Murlough Bay, and the minority going on to the Causeway, including a visit to the cliff path, the White Rocks, and the altered Lias at Portrush. Dining in the train, the first contingent crossed the Channel on the way home on Tuesday night, the remainder on Thursday night, all having enjoyed ideal summer weather for the entire visit. The Chairman and his family afterwards visited Ballycastle for a month, and some other members with their families propose to do so this coming season.

NOTES.

The Use of the word "British."

I quite agree with Professor Carpenter that some agreement is required among scientific folk as to the use of the word "British." Science has been defined as exact knowledge, yet here is a word used daily in different senses by naturalists. We have a "London Catalogue of *British* Plants," "Illustrated Manual of *British* Birds," &c., &c., British here referring to the British Isles; while on the other hand we read "Bibliographical Index of *British and Irish* Botanists," or (to show that this use of the term is not confined to scientific men), "*British and Irish* Steam Packet Company." The use of the word in this double sense is clearly undesirable. As to which of the two meanings of the word ought to be adopted, there is not much choice. If we use the word in its wider sense of "belonging to the British Isles," we are then left without a term for "belonging to Great Britain," which is little less than a *reductio ad absurdum*. It seems clear, then, that, as advocated by Prof. Carpenter, the word should be used in its latter and restricted sense; and the suggested use of the word "Britannic" for the wider sense seems to me to get us out of a serious difficulty, and to offer no ground for objection.

R. Lloyd Praeger.

Dublin.

The Numbering of the County Divisions of Ireland.

The recent discussion in this Journal on the above subject is just as important to zoologists as to botanists; for zoologists have long wished for a better method of illustrating geographical distribution than was supplied by the only scheme which till recently was available—namely, that used by the Conchological Society, which was a modification of Babington's scheme. In this the vice-counties of Great Britain are numbered from south to north 1 to 112, according to Watson's plan, while Ireland follows on, being numbered *from north to south* 113 to 148—a wholly unscientific plan. As for the Conchological Society's Census and Taylor's Monograph (the former was begun as a preparation for the latter), such an immense amount of work had already been registered on the old system, that to convert it at the last moment into Praeger's system would have involved very heavy labour, and been in some cases impossible, where the partitioned counties were concerned.

Speaking for myself, and many friends in England and Ireland who are working at the distribution of Mollusca, we are pleased with Praeger's improved system, by which we can more readily compare the fauna of similarly-situated districts in the two islands. No protest against the plan was made when it was tentatively published in 1896; and it is now quite clear that we have a system given us on which both botanists and zoologists can work with advantage.

In referring to their proper divisions, under Praeger's scheme, many of the old records for the partitioned counties, in connection with the forthcoming revision of the Irish Land and Fresh-water Mollusca, considerable difficulty is being experienced. But Dr. Scharff and those who are assisting him, so far as I am aware, are of opinion that it is well worth the trouble.

As regards the conchologists on whose behalf I have ventured to write, Mr. Waddell may rest assured that they are not working on narrow lines. Several are hard at work on north England as well as north Ireland, another on south England and Ireland north, east, and west; and most have since 1896 so registered their records that they may be published on Praeger's plan, and according to the suggestion which he made in this Journal for October last, vol. xiv., p. 220.

R. Welch.

Belfast.

BOTANY.

Asplenium Ruta-muraria on Achill Island.

This fern has, like *Ceterach officinarum*, penetrated to Achill, presumably since mortar-built walls were erected there. Mr. T. Watts has sent me a specimen from the yard wall of the Rectory at Dugort. The occurrence

of these wall plants far in the heart of non-limestone districts, where population is sparse and mortar-built walls few and far between, furnishes an interesting problem in plant migration. It is unlikely that either of the ferns mentioned is native in Mayo anywhere west of Westport, where the limestone ends.

R. Lloyd Praeger.

Dublin.

Kilkenny Roses.

In the course of a walk along the Nore valley from Bennett's Bridge to Kilkenny late in September last, I found, among other very interesting plants, the following Roses not yet recorded for the county:—*Rosa spinosissima* L., *R. rubiginosa* L., *R. sepium*, Thuill., *R. canina*, var. *lutetiana*, and the hybrid *R. rubiginosa* × *R. spinosissima* = *R. involuta*, (probably) var. *Moorei* Baker.

Of these, the most interesting is, perhaps, *R. sepium*, a very distinct plant hitherto found only near the shores of Lough Corrib, Lough Derg and Lough Ree, where it is abundant. I met only one bush along the Nore valley.

The hybrid *R. involuta*, var. *Moorei* has previously been recorded from Derry only. The Rev. E. F. Linton has kindly confirmed the identity of my specimens.

R. A. Phillips.

Cork.

Euphrasia Foulaensis in Ireland.

Last August, by the kindness of Mr. Grierson, I obtained a supply of fresh specimens of the small Eyebright which I had gathered on the summit of Croaghaun, Achill Island, in July of the previous year. Mr. Townsend at the time considered this plant referable to *E. Foulaensis*, Townsend, but asked to see further material. As the result of an examination of fresh specimens, kindly undertaken in spite of illness, Mr. Townsend now writes that the Achill plant is *E. Foulaensis*, differing slightly from the Shetland type, and matching the Faröe form, which according to Ostenfeld, is a frequent plant on those islands. The occurrence in the west of Ireland of this Eyebright, hitherto not found south of the extreme north of Scotland, is interesting. On Croaghaun its neighbours include the tiny Shetland var. *procumbens* Rostrup of *Hypericum pulchrum*, and *Cochlearia grænlandica*. Of this little group of northern plants, the last alone is found elsewhere in Ireland, having several stations in Rossgull, north Donegal.

R. Lloyd Praeger.

Dublin.

ZOOLOGY

Entomological Notes from Londonderry.

During the past year my brother, Rev. W. Howard Campbell, M.A., who was home on furlough from India, devoted considerable time to the Lepidoptera of the district in order to complete the local collection in our city museum. I was only able to give him a little assistance from time to time, and am happy to say the results were most gratifying, as he turned up a number of species not recorded from this district before in my list in the *Irish Naturalist* (vol. ii., 1893), or in Mr. Kane's Irish list. A note of these, as well as some of the commoner species, will, I doubt not, be of interest to those readers who are entomologically inclined. The districts worked were Londonderry, Lough Swilly, Ballymoney, and Ballycastle, Co. Antrim.

Among the butterflies we found the Silver-washed Fritillary (*Argynnis paphia*) very common in the old oaks and holly woods at Rathmullan, Lough Swilly. We took one specimen of the Marsh Fritillary (*Melitæa aurinia*) at Buncrana, at the same spot that my nephew took a specimen four years ago. We probably overlooked this species in past years, mistaking it for the male "Argus" when on the wing.

The Painted Lady (*Pyrameis cardui*) and the Red Admiral (*P. atalanta*) were very scarce. We took two or three Peacocks (*Vanessa io*). During the years from 1874 to 1884, in which we thoroughly worked this district, we never found *V. io.* When it turned up a few years ago it came to stay, for it has been noticed every year, although in much larger numbers during some summers. The very dark form of the Large Heath (*Cœnonympha typhon*) occurred commonly in the Garry Bog, near Ballymoney. The Little Blue (*Cupido minima*) we found commonly on the shores of Lough Swilly.

We took many interesting moths. Among the Noctuæ we took two *Hadena dentina* at Portsalon, Lough Swilly. This is a rare species here. At Ballymoney we took, at end of May, a specimen of the rare and local *Acronycta menyanthidis*, and we found the larvæ feeding on sallow in August. During the early summer we took *Thyatira derasa*, *T. batis*, *Plusia pulchrina*, *P. iota*, and *P. festucæ*, and many others.

Later we did fairly well at ragwort, taking among hosts of common species *Mania maura*, *Mamestra albicolon*, *Caradrina alsines*, *Aporophyla nigra*, *Epunda lutulenta.* We were surprised to find *Celæna Haworthii* at ragweed, as we had never before taken it in this way. Strange to say, we found none of the usual coast Noctuæ, not even *Agrotis tritici* at Ballycastle. We were delighted to add *Cirrhædia xerampelina* to our list My brother took a beautiful specimen at rest on the door of his lodgings in Ballycastle. Canon Bristow took a specimen at rest on an ash tree about the same time.

Among the Geometræ my brother took *Ennomos alniaria* at Ballymoney. We found *Emmelesia tæniata* very common in the old oak

woods at Rathmullan, but mostly in poor condition, in July. *Geometra papilionaria* again turned up at Kilderry, and I was surprised to find that this beautiful Emerald frequented the electric lamps in the city. Mr. E. M'Court, taxidermist in our Museum, brought me a specimen taken from a public lamp. We took a specimen of the rare and local "pug," *Emmelesia pygmæata*, near Derry. In our gardens we found *Cidaria prunata* very common.

We collected a large number of "Micros." Among the Tortrices we took *Bactra furfurfana*, only previously recorded from Co. Cork in Mr. Kane's list. We found *Ephippiphora trigeminana* at Ballycastle, also *Peronea aspersana*. *Tortrix forsterana*, only previously recorded from Howth and Sligo, turned up at Derry. The three local species, *Pædisca solandriana*, *Rhacodia caudana*, and *Dictyopteryx holmaniana* also occurred here, and we took *D. læflingiana*, only recorded from Sligo.

In the other families of "Micros" I may mention *Scoparia truncicolella* at Rathmullan, L. Swilly; *Cerostoma costella* and *Tachyptilia populella* at Ballycastle—the latter seems only to have been taken at Killarney.

Then we took two Tineids, *Lampronia prælatella* and *Cerostoma sylvella*, neither of which I can find previously recorded from Ireland.

D. C. Campbell.

Londonderry.

Dotterel in Donegal Bay.

On November 30th Mr. W. A. Hamilton, of Coxtown, Bridgetown, Co. Donegal, sent to the museum for identification a bird that he had shot the previous day out of a large flock of more than 100 birds on a mud flat in Donegal Bay. It was an immature Dotterel (*Endromias morinellus*, L.), and Mr. Hamilton informs me that he believes the flock consisted of Dotterel, as they were smaller than the few Golden Plover near them. As the bird was shot unusually late in the autumn, and since of late years the Dotterel appears to be very rare in Ireland, I thought the occurrence might be of sufficient interest to record in the *Irish Naturalist*.

A. R. Nichols.

Dublin Museum.

Fork-tailed Petrel in Co. Fermanagh.

A bird of this species (*Oceanodroma leucorrhoa*), was picked up in a very weak state, and unable to fly, in a field outside Tempo demesne, by a boy who brought it to me on November 28th last. It had evidently been blown inland by the gale of the preceding days. It was a female, and is now in my collection. This is the first time this species has been obtained in Co. Fermanagh I think.

Charles Langham.

Tempo Manor, Co. Fermanagh.

Gulls and Gravity.

Apropos of Mr. Colgan's observations in the January number (*supra*, p. 14), I may add that on December 24, from the Clontarf tram, my wife and I counted eight Herring Gulls engaged in the occupation described by the observer named, namely, carrying sea-shells high into the air and then deliberately dropping them. There was a whole mob of gulls flying about, and probably further observation would have shown that the majority of them were practising this device. A "knowledge of the laws of gravity" would seem to constitute a part of the stock-in-trade of every well-educated Herring Gull.

R. Ll. Praeger.

Dublin.

Polecat remains in a Clare Kitchen-midden.

Miss D. C. Parkinson, who has recently been exploring the kitchen-middens of Lahinch, Co. Clare, found among other bones the lower jaw of a small mammal, which she handed to me for identification. I was surprised to find that it did not belong to our Irish species, but to the Polecat (*Putorius putorius*) which is not known to exist in this country. It is unlikely that anyone would introduce Polecats into this country, but Ferrets, which are only pale-coloured domestic forms of Polecats, are frequently brought over for sport. On asking Miss Parkinson for further information she thought that Ferrets were often introduced for trapping Rabbits in the sandhills. The little jaw, moreover, has a recent look about it, and it possibly belongs to a ferret which found its death in a rabbit burrow. I thought it right to place the occurrence on record, because there is of course a possibility that the Polecat may once have been an inhabitant of this country, and have become extinct within recent times.

R. F. Scharff.

Dublin Museum.

GEOLOGY.

The Origin of Galway Bay.

With reference to my geological notes in last month's *Irish Naturalist*, I am informed by Mr. J. D. Lawson, from whose paper I abstracted a quotation (*supra*, p. 10) that the name "Kinahan" in his paper was a misprint for "Kirwan." I regret having been the medium for attributing to Mr. G. H. Kinahan an opinion which that veteran geologist does not hold, and one which I never really believed had originated with him.

Henry J. Seymour.

Geological Survey, Dublin.

ADDITIONS TO "IRISH TOPOGRAPHICAL BOTANY" IN 1905.

BY R. LLOYD PRAEGER.

[Read before the Dublin Naturalists' Field Club, 12 December, 1905.]

DURING the past year the additions to our knowledge of plant-distribution in Ireland have been well up to the standard both as regards quantity and quality, though no very startling announcement has to be chronicled. The total number of new county records to be recorded in this, my fifth annual supplement, is 254, a number considerably larger than that attained in any previous year. But it ought at once to be added that the amount of field work, as judged by its results from a statistical point of view, was less in 1905 than usual, and this total of additions to the county lists would have been considerably less but for brief raids made by myself into the imperfectly worked north-central region of Ireland, resulting in large lists of additions more remarkable for quantity than for quality.

As regards published matter. In addition to my own contributions on the flora of Central Clare[1], and of the Mullet district of West Mayo[2], the chief papers published during the year recording the results of personal field work are those of Mr. Phillips, treating of the Brambles[3] and of the flora in general[4] of the Limerick district. Miss Knowles' examination of the Douglas collection in the National Herbarium[5], has added a number of plants to the Kildare flora; and the same observer has published particulars of the discovery of *Glyceria Foucaudi* on the Shannon estuary[6]. The result of M. Pugsley's examination of large sets of Irish Fumitories has also appeared

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[1] Notes on the Botany of Central Clare. *I.N.*, xiv., 188–193. 1905.

[2] The Flora of the Mullet and Inishkea. *I.N.*, xiv., 229–244. 1905.

[3] Some Irish Brambles. *I.N.*, xiv., 5–7. 1905.

[4] Some Notes on the Flora of Limerick. *Journal* Limerick Field Club, iii. 32–35. Plate. June, 1905.

[5] The Douglas Collection in the Herbarium of the National Museum. *I.N.*, xiv., 11–14. 1905.

[6] Atropis Foucaudi in Ireland. *I.N.*, xiv., 51–53. 1905.

in the form of a revision of the distribution in Ireland of the genus[1]. Our knowledge of Irish Hawkweeds is also in some degree extended by the publication of W. R. Linton's "Account of the British Hieracia."

As usual, the geographical distribution of the new records is very irregular. No less than nine of the forty county-divisions do not figure at all in the list, while nineteen others yield less than four new plants apiece. Work during the year has centred in three districts. In the south-west Miss Knowles and Mr. Phillips are mainly responsible for 32 new Limerick plants, and Mr. Phillips and myself for 35 species new to Clare. In the east we have 18 additions to the Kildare flora, chiefly from the Douglas collection. And going north-west I am mainly responsible for 11 plants new to West Mayo, 20 to Leitrim, 37 to Cavan, and 39 to Monaghan. The welcome addition of 10 plants to Tyrone and 6 to North Tipperary is mostly due to two new recruits, Mr. R. W. Bingham and Mr. E. H. Bowers. To the botanists mentioned above, and many others who during the year favoured me with specimens and notes, my best thanks are tendered.

Seven plants published during the year rank as additions to the Irish flora, but one of these is an addition in name only. *Glyceria Foucaudi* is the most interesting of the seven. *Rubus criniger* ranks as new, the Co. Down record for this blant being now transferred by Mr. Rogers to *R. Lettii*. *Rosa obtusifolia* is an interesting addition. *Hieracium Scullyi* is a newly described plant with an Irish habitat. *H. crebridens* (formerly ranked as a variety of *H. murorum*) is now recorded from Ireland, as also *H. stictophyllum ;* while *H. pachyphyllum*, now allotted specific rank by Mr. Linton, has already been noted from Ireland as a variety of *H. murorum*.

Some important extensions of range have also been made, such as *Polygonum mite* and *Carex aquatilis*, whose range Mr. Phillips has extended the one from Leitrim, and the other from Dublin and Kerry, to Limerick.

Withdrawals during the year are fortunately few. To *Rubus criniger* I have referred already. In Fumaria, setting against

[1] Praeger: The Distribution of Fumitories in Ireland. *I.N.* xiv., 156-163. 190

the old list the new list referred to above, and reinforcing the latter by old records which, as noted in my paper, there is little reason to suspect, we find that the withdrawals in this genus are ultimately very few, namely :—

F. capreolata,	withdraw	none.
F. Borœi,	„	17, 18, 20, 24, 25, 28, 31.
F. confusa,	„	7, 11, 30.
F. muralis,	„	all records.
F. densiflora,	„	none.
F. officinalis,	„	13.

Two other records must also be withdrawn : that for *Hieracium cerinthiforme*, which, if we follow Mr. Linton, ranks only as a variety ; and the S. Tipperary record for *Lemna gibba* (1904), which Mr. Phillips transfers to *L. polyrhiza*.

I now give the new county-records of the year, arranged under the respective divisions. The numerals appended to certain names show the page of vol. xiv. of the *Irish Naturalist* on which those records which have been published appear. Eight new records have been published elsewhere than in the *Irish Naturalist*. Three Limerick ones in the *Journal* of the Limerick Field Club are distinguished by the letters 'L. F. C.' prefixed to the reference to volume and page ; and in connection with a few Hawkweeds, recognizable contractions are used for Linton's 'British Hieracia,' Williams' 'Prodromus Floræ Britannicæ' the *Reports* of the Botanical Exchange Club, and the *Journal of Botany*.

NEW RECORDS (ARRANGED UNDER COUNTY DIVISIONS).

1. KERRY SOUTH—	Hieracium Scullyi, Linton's Br. Hier.
3. CORK WEST—	Rosa glauca (subcristata).
4. CORK MID.—	*Matricaria discoidea, 223.
Ranunculus heterophyllus.	Hieracium Schmidtii.
5. CORK EAST—	Rubus longithyrsiger (botryeros) 7.
Rubus villicaulis (Selmeri), 6. mutabilis, 7.	*Matricaria discoidea, 223.
7. TIPPERARY S.—	Bidens tripartita.
Hypericum hircinum.	Lemna polyrhiza.

8. LIMERICK—
Ranunculus circinatus.
Baudotii (confusus).
*Erysimum cheiranthoides.
Viola canina.
Stellaria palustris.
Arenaria trinervia.
Geranium pyrenaicum, L.F.C. iii., 34.
Rubus plicatus.
rhamnifolius, 6.
argentatus, 6.
myricæ (hesperius), 6.
anglosaxonicus, 7.
scaber, 7.
cæsius, 7.
Rosa involuta.
Rosa obtusifolia (frondosa).
Callitriche obtusangula.
*Carum Carui, L.F.C. iii., 34.
Scutellaria galericulata.
Lamium amplexicaule.
Polygonum mite.
†Salix triandra.
pentandra.
Potamogeton nitens.
Carex aquatilis (virescens).
limosa.
pallescens.
Glyceria Foucaudi, 51.
Festuca sylvatica.
Agropyron acutum.
*Bromus secalinus, L.F.C. iii., 34.
Chara contraria.

9. CLARE—
Thalictrum flavum, 191.
Ranunculus peltatus, 191.
*Arenaria tenuifolia, 191.
Rubus rhamnifolius, 6.
pulcherrimus, 6.
silvaticus.
iricus.
pyramidalis, 6.
criniger, 7.
oigocladus, 7.
podophyllus, 7.
serpens, 7.
dumetorum, 7.
Myriophyllum verticillatum, 192.
spicatum, 192.
*Petroselinum sativum, 192.
*Matricaria discoidea.
†Picris echioides.
Hieracium crebridens, Williams' Prod. Fl. Br.
Betula verrucosa, 192.
‡Salix fragilis, 192.
† purpurea, 193.
Orchis Morio, 193.
incarnata, 190.
Sparganium affine, 193.
Lemna polyrhiza, 193.
Potamogeton heterophyllus, 193.
nitens, 193.
prælongus, 193.
Carex Hudsonii, 190.
Melica uniflora, 193.
Glyceria plicata, 193.
Equisetum trachyodon, 193.
Chara polyacantha, 193.
Tolypella glomerata.

10. TIPPERARY N.—
Ranunculus Auricomus.
Fumaria Boræi, 159.
Rubus pyramidalis, 6.
Callitriche hamulata.
Hieracium vulgatum.
Sisyrinchium angustifolium, 197.

11. KILKENNY—
Fumaria officinalis.
Carex Pseudo-cyperus.

13. CARLOW—
Fumaria confusa (hibernica), xiii., 35.

14. QUEEN'S CO.—

Ranunculus Auricomus.
Fumaria confusa.

17. GALWAY N.E.—

Ranunculus heterophyllus.
Rubus leucostachys, 7.

19. KILDARE—

Sisymbrium Thalianum, 12.
*Saponaria officinalis, 12.
‡Melilotus officinalis, 12.
Lotus uliginosus, 12.
Saxifraga granulata, 12.
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MARCH, 1906.

The Irish Naturalist

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1	The Warble Fly.
2	*Out of Print.*
3	*Out of Print.*
4	Workmen's Compensation Act, 1900.
5	Separated Milk as Food for Calves.
6	Charlock Spraying.
7	Fluke in Sheep.
8	Timothy Meadows.
9	The Turnip Fly.
10	Wireworm.
11	Prevention of White Scour in Calves.
12	*Out of Print.*
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14	Prevention of Potato Blight.
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19	Early Potato Growing.
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21	Diseases of Poultry:—Gapes.
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26	Winter Fattening of Cattle.
27	Breeding and Feeding of Pigs.
28	Blackleg, Black Quarter, or Blue Quarter.
29	Flax Seed.
30	Poultry Parasites—Fleas, Mites, and Lice.
31	Winter Egg Production.
32	Rearing and Fattening of Turkeys.
33	Profitable Breeds of Poultry
34	The Revival of Tillage.
35	The Liming of Land.
36	Field Experiments—Barley.
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40	„ „ Oats.
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42	Permanent Pasture Grasses.
43	The Rearing and Management of Chickens.
44	"Husk" or "Hoose" in Calves.
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46	Haymaking.
47	The Black Currant Mite.
48	Foul Brood or Bee Pest.
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50	Portable Poultry Houses.
51	The Leather-Jacket Grub.
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53	The Construction of a Cowhouse.
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55	The Apple.
56	Cultivation of the Root Crop.
57	Fruit Packing.
58	Sprouting Seed Potatoes.
59	Seed Testing Station for Ireland.
60	The Packing of Butter.
61	The Care of Milk for Creameries.
62	Plans for Creamery Buildings.
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64	Varieties of Fruit suitable for cultivation in Ireland.
65	Forestry: The Planting of Waste Lands.
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69	The Prevention of Tuberculosis in Cattle.
70	Forestry: Planting, Management, and Preservation of Shelter-Belt and Hedgerow Timber.
71	Forestry: The Management of Plantations.

Copies of the above leaflets can be obtained free of charge and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.

34. DONEGAL, E.—
Fumaria Boræi, 159.

35. DONEGAL, W.—
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36. TYRONE—
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villicaulis (Selmeri).
Kœhleri (dasyphyllus).
Rosa arvensis.
Leontodon hirtus.
Primula officinalis.
Orchis pyramidalis.
†Leucojum æstivum.
Ophioglossum vulgatum.

37. ARMAGH—
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38. DOWN—
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39. ANTRIM—
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Hieracium pachyphyllum, Linton's Br. Hier., and J. Bot., xxxiii., 114, 1895.

40. LONDONDERRY—
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The proportion of unpublished material is this year so large that I have had, in the notes below, to confine myself to giving particulars of unpublished new county-records, and have been unable to include second records, as given in former papers of this series. The latter are many in number, and include some interesting and rare plants.

PARTICULARS OF UNPUBLISHED NEW RECORDS.

Ranunculus circinatus, Sibth.

8. LIMERICK. R. Deel at Newbridge, '05—Miss Knowles and Miss O'Brien.

R. trichophyllus, Chaix.

30. CAVAN. Shantemon L., '05—P.

Ranunculus heterophyllus, Fr.

4. Cork Mid. The Lough, Cork, '04—R. A. Phillips.
17. Galway N.E. Near Menlo, '02—R. A. Phillips.

R. penicillatus, Dum.

29. Leitrim. Stream on N. side of Glenade L., '05—P.
30. Cavan. Annalee R. below Butler's Bridge, '05—P.

R. Baudotii, Godr.

8. Limerick. Foynes, '04 (*confusus*)—Miss Knowles.

R. Auricomus, L.

10 Tipperary N. Near Borrisokane, '03—R. A. Phillips.
14. Queen's County. Near Ballybrophy, '03—R. A. Phillips.
32. Monaghan. Bellanode, '05—P.

P. dubium, L.

29. Leitrim. Manorhamilton, '05—P.

***Cheildonium majus,** L.

28. Sligo. Ballysadare, '05—P.
29. Leitrim. Manorhamilton, '05—P.
30. Cavan. Near Lisnananagh L., '05—P.
32. Monaghan. Scotstown, '05—P.

Fumaria confusa, Jord.

14. Queen's County. Maidenhead House, '05—E. H. Bowers.

F. officinalis, L.

11. Kilkenny. Piltown, '05—E. H. Bowers.

Cochlearia anglica, L.

22. Meath. South bank of R. Boyne above Drogheda, '05—W. A. Barnes!
31. Louth. North bank of R. Boyne below Drogheda, '05—P.

***Hesperis matronalis,** L.

36. Tyrone. Established near Dungannon, '05—R. W. Bingham.

***Erysimum cheiranthoides,** L.

8. Limerick. Cornfield at Castleconnell, '05—R. A. Phillips. Cultivated land at Ardagh, '05—Miss Knowles.

Brassica alba, Boiss.

30. Cavan. Near Cavan, '05—P.

Reseda Luteola, L.

29. Leitrim. Manorhamilton, '05—P.

†**Viola odorata,** L.

32. Monaghan. Hedge banks at Bellanode, '05—P.

V. canina, L.

8. Limerick. Castleconnell, '04—R. A. Phillips.

Polygala vulgaris, L.

32. Monaghan. Scotstown, '05—P.

Silene Cucubalus, Wibel.

29. Leitrim. Manorhamilton, '05—P.

‡**Lychnis Githago,** Scop.

30. CAVAN. Butler's Bridge, '05—P.

Stellaria palustris, Retz.

8. LIMERICK. Castleconnell, '05—R. A. Phillips.

Arenaria trinervia, L.

8. LIMERICK. Castleconnell, '04—R. A. Phillips.

32. MONAGHAN. Bellanode, '05—P.

***Hypericum hircinum,** L.

7. TIPPERARY S. Plentiful and spreading along the river bank at Clonmel, '03—R. A. Phillips.

H. dubium, Leers.

30. CAVAN. Lisnananagh L., '05—P.

H. elodes, L.

22. MEATH. Near Virginia Road station, '05—W. A. Barnes!

32. MONAGHAN. Two miles from Carrickmacross, '05—W. A. Barnes!

***Prunus insititia,** L.

30. CAVAN. Frequent in the Cavan district, '05—P.

Rubus plicatus, Wh. & N.

8. LIMERICK. Newbridge, '04—Miss Knowles.

30. CAVAN. Annagh L., '05—P.

R. villicaulis, Kœhl.

36. TYRONE. Near Cookstown (*Selmeri*), '05—Miss Knowles.

R. silvaticus, Wh. & N.

9. CLARE. Inchiquin L., '05—P. "Quite characteristic except for weak panicle."—W. M. Rogers.

R. hesperius, Rogers.

This bramble has been recently found in Wales (see Bot. Exchange Club Report for 1904), and it is therefore no longer to be looked on as endemic in Ireland, though still western in its range.

R. iricus, Rogers.

9. CLARE. Inchiquin L., '05—P.

R. pyramidalis. Kalt.

30. CAVAN. Near Cavan, '05—P.

R. leucostachys, Schleich.

36. TYRONE. Near Cookstown, '05—Miss Knowles.

R. Kœhleri, Wh. & N.

29. LEITRIM. Glenade (*dasyphyllus*), '05—P.

36. TYRONE. Near Cookstown (*dasyphyllus*), '05—Miss Knowles.

R. corylifolius, Smith.

30. CAVAN. Near Cavan, '05—P.

Potentilla procumbens, Sibth.

29. LEITRIM. Manorhamilton and Glenade, '05—P.

Rosa spinosissima, L.

30. CAVAN. Clonervy Hill, '05—P.

R. involuta, Smith

8. LIMERICK. White River, '05—Miss Knowles and R. D. O'Brien.

R. obtusifolia, Desv.

8. LIMERICK. Loghill (*frondosa*), '05—R. A. Phillips.

Rosa glauca, Vill.

3. Cork West. Glengarriff (*subcristata*), '05—R. A. Phillips.

R. arvensis, Huds.

30. Cavan. Lisnananagh L. and other spots near Cavan, '05—P.

36. Tyrone. Stewartstown, '96—Miss Knowles. About Dungannon, '05—R. W. Bingham.

Saxifraga granulata, L.

8. Limerick. Reported by R. A. Phillips as apparently native at Glenstal; but as certain other plants, such as *Geranium pratense*, which grow freely there now in wild ground, were certainly originally planted, the standing of this Saxifrage in Limerick, so far from its native stations in the east, appears doubtful.

‡**Sedum Telephium,** L.

30. Cavan. Shores of Lisnananagh L., '05—P.

Myriophyllum spicatum, L.

32. Monaghan. Annagh L.; frequent near Monaghan, '05—P.

Callitriche hamulata, Kuetz.

10. Tipperary N. Near Thurles, '02—R. A. Phillips.

C. obtusanguia, Le Gall.

8. Limerick. Stream near Ballyclough, '04—Miss Knowles.

‡**Smyrnium Olusatrum,** L.

30. Cavan. Near Cavan, '05—P.

Sium latifolium, L.

32. Monaghan. Finn R. near Redhill, '05—P.

Pimpinella Saxifraga, L.

32. Monaghan. Near Monaghan, '05—P.

Scandix Pecten-Veneris, L.

29. Leitrim. Manorhamilton, '05—P.

Æthusa Cynapium, L.

32. Monaghan, Near Monaghan, '05—P.

Valerianella olitoria, Poll.

30. Cavan. Cavan, '05—P.

32. Monaghan. Bellanode, '05—P.

Scabiosa arvensis, L.

29. Leitrim. Manorhamilton, '05—P.

Solidago Virgaurea, L.

32. Monaghan. Scotstown, '05—P.

Bidens tripartita, L.

7. Tipperary S. Mullinahone, '05—E. H. Bowers.

‡**Anthemis Cotula,** L.

30. Cavan. Roadside near Cavan, '05—P.

***Matricaria discoidea,** DC.

9. Clare. Cratloe, '05—R. D. O'Brien.

***Tanacetum vulgare,** L.

32. Monaghan. Monaghan and Bellanode, '05—P.

Senecio sylvaticus, L.

32. Monaghan. Scotstown, '05—P.

Arctium minus, Bernh.

30. CAVAN. Near Cavan, '05—P.

32. MONAGHAN. Scotstown, '05—P.

***Silybum Marianum,** Gaertn.

32. MONAGHAN. Near Bellanode, '05—P.

***Centaurea Cyanus,** L.

30. CAVAN. Near Cavan, '05—P.

***Cichorium Intybus,** L

9. CLARE. The Longpavement record in *I.T.B.* belongs to Clare, not to Limerick.

32. MONAGHAN. Near Bellanode, '05—P.

†Picris echioides, L.

9. CLARE. Two stations near Cratloe, '05 (Mrs. Webb)—R. A. Phillips.

Hieracium Schmidtii, Tausch.

4. CORK MID. Carrigrohane, '05—R. A. Phillips.

H. vulgatum, Fr.

10. TIPPERARY N. Near Thurles, '03—R. A. Phillips.

H. stictophyllum, Dahlst.

35. DONEGAL WEST. By the Carrick River, '91—F. J. Hanbury.

Leontodon hirtus, L.

36. TYRONE. Orriter near Cookstown, '05—Mrs. Leebody!

Tragopogon pratensis, L.

37. ARMAGH. Railway bank at Portadown, '05—P.

Jasione montana, L.

30. CAVAN. Slieve Glah, '05—P.

Primula officinalis, Jacq.

36. TYRONE. Frequent between Dungannon and Moy, '05—R. W. Bingham.

Convolvulus arvensis, L.

29. LEITRIM. Manorhamilton, '05—P.

Solanum Dulcamara, L.

30. CAVAN. Lisnananagh L., '05—P.

Verbascum Thapsus, L.

30. CAVAN. ‡Walls near Cavan, '05—P.

Veronica hederæfolia, L.

32. MONAGHAN. Drumreaske House, '05—P.

V. agrestis, L.

28. SLIGO. Near Sligo, '05—P.

V. polita, Fr.

32. MONAGHAN. West of Monaghan, '05—P.

‡Mentha piperita, L.

32. MONAGHAN. ‡Bellanode, '05—P.

M. sativa, L.

32. MONAGHAN. Slacksgrove L., '05—P.

Origanum vulgare, L.

32. MONAGHAN. Banks west of Monaghan, '05—P.

Scutellaria galericulata, L.

8. Limerick. Mountshannon, '05—R. A. Phillips and R. D. O'Brien.

Galeopsis versicolor, Curt.

30. Cavan. Belturbet Junction, '05—P.

Lamium amplexicaule, L.

8. Limerick. Ardagh, '05—Miss Knowles.

‡**Ballota nigra,** L.

32. Monaghan. ‡Scotstown, '05—P.

***Chenopodium Bonus-Henricus,** L.

30. Cavan. Near Cavan, '05—P.

32. Monaghan. Scotstown, '05—P.

Polygonum mite, Schrank.

8. Limerick. By the Abbey River near Limerick, '05—R. A. Phillips.

Euphorbia exigua, L.

32. Monaghan. Near Monaghan, '05--P.

Parietaria officinalis, L.

29. Leitrim. Manorhamilton, '05—P.

†**Salix triandra,** L.

8. Limerick. Near Limerick, '04—R. A. Phillips.

S. pentandra, L.

8. Limerick. Mountshannon, '05—R. A. Phillips and R. D. O'Brien. "Grows with native shrubs and trees . . . Native I think."—R. A. P.

‡**S. fragilis,** L.

30. Cavan. By Lough Oughter, '05—P.

S. repens, L.

30. Cavan. North base of Slieve Glah, '05—P.

Orchis pyramidalis, L.

36. Tyrone. Dungannon, '05—R. W. Bingham!

†**Leucojum æstivum,** L.

36. Tyrone. A large patch in a bog a few miles from Dungannon, '05—R. W. Bingham.

Juncus obtusiflorus, Ehrh.

32. Monaghan. Rosefield L., Lakeview L., Annyalty L., Drumreaske L., '05—P.

Luzula vernalis, DC.

30. Cavan. Near Devon Cottage, '05—P.

Sparganium simplex, Huds.

29. Leitrim. Glenade L., '05—P.

Lemna trisulca, L.

29. Leitrim. Lurganboy, '05—P

L. polyrhiza, L.

7. Tipperary S. Pool near Clonmel, '03—R. A. Phillips. This is the "L. gibba" of my paper on Additions in 1903.

Sagittaria sagittifolia, L.

32. Monaghan. Finn R. near Redhill, '05—P.

Potamogeton plantagineus, Ducr.
32. MONAGHAN. Annyalty L., '05—P.
P. nitens, Weber.
8. LIMERICK. R. Shannon at Castleconnell, '04—R. A. Phillips.
Scirpus fluitans, L.
28 SLIGO. Carrowgarry near Ballysadare, '05—P.
29. LEITRIM. Lurganboy, '05—P.
Carex vulpina, L.
32. MONAGHAN. Scotstown, '05—P.
C. aquatilis, Wahl.
8. LIMERICK. Near Corbally (*virescens*), '04—R. A. Phillips.
C. limosa, L.
8. LIMERICK. Knockaninagh, '04—Miss Knowles.
C. pallescens, L.
8. LIMERICK. Castleconnell and Mountshannon, '05—R. A. Phillips.
C. Pseudo-cyperus, L.
11. KILKENNY. Grange bogs near Graigue, '05—E. H. Bowers.
Avena pubescens, Huds.
30. CAVAN. Near Cavan, '05—P.
32. MONAGHAN. Monaghan, '05—P.
***Poa compressa,** L.
20. WICKLOW. Arable land at Delgany, '05—W. B. Bruce
Glyceria plicata, Fr.
29. LEITRIM. Lurganboy, '05—P.
32. MONAGHAN. Near Monaghan and Bellanode, '05—P.
Festuca rigida, Kunth.
29. LEITRIM. Manorhamilton, '05—P.
F. sylvatica, Vill
8. LIMERICK. Glenstal, '05—R. A. Phillips.
F. elatior, L.
32. MONAGHAN. Monaghan, '05—P.
Bromus sterilis, L.
30. CAVAN. Near Cavan. '05—P.
32. MONAGHAN. Monaghan, '05—P.
***B. secalinus,** L.
8. LIMERICK. Meadow at Castleconnell, '05—D. K. Stewart!
20. WICKLOW. Roadside at Rathdrum, '05—W. B. Bruce.
†**Lolium temulentum,** L.
30. CAVAN. Cavan, '05—P.
Agropyron acutum, R. & S.
8. LIMERICK. Foynes Island, '05—Miss O'Brien.
21. DUBLIN. Sutton, '05—D. K. Stewart. Skerries, '05—W. B. Bruce.
Ophioglossum vulgatum, L.
36. TYRONE. Three places near Dungannon—R. W. Bingham, '05.
Chara contraria, Kuetz.
8. LIMERICK. Mullough R., '04—Miss Knowles.
Tolypella glomerata, Leonh.
9. CLARE. Above Athlunkard bridge, '04—R. A. Phillips,

THE LAND AND FRESH-WATER MOLLUSCA OF NORTH-WEST DONEGAL.

1. Bunbeg, Gweedore, Horn Head, and Glenveagh Areas.

BY A. W. STELFOX.

[Plate 2.]

The north-west corner of the large county of Donegal does not seem to have been hitherto explored by any conchologist, though limited areas have received fair attention. This was the main factor which influenced Dr. Chaster and myself in selecting the district for our holiday resort. This part of Donegal consists chiefly of granite, though at Horn Head smaller areas of quartzite and intrusive diorite occur. Peat bogs cover the greater portion of the underlying rocks, so that, except for a narrow strip round the coast and the lake shores, the ground does not favour molluscan life. Large areas of blown sand occur, and these dunes are highly calcareous, being composed of finely comminuted shells, and seem to make up in that respect for the scarcity of limestone rocks. These latter are represented only by small outcrops of crystalline limestone. The greater portion of the dunes is poor collecting ground, owing to the constant shifting of the sand, but the landward dunes, being turfed over, and lakes having formed in their hollows, provide excellent habitats for species not usually associated with sand-hill areas. Some of these lakes are of fairly large extent, as for instance Mullaghderg, four miles south-west of our headquarters at Middletown, Bunbeg. The shores of this lake contributed no less than forty species to our list—the largest number we obtained in any restricted locality. The mainland near Bunbeg was very disappointing, while the peninsula of Carrickfin, though only separated by a narrow channel, proved fairly good collecting ground. This peninsula, and the district lying around Mullaghderg Lough, would, we believe, well repay further investigation. None of the outlying islands were visited, but Inishcoole (Skull Island), close to Bunbeg, and Inishinny, off the north of Carrickfin peninsula, were searched. Both these islands

are connected to the mainland at low water by sand banks, across which shells could easily be blown, and it seems quite possible that this might be the manner in which shells spread from the mainland to the islands. It also does not appear improbable that even the outlying islands may have been joined to the mainland, at some not very remote period, by this means, because as recently as fifteen years ago, Inishinny was connected to the Bunbeg dunes, while now there is at least 15 feet of water at the lowest tide separating them. Of the many inland lakes only two were closely searched—Dunlewy Lough and Lough Veagh. The shores of these are, in parts, well wooded, and in consequence some species were found which were not met with on the unsheltered coastal areas. On our way home, we visited Horn Head—which, for all fauna records, might almost count as an island—Dunfanaghy district and Glen Lough. At this point R. Welch's list, for the Rosguill and Sheephaven areas, joins on. The season chosen for the visit was late September, so that the greater number of the species were well grown. The summer having been exceptionally hot and dry, we did not expect a large list, yet our ten days collecting resulted in sixty-four species being found. In the following list Dr. Scharff's nomenclature (as given in this Journal, vol. I., 1892) is adopted.

List of Species.

Vitrina pellucida, Müll.—Large specimens common to all the sand-hills, smaller at Glenveagh and Glen Lough.

Hyalinia cellaria, Müll.—Must be considered a rare species in this district—was found alive at Middletown, Dunlewy, and Horn Head, though dead shells were very common in shell-pockets at Mullaghderg and Carrickfin.

H. alliaria, Miller.—Dark in colour and common in all places visited; one specimen of var. *viridula* was taken at Glen Lough.

H. nitidula, Drap.—Dunlewy, Glenveagh, and Glen Lough.

H. pura, Alder.—Though common with *H. cellaria* in shell-pockets, was only taken alive in same locality as last species.

H. radiatula, Alder.—Generally distributed, but not common anywhere, var. *viridescenti-alba* only seen at Glen Lough.

H. crystallina, Müll.—This common shell was only found alive at Dunlewy, Glenveagh, and Glen Lough.

H. fulva, Müll.—Generally distributed and not rare.

Hyalinia nitida, Müll.—Common in suitable habitats, and especially so on limestone at Sessiagh Lough.

H. excavata, Bean.—Very sparingly. Found only at Dunlewy and in the woods at Glenveagh.

Arion ater, L.—The black form common everywhere, except at Glenveagh, where lighter colours prevailed.

A. subfuscus, Drap.—Excepting the above, the commonest Arion in the district.

A. hortensis, Fér.—Dunlewy, Falcarragh, Sessiagh Lough, and Glenveagh—except at the last locality was only found near dwellings.

A. circumscriptus, Johnst.—Fairly common in woods at Dunlewy, not seen elsewhere.

A. intermedius, Normand.—Only found at Sessiagh Lough, under dead wood.

Limax maximus, L.—Extremely rare—only seen in Mullangore wood, Glenveagh.

L. marginatus, Müll.—Very abundant everywhere, even on the old watch tower at the extreme point of Horn Head.

Agriolimax agrestis, L.—Common in all localities visited.

A. lævis, L.—Everywhere in very damp places with *H. nitida* and *V. antivertigo*.

Amalia gagates, Drap.—A few large specimens near the harbour at Bunbeg.

A. Sowerbyi, Fér.—Common at Dunlewy and Mullaghderg; two specimens only at Glenveagh.

Helix pygmæa, Drap.—Plentiful in shell-pockets, alive only at Dunlewy.

H. rotundata, M ll.—Common throughout the district.

H. pulchella, Müll.—This species as usual outnumbered all others in the shell-pockets. It was taken alive at Horn Head and on Inishinny, with var. *costata*. Some of the specimens collected appear identical with *H. excentrica*, Sterki—as pointed out by some members of the Conch. Soc. at the annual meeting in Liverpool, 1905.

H. aculeata, Müll.—A few spineless specimens were taken on the shores on Mullaghderg Lough. Common in most of the shell-pockets, but was not observed in those at Horn Head.

H. lamellata, Jeff.—Only one specimen taken, in Mullangore wood, Glenveagh—though probably common there.

H. hispida, L.—Almost absent from the district, though common at Dunlewy. Also seen at Sessiagh Lough.

H. fusca, Mont.—Mullangore wood only, common but all very young.

H. ericetorum, Müll.—This seems to be the headquarters of this species in Ulster, as it was in abundance on all sand-dunes in the district. Some very marked varieties, both in colour and banding, were collected; while semi-scalariform specimens were seen in most places. It may be interesting to note that each area of sand-dunes seemed to have a distinctive form, which dominated all others.

Helix caperata, Mont.—A flourishing colony was discovered on Horn Head, whose headquarters appeared to be an old circus ring. Some extremely large shells were taken, and many varieties of colour, including one almost black referable to var. *fulva*, Moq.

H. acuta, Müll—Like *H. ericetorum* very abundant on all sand dunes.

H. nemoralis, L.—Common everywhere. In some localities the white-lipped form was more common than the type. A beautiful lemon-coloured form, with translucent bands, was found near Bunbeg. In Glenveagh and Glen Lough a few very fragile shells were collected —in fact by the time we reached home many of them were damaged.

H. aspersa, Müll.—Very common on all old walls near all sand-hills. In myriads in graveyard of Magheragallon old church, covering the small wooden crosses, until in some cases the wood was scarcely visible.

Cochlicopa lubrica, Müll.—Very common in all localities visited.

Pupa anglica, Fér.—Fairly common in woods at Glenveagh. In shell-pockets at Mullaghderg and Carrickfin.

P. cylindracea, Da Costa.—Mostly small specimens wereeollected, but at Horn Head and Glenveagh very large thin shells were taken.

P. muscorum, Müll.—Common in all shell-pockets and found alive on Inishcoole.

Vertigo edentula, Drap.—Dunlewy, Horn Head, and Glenveagh. In shell-pockets at Mullaghderg and Carriekfin, rare.

V. pygmæa, Drap.—Very common in all localities visited.

V. substriata, Jeff.—Very rare alive, at Mullaghderg and Glen Lough. Common in all shell-pockets.

V. antivertigo, Drap.—Common and very large where suitable surroundings were to be found—Bunbeg, Mullaghderg, Falearragh, Horn Head, Sessiagh Lough, and Glen Lough. Also in shell-pockets at Bunbeg, Carrickfin, and Mullaghderg.

V. angustior, Jeff.—Common in all shell-pockets, and though not taken alive, some of the shells from Mullaghderg were perfectly fresh and could not have been long dead.

V. pusilla, Müll.—Like *V. angustior* this species was not taken alive but was fairly common in all shell-poekets.

Balea perversa, L.—Found at Dunlewy, Horn Head, and Glenveagh. At Horn Head the shells were living in dozens on the mortar of the old watch tower, which stands at the extreme north point. They were all very large and had splendidly formed lips, quite unlike anything we have seen before, exeept a few eollected on Islandmagee, County Antrim, in August last year, by R. Welch and myself. It may be of interest to note that the nearest tree to the old watch tower mentioned, would be three miles away, most of which distance is occupied by bog-land, with a few small cultivated patches interspersed.

Clausilia bidentata, Ström—Generally distributed.

Succinea elegans, Risso.—Mullaghderg Lough, Carnboy Lough, Horn Head, and shores of Sessiagh Lough. All the specimens were small and dark, and seem referable to the *S. Pfeifferi* of continental authorities.

Carychium minimum, Müll.—Common in all damp situations and in all shell-pockets.

Limnæa auricularia, L.—The var. *acuta* of this species occurred rather sparingly in Mullaghderg and Carnboy Loughs. Some of the specimens from both localities were also var. *albida*, Jeff.

L. peregra, Müll.—Common in all lakes and ponds. A very peculiar variety was found in Carnboy Lough, on the Carrickfin peninsula. Many of the shells were pure white, and some [see Plate 2] closely resemble var. *Boissii*, Dupuy. The shells in many lakes in this district show an inclination to the same form, and there are some similar specimens in the Dublin Museum, collected by R. Patterson in Lough Salt.

L. palustris, Müll.—Plentiful in Mullaghderg, not seen elsewhere.

L. truncatula, Müll.—Generally common.

Planorbis spirorbis, L.—Common in shallow parts of Mullaghderg, Dunlewy, and Carnboy Loughs. Also in many of the small lakes near Middletown, Bunbeg.

P. contortus, L.—Two dead shells in Mullaghderg Lough ; probably common.

P. crista, L.—Very common in all lakes at Middletown, and also in Mullaghderg and Carnboy Loughs, with var. *nautileus*.

P. glaber, Jeff.—Mullaghderg, Carnboy, Middletown, and Sessiagh Loughs, common and very large. L. E. Adams gives $3\frac{1}{2}$ mm. as the standard size, but many of the specimens taken reached 5 mm. in diameter.

Ancylus fluviatilis, Müll.—Common, but very young, in Dunlewy Lough.

Acme lineata, Drap.—Owing no doubt to want of time, this shell was not found alive, but was plentiful in shell-pockets at Mullaghderg, Carrickfin, and Horn Head.

Valvata piscinalis, Müll.—Only seen at Sessiagh Lough, very young.

V. cristata, Müll.—Very common in Mullaghderg Lough, and in Kil Lough near Dunfanaghy.

Unio margaritifer, L.—Very abundant in Clady River, Bunbeg. In dry weather when the river is low, the people from the surrounding country come to search for pearls, as the banks of the river amply testify, being covered with great numbers of valves. We succeeded in getting five small dark brown pearls and five or six pieces of pearly substance, from a single shell. The largest of the brown pearls was almost one-eighth of an inch across.

Pisidium fontinale, C. Pfr.—Mullaghderg and Dunlewy Loughs.

P. milium, Held.—Mullaghderg Lough, rare.

P. obtusale, C. Pfr.—Mullaghderg Lough, common.

P. pusillum, Gmel.—Generally distributed.

P. nitidum, Jenyns.—Common in lough below Dunlewy House.

The shell-pockets in the dune areas are extremely abundant, but as many of the shells may be derived from older deposits, these have been listed separately from the live records. I have to thank C. Oldham and Dr. Chaster for looking over the *Pisidia* and some other species.

Belfast.

2. Rosguill Peninsula and Sheephaven Dunes.

BY R. WELCH, M.R.I.A.

Like Horn Head, the little peninsula of Rosguill may have been an island or rather a group of islands in recent geological times. Lying between Sheephaven and the long narrow Mulroy inlet, it is now connected with what might be called its mainland by a low sandy neck, almost covered by high spring tides, except on the western side. Here there are high sand dunes fringing the great strand—Tramore—on Sheephaven. The south end of the peninsula is formed mainly of quartzite and schistose rocks, very rugged and bare, rising in Ganiamore Mountain to 682 feet; indeed most of this portion is over 200 feet high. The northern part is connected with this by a great sand flat, over half a mile wide and only a few feet above the sea over its entire area. The rocks here are mainly granite, which has intruded into the metamorphic rocks, Magherachullion Mountain (544 feet) showing the line of contact clearly from bottom to top. Most of the areas mentioned would be very poor collecting ground, were it not for their very rugged character. Useless for tillage purposes, they contain masses of loose rocks, with a fair amount of food plants—good shelter for the land mollusca. The mossy areas of the sand dunes are the homes of immense numbers of some xerophile species, with *Vitrina* and *Helix pulchella*.

Considering its size, Rosguill has a fair number of freshwater species. Melmore Lough is the largest water area, an L-shaped lake in a deep hollow at the foot of a mountain, that is being filled up by drifting sand, blown in through the Murder Hole by westerly winds from the open Atlantic. This lake looks as if it had filled this extensive hollow at one time. Close to Rosapenna hotel is a very shallow lakelet on the sand-flat at Trabeg, and these, with a few very small ponds of peaty

water and mountain rivulets, provide the only habitats for the fresh-water mollusca. There are many old land-shell zones in the great dunes of Tramore, and some remnants at Tranarossan sand-flat, but these will be described in a future paper on the Irish Pleistocene and recent deposits. As it is quite certain that old shells out of these deposits get into the modern wind-drifted shell-pockets. I mention separately species found in the latter.

Most of the work for this list was done in 1903–4–5, but I collected a number of species about Trabeg and Rosapenna in 1893–94. I include a few species found at Doe Castle, near Creeslough, and at Lough Salt, where A. W. Stelfox's list just overlaps.

List of Species.

Vitrina pellucida, Müll.—In large quantities in autumn on the Tramore sand-dunes. Alive at Doe Castle, and also found in the shell-pockets.

Hyalinia cellaria, Müll.—At Doe Castle only: some of these were so large that Dr. Scharff thought they might be *H. Draparnaudi*, but some full grown living specimens are necessary to settle the question with certainty. In recent research work on the west coast, such large forms have turned up of this and other species, that the subject deserves special attention.

H. alliaria, Miller.—Ganiamore, and abundant in the shell-pockets at Tramore.

H. nitidula, Drap.—East slope of Ganiamore, Murder Hole, Doe Castle, and a small thin dark form at Lough Salt.

H. pura, Alder.—Ganiamore, and in shell-pockets at Tramore, Rosapenna.

H. radiatula, Alder.—Ganiamore, rare.

H. crystallina, Müll.—Not very common on Rosguill.

H. nitida, Müll.—South slope of Ganiamore only.

Arion ater, L.—Fairly common on Rosguill, all jet black on the mountain above 400 feet altitude.

A. hortensis, Fér.—Mevagh and Tranarossan, common but local.

A. intermedius, Normand.—Very rare, Rosapenna only.

Agriolimax agrestis, L.—Very abundant almost everywhere.

A. lævis, Müll.—Fine large specimens in a ditch near Carrigart.

Amalia Sowerbyi, Fér.—The hill above Rosapenna, rare.

Helix pygmæa, Drap.—In shell-pockets on Rosguill only.

H. rotundata, Müll.—Sparingly on Rosguill and common at Doe Castle.

Helix pulchella, Müll.—Alive under stones at Rosapenna. Common in shell-pockets and old land-shell deposits there and at Tranarossan.

H. aculeata, Müll.—A few only in shell-pockets at Rosapenna.

H. hispida, L.—A small dark form on Ganiamore and at Mevagh; Doe Castle. Abundant in shell-pockets.

H. rufescens, Penn.—One locality only—among nettles on Ganiamore.

H. ericetorum, Müll.—In myriads all over the Tramore dunes, Rosapenna, and at Tranarossan—many abnormal in shape. Near the north end of Rosguill, this species lives as high up the mountains as the fine shell-sand blows, well over 200 feet; but where the sandy turf stops and the peaty ground commences, it is no longer to be found. This may be well seen where a band of wind-blown sand crosses the hills from east to west in a narrow pass south of Melmore Lough.

H. acuta, Müll.—Almost as common as the last. More so on the short wind-cut turf at Muslac cliffs.

H. nemoralis, L.—Quite as abundant on the sand-hills as in other west Donegal localities. Plentiful in the kitchen-midden black zones at Rosapenna, and in almost all the land-shell deposits. I did not notice any sinistral specimens, though J. R. B. Masefield, of the Conch. Soc., found some at Rosapenna a few years ago.

H. aspersa, Müll.—Local on Rosguill, a few on south slope of Magherachullion Mt., and in crevices of rocks at east side of Tranarossan sand-plain.

Cochlicopa lubrica, Müll.—Common, a small form in moss on sand-hills at Rosapenna and in large quantities in the "pockets."

Pupa cylindracea, Da Costa.—Seems rare on Rosguill so far as living specimens go, but with the next it occurs in the shell-pockets, though less commonly.

P. muscorum, Müll.—Alive under stones, locally, at Rosapenna. Very common in shell-pockets.

Vertigo pygmæa, Drap.—Many in shell-pockets; alive but not common near Carrigart.

V. angustior, Jeff.—Dead shells only, abundant in all the "pockets" and in old deposits on Rosguill, but I found perfectly fresh-looking specimens on the Doaghmore dunes in Fanad, on the east side of Mulroy Bay, that seemed not long dead.

Balea perversa, L.—A few on trees at Doe Castle.

Clausilia bidentata, Ström.—Very sparingly at one or two rocky localities near base of Ganiamore in 1893 and 1904. In comparison with its present scarcity the former abundance of this species is interesting. It occurs in some of the old land-shell deposits, under some of the dunes at Rosapenna in the greatest profusion; thousands may be collected in some of the larger dune hollows, yet not a trace of the living animal now to be found on or near the dunes anywhere.

It seems to point to distinctly altered conditions of life, possibly the destruction of the old Irish forests. Milne found this also on Achill (*Journ. of Conch.*, 1891, p. 419).

Carychium minimum, Müll.—On mossy dunes, Rosapenna, and in the shell-pockets.

Otina otis, Turton.—Mr. W. G. D. Walker sent me this in shell-sand from Rosapenna, March, 1902 (*I.N.*, xi., p. 174).

Limnæa peregra, Müll.—Several forms in Rosapenna and Melmore Loughs. A few in dried-up pools near Ganiamore, and Melmore Head.

L. palustris, Müll.—In a shallow pool near Kinnalargy, in Melmore Lough, and pond on Melmore Head.

L. truncatula, Müll.—Common in drains near Melmore Head.

Aplexa hypnorum, L.—Met with only in one pool below Melmore Head, plentiful there.

Planorbis albus, Müll.—Large specimens in Melmore Lough and pond on Melmore Head.

P. glaber, Jeff.—This local species was first noticed by B. R. Lucas in Rosapenna Lough; lately I have also found it in Melmore Lough and at Melmore Head.

P. crista, L.—In a pond at Melmore Head with the var. *nautileus*, on duckweed in a little stream running into Mulroy Bay, and in Rosapenna Lough.

Hydrobia ulvæ, Penn.—In shell sand, Tramore.

Valvata piscinalis, Müll.—Common, Melmore Lough.

V. cristata, Müll.—In Melmore Lough or the pond near Melmore Head. I am not sure which.

Pisidium fontinale, C. Pfr.—A few in Melmore Lough.

P. milium, Held.—With the last, also in little streams running into Mulroy Bay, north of Gortnalughoge Bay.

P. obtusale, C. Pfr.—Melmore Lough only.

P. pusillum, Gmel.—Rosapenna and Melmore Loughs, Gortnalughoge streams, and in a peaty tarn on Ganiamore. The var. *grandis* in a little pond at Melmore Head.

I have to thank Mr. C. Oldham for examining the *Pisidia*, and Mr. G. W. Taylor some varieties in other species for me.

R. Standen's list for the Old Kingdom of Fanad [*Journ. of Conch.*, vii., p. 195] continues the survey eastward to Portsalon on Lough Swilly.

Belfast.

OBITUARY.

FREDERICK WILLIAM BURBIDGE, M.A., F.L.S., M.R.I.A.

The death of Mr. F. W. Burbidge, late Curator of Trinity College Botanic Garden, Dublin, at a comparatively early age, has caused widespread feelings of regret throughout a large circle. Mr. Burbidge came to Ireland in 1879 to take up the position which he held until his death on 24th December last, and he soon became widely known amongst students and lovers of natural history and horticulture. His previous training had been such as eminently to qualify him for the position he filled with credit and distinction for so many years.

From an early age he devoted himself to the study of plants. He became a student in the Horticultural Gardens, Chiswick, passed through the full course there, and took the principal prize when leaving. This prize, a cheque for £4, he took to Lord Avebury, then Sir John Lubbock, to be cashed, and purchased a microscope. Mr. Burbidge has told the writer of the pleasant interview he had with Lord Avebury, and the kind encouragement he got to persevere in his studies; advice which bore good fruit. From Chiswick he went to Kew, where he attended classes, and perfected his drawing and painting. From Kew he joined the staff of *The Garden* newspaper, and many of its readers remember the interesting and instructive articles written by him, sometimes over his own name, sometimes over that of "Veronica," or some other pseudonym, but no matter over what name the article appeared the charming, free and polished style, and the quality of the matter betrayed the real author. In 1877, in company with Mr. Peter Veitch, of Exeter, he went on a botanical collecting tour for Messrs. Veitch, of Chelsea, to Borneo and to the Sulu Archipelago, where he did excellent work, discovering many new plants of merit and interest, several of which he successfully introduced into cultivation, and some of which have been called after him. He took copious notes, and recorded with accuracy his observations of plants and animals in their natural surroundings, his analytical drawings of the flowers and plants he collected proving of great value to monographers when species came to be described. As already stated, he was appointed Curator of the College Gardens in 1879, and so highly was his work there appreciated, that the College authorities conferred on him the honorary degree of M.A. in 1888.

Always a keen observer, and careful accurately to record his observations, he succeeded in accumulating a vast number of valuable notes, and published several books which are held in high esteem in gardening circles. Amongst these are "The Art of Botanical Drawing," "The Narcissus," "Cool Orchids," "Domestic Floriculture," "Cultivated Plants, their propagation and treatment," (still about the best book on the subject), "Gardens of the Sun," "Sweet scented Flowers," &c.

From its commencement, Mr. Burbidge closely associated himself with the interests of the Dublin Naturalists' Field Club, eventually becoming its President in 1904. He was also a member of other scientific societies, such as the Linnean Society, and the Royal Irish Academy. The Royal Horticultural Society of England acknowledged his work by conferring on him the Victoria Medal of Honor in 1897, and he also held the Veitch Memorial Medal for distinguished services to horticulture. His genial, cheery manner, and the honest sincerity of his friendship are traits which have left a lasting impression on all who had the privilege of knowing him.

F. W. M.

SIR ROBERT LLOYD PATTERSON, D.L., F.L.S.

The civic and scientific life of Belfast will long feel the poorer for the loss of one of the most prominent of the many energetic amateur naturalists of the north. Sir R. Ll. Patterson passed away on January 29th, the immediate cause of his death being weakness, following on a necessary operation. He had reached his seventieth year, having been born in December, 1836, the second son of Robert Patterson, F.R.S., one of the most famous of the eminent group of Ulster naturalists of the first half of the last century. Educated at the Royal Academical Institution and at Stuttgart, he entered business life as a flax merchant when only twenty-two years of age; and he did not retire until 1886. His untiring and energetic work on behalf of the Belfast Chamber of Commerce, which he joined in 1864, and of which he held the Presidency in 1880 and again in 1896, was recognised by the warm esteem in which he was universally held in northern business and municipal circles; and the knighthood conferred on him in 1902 was no surprise to any who knew his work for the good of his native city.

As a naturalist Sir R. Ll. Patterson will be remembered for his observations, carried on through many years, of the animals of Belfast Lough. He was an enthusiastic yachtsman, and took every opportunity of watching the habits of sea birds and other denizens of the waters. His studies on these subjects were embodied in his well-known book: "The Birds, Fishes, and Cetacea of Belfast Lough," published in 1888. Notes from his pen appeared from time to time in the pages of the *Ibis*, the *Zoologist*, the *Field*, and the *Irish Naturalist*. In the establishment and progress of this magazine he ever took a kindly interest.

In the scientific societies of Belfast he was always a well-known and popular figure. For forty years he was a member of the Belfast Natural History and Philosophical Society, and for two periods—in 1881-2 and 1882-3, and again in 1894-5 and 1895-6—he occupied the presidential chair. For the furtherance of this Society—of which his father had been one of the founders in 1821—he never spared himself, and the Belfast Naturalists' Field Club also found in him a willing helper. During the

last few years he took great interest in the establishment of the Ulster Fisheries and Biology Association, of which he was a Vice-President. One of his latest public benefits was the generous help which he gave to the "Patterson Museum" in connection with the Belfast "People's Palace"; and by his will provision is made for valuable additions and improvements to the Municipal Art Gallery. His business enterprise, public spirit, scientific enthusiasm, and unaffected kindliness, will never be forgotten in the northern city that he loved and served so well.

G. H. C.

REVIEW.

TWO SCIENTIFIC ANNUALS.

The Science Year Book and Diary for 1906. Edited by MAJOR B. F. S. BADEN-POWELL. Pp. 210 and 365 + vi. London: King, Sell, and Olding, Ltd.. Price, 5*s.* net.

The Naturalists' Directory, 1906. Pp. 188. London: L. Upcott Gill. Price 1*s.* 6*d.* net.

These two welcome annuals cannot fail to be useful to men of science. In the first named will be found notes and tables on Astronomy, Geography, Physics, Chemistry, and Meteorology, reviews of the past year's progress in various departments of science by specialists, and a directory of periodicals, universities, societies, and of scientific individuals, with biographical details; the volume concludes with a comprehensive diary. With regard to the sciences which come within our scope, we may mention that the summary on Botany is written by Mr. Geo. Massee, of Kew Gardens, that on Zoology by Mr. W. P. Pycraft of the British Museum, that on Physiology by Dr. Felix Oswald, that on Geography by Mr. Edward Heawood, and that on Geology by Mr. Henry J. Seymour, of the Irish Geological Survey.

The information in the lists and directory seems on the whole to be accurate, but we notice that the staff of the Irish Geological Survey, as given on p. 138, represents that body as it existed five or six years ago.

Mr. Gill's "Naturalist's Directory" improves with each year of issue, divers omissions being filled up and errors rectified. Unfortunately the practice of printing advertisements on pages alternating with the text has not been abandoned, though we can conceive of nothing more calculated to repel the user of an otherwise handy and pleasant little volume.

NOTES.

The use of the word "British."

The proposal to substitute the term "Britannic" for "British and Irish" or "belonging to the British Isles" strikes me as meeting the needs of the case admirably, alike on grounds of convenience and of common-sense; and I venture to predict that it will soon pass into general use, in this sense.

EDWARD S. MARSHALL.

Taunton.

I feel gratified that my suggestion as to the meaning of these adjectives has met with approval both from a "British" and an "Irish" naturalist. I made the suggestion with some diffidence, fearing that the exclusion of Ireland from the British area (biologically considered) might be offensive to the imperial feelings of some of my colleagues. It was with much satisfaction, therefore, that I noticed the use of the term "British" in the sense advocated by me (so as to exclude what is Irish) made by one whose imperial enthusiasm is above all suspicion, in a recent allusion to a section of the "Britannic" fauna. Speaking of the highest family of our indigenous mammalia, the Right Hon. A. J. Balfour is reported to have asked at Inverness on January 18th the question—"Was not that playing *with the British and with the Irish people?*"

GEO. H. CARPENTER.

Dublin.

ZOOLOGY.

Beetles from three Counties.

Besides the *Pæderus caligatus* Er. from Co. Wexford already recorded (*ante* p. 14), the following which were sent with it by my friend Mr. J. H. Johnston, deserve mention—*Bradycellus distinctus*, Dej., *Demetrias atricapillus*, L., *Cercyon lugubris*, Payk., *Cis boleti*, Scop., *Ptinus fur*, L. *Lagria hirta*, L., *Apion cruentatum*, Walt. None of these species are particularly rare, but *Cercyon lugubris* has not been previously recorded from Leinster nor *Ptinus fur* from Wexford. I hope my friend will go on collecting, for he has made an excellent start, and has a capital coadjutor in Rev. J. Montgomery Browne.

I got a bag of moss at Omeath, Co. Louth, in November last, but the resultant beetles were rather disappointing both in quantity and quality. My best captures were *Quedius puncticollis*, Thorns., *Q. rufipes*, Grav., *Stenus declaratus*, Er., *Mycetoporus splendidus*. Grav. (this pretty little Staphylinid is widely spread from Donegal to Kerry, but it never seems to occur in any great numbers; I do not think I ever got more than two or three at one time); *Sitones cambricus*, Steph.

In several bags of moss from this neighbourhood I have taken plenty of beetles, butnot many worth recording. *Bembidium obtusum*, Sturm., occurred sparingly as it usually does, and I noticed in lamp-light a blue reflection on the elytra which I had not observed before. I was pleased to take three species of *Choleva*, viz., *C. angustata*, F., *C. agilis*, Ill., and *C. tristis*, Panz.; unfortunately I only got a couple of specimens of each. In each of two bags of moss taken from a particular spot I got single specimens of each of these Cholevæ; *Barypeithes sulcifrons*, Boh. occurred pretty freely in the same spot as the *Choleva*.

W. F. Johnson.

Acton Glebe, Poyntzpass.

Some new Molluscan Records for Co. Tyrone.

Knowing that Tyrone had been somewhat neglected by conchologists, we have often intended to visit it, but until January 22, 1906, our hopes were not realized. Unfortunately the day chosen for the "hunt" turned out frosty, otherwise a larger list than 36 species would have been recorded. The district visited was that lying west of the mouth of the Blackwater. This includes the Coalisland canal and part of the shore of Lough Neagh. The rejectamenta in Washing Bay, Lough Neagh, proved our best collecting ground, in this flood refuse the following species were taken:—*Agriolimax agrestis*—in considerable numbers in various stages of decomposition, *Helix hispida*, *Succinea putris*, *S. elegans*, *Limnæa stagnalis*, *L. peregra* and var. *lacustris*, *Planorbis carinatus*, *P. albus* (rare), *Hydrobia Jenkensi*, *Bythinia tentaculata*, *Valvata piscinalis*, *Sphærium corneum*, *Pisidium amnicum*, *P. fontinale*, *P. pusillum*. The *Hydrobia* accounted for nearly 75 per cent. of the shelly part of the rejectamenta, in fact, it could have been easily collected with a shovel. With the exception of a few of the *Limnæa* all of the above were dead shells.

The following 16 records are new to Tyrone, according to the Conchological Society's Census of 1902:—*Arion subfuscus*, *A. hortensis*, *A. circumscriptus*, *Agriolimax agrestis*, *Hyalinia pura*, *Balea perversa*, *Succinea putris*, *Planorbis albus*, *P. carinatus*, *Physa fontinalis*, *Limnæa stagnalis*, *Bythinia tentaculata*, *Hydrobia Jenkinsi*, *Valvata cristata*, *Pisidium amnicum*, *P. fontinale*. On our way home a few mollusca were collected in Co. Armagh, of which the following are new to the county:—*Arion circumscriptus*, *Limax arborum*, *Vitrina pellucida*, *Balea perversa*, and *Succinea putris*. All the above were taken at the Armagh end of Verner's Bridge, which crosses the Blackwater about 1½ miles north of the railway. It might be well to mention that at this point the Blackwater forms the boundary between Armagh and Tyrone. We have used Dr. Scharff's nomenclature, as given in *I. N.*, vol. i., 1892, in the above lists.

J. N. Milne,
A. W. Stelfox.

Belfast.

A new station for Helix virgata.

While collecting near Magheramourne on January 13 this year, we discovered a very local but numerous colony of this species, on the railway embankment, about a quarter of a mile north of Magheramourne station, along with *H. caperata* and *H. rufescens*. It is probable that two of these three species have been introduced with ballast, and one of the railway employees informed us that he remembered ballasting this particular portion of the line with gravel that came from a ship at Larne. Neither *H. virgata* nor *H. rufescens* seem to have spread from the railway, but this cannot be said of *H. caperata*, as H. L. Orr and J. N. Milne have both taken it previously on the old quarry tip, and J. N. Milne has also taken it, two years ago, above the present quarry, fully half a mile from the colony. We, ourselves, on 13 January, took a few specimens where the quarry tramway runs under the county road. From this it seems to us just possible that there may have been an original colony of *H. caperata* there. The *H. virgata* are very different from the Ballycastle, North Antrim, form, much higher in the spire, and more varied in colour and markings.

J. N. Milne
A. W. Stelfox.

Belfast.

Land and Freshwater Mollusca from Co. Roscommon.

Mr. B. St. G. Lefroy sends me the following species from Termonbarry and the Shannon near there. Roscommon records being few and far between, these are welcome towards future county lists:—*Limax maximus*, *L. marginatus*, *Agriolimax agrestis*, *Limnæa peregra*, *Planorbis carinatus*, *P. vortex*, *Bythinia tentaculata*, *Neritina fluviatilis*, *Sphærium corneum*, *Pisidium pusillum*.

R. Welch.

Belfast.

Rock Pipit at Sea.

On Monday, 22nd January last, when crossing from Dublin to Holyhead, I noticed a small bird flitting over the waves towards the steamer. As it came quite close to the boat it raised its flight, and, reaching the rigging, it alighted for a short time on one of the ropes. After a couple of minutes it flew off. It was strong on the wing. When it came on board we were about eight miles from the South Stack lighthouse. To the best of my belief the bird was a Rock Pipit (*Anthus obscurus*), but as I had not my field glass with me, and I was only permitted a very short time to make observation, I will not state dogmatically that it was not *Anthus pratensis*, or even a rare species.

C. J. Patten.

Sheffield.

Grey Crow at Jerrettspass, Co. Armagh.

When driving to Newry on January 27 I saw a Grey Crow (*Corvus cornix*, L.) sitting in a tree by the roadside between Jerrettspass and Goraghwood. This is the first time I have seen this bird about here since I began my residence, now ten years since.

W. F. Johnson.

Acton Glebe, Poyntzpass.

Greenland Falcon in Co. Antrim.

On Monday, 12th February, a male Greenland Falcon (*Falco candicans*) was shot on the top of the mountain called the Knockagh, near Carrickfergus, by Mr. Paul Logan. It was brought to me in the flesh, and was in beautiful condition. Its stomach contained the remains of a Lark. This arctic Falcon has not occurred in Co. Antrim since 1865, when one was shot on Rathlin Island. In view of the visitation of these birds to the west coast of Ireland last spring, it will be interesting to hear if the recent wintry weather has brought any more of them to the inhospitable shores of Ireland.

Robert Patterson.

Holywood, Co. Down.

Albino Common Snipe in Co. Wicklow.

Early in January of this year, my friends, Messrs. R. Goodisson and E. C. Mowbray, saw a pure white Snipe on a bog at the base of Connagh Hill, near Hollyfort. A few days later my brother and I shot over the same ground; but a sharp frost had almost cleared out the birds, and we failed to find it. Jack Snipe have been unusually abundant this season; out of 108 birds obtained, 30 belonged to this species. As a rule, we have shot less than a dozen in the district.

Edward S. Marshall.

Taunton.

Sagacity of Gulls.

At Magilligan Strand, Co. Derry, I have, on several occasions, watched the seagulls, in numbers together, breaking the shells of molluscs on the hard, sandy beach, in the way described by Mr. Colgan. The gull would let itself drop at the same moment as the shell, and reach the ground almost simultaneously with it, checking its fall by a sudden movement of the wings when within a few inches of the ground, and having swallowed its prey, would proceed to look for more. Is there not an ancient story related of a certain philosopher, killed by an eagle, that mistook his cranium for a white stone, and dropped a tortoise on it?

W. E. Hart.

Kilderry, Co. Donegal.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

JANUARY 30.—The annual general meeting was held in the rooms of the Royal Irish Academy, Dawson-street, the Right Hon. Jonathan Hogg, Vice-President in the chair.

The report stated that 15,000 more people had visited the Garden in 1905 than in the previous year, and £100 more was taken at the turnstiles The receipts from entrance fees and subscriptions amounted to £752 18*s.*—the largest amount the Society had ever received from this source, so that a substantial balance was carried over to next year's account. Building had been gradually extended. The Council had been able to erect a very large open-air aviary on the far side of the lake. As this aviary was 90 feet long and about 50 feet wide, by 20 feet high, there was space for sufficient freedom of movement. In order that some of the water birds might also find a congenial home in this large enclosure a portion of the lake has been fenced in so as to form part of the cage. About half a dozen trees had been left in the aviary, and it was proposed to plant shrubs and other undergrowth, as well as to construct wind shelters. Having noticed that many species of parrots and parrakeets were quite hardy enough to withstand winter temperature in the open, the Council had turned over one-half of the smaller old aviary to their sole use. The other half of the same structure, which had been divided in the middle by a wire screen, had been allocated to a group of Rhesus Monkeys. The Council had this year allowed the Rhea, or South American Ostrich, and also its near relation, the Emu, to have complete liberty in the grounds. Similarly the Pelicans had been set free. Probably other birds would join them next year. The Giraffe House has been provided with a brick floor, small shelters had been erected in the open-air rodent enclosure, and changes had been made in its internal fittings, the large Bear Den had been strengthened, and an iron hut had been built in it. With regard to the Council's future plans, it had been deemed of urgent necessity for many years past to enlarge and improve the accommodation for Anthropoid Apes. A special committee was charged with the details of the scheme, and it was found that the most economical method of carrying out the Council's views was to turn the whole of the existing small room attached to the Monkey House into one or two cages. The Council had now decided to adopt the committee's recommendation, and the work would be commenced immediately. It had also been agreed upon that an unheated house for the various smaller Mammalia should be constructed, so as to prevent overcrowding in the Monkey House, and to enable the Council eventually to use the

latter entirely for monkeys. It has been referred to in previous reports that one pair of lions—Remus and Vesta—were placed in an open air den in 1902. This was, therefore, the fourth winter which they were spending in the open air in an unheated cage. In September last this pair had two young, viz , one male and one female, but unfortunately, they were both killed by the mother. "Pluto" and "Lady Macbeth" had a litter of three cubs in May last, viz., two females and one male. One of these was exported to the west of Ireland, the remainder went to Germany. Finally, in August, "Pluto" and "Dido" had a litter of two males and one female cub. The Council had thus had eight cubs during the year, of which six had survived. It was rather remarkable that only four out of these eight should have been males, as the male cubs, as a rule, were more numerous than the females. There were, therefore, eighteen specimens in the Gardens at present, eight of which were lions and ten lionesses, and ten of these eighteen were Irish by birth. Once more the Council had trusted largely to donations or exchanges, and had refrained from spending any large sum of money on buying animals. When any real bargains, however, were in the market, as the Ant-eater, the Nigger monkey, the Slender Loris, and some of the Lemurs, it was considered advisable to secure them. The Council had also been able to effect some exchanges, which enriched the Society's collections by fourteen specimens. Altogether the Council had added by purchase or exchange 120 specimens. The amount spent on purchases this year amounted to the moderate sum of £148. Altogether 271 specimens had been added to the Society's collection during the year. In only a few cases of the deaths, in such where it seemed particularly desirable, was a post-mortem examination made. The remainder of the dead animals were sold. The post-mortem examinations were performed as in previous years by Principal Mettam in the Royal Veterinary College. As in human beings so also among animals, a great many deaths were due to tubercular disease. Thus the White-tailed Gnu which had lived in the Gardens for five years died from tuberculosis. So did a Sambur deer and an antelope. The Pigmy Bull suffered from pneumonia, and one of the Striped Hyænas succumbed after an attack of pleurisy complicated by peritonitis. A young Leopard which died shortly after being presented was found to be affected by ulceration of the stomach, and a penguin suffered from acute inflammation of the same organ. The Council's silver medal for the best set of photographs of animals in the Gardens was awarded to Mr. C. C. Haughton.

The adoption of the report was moved by Mr. Justice Ross, and seconded by Mr. George Brett, and carried unanimously. The Earl of Dudley having resigned the presidency of the Society on his departure from Ireland, the Right Hon. Jonathan Hogg was elected to the vacant chair, while Mr. W. E. Peebles' long and invaluable services to the Society were recognised by his election as an honorary Vice-President. The Duke of Bedford and Dr. P. Chalmers Mitchell were elected honorary members.

DUBLIN MICROSCOPICAL CLUB.

JANUARY 10.—The Club met at Leinster House.

Dr. R. F. SCHARFF exhibited a piece of cloth which he had obtained in a bog in Co. Antrim, along with a number of interesting human implements. He thought the cloth was manufactured from horse hair, but had not been able to identify it with certainty.

J. N. HALBERT exhibited a fresh-water mite, *Laminipes bullata*, Sig. Thor, not previously recorded from the British Isles. A single specimen was found in a pool by the side of Lough Leane, Killarney. The species was quite recently described by Sig. Thor from Scandinavian specimens (*Archiv. für Math. og Naturv.*, vol. xxi.)

Dr. G. H. PETHYBRIDGE exhibited two species of wild yeast or torula, which he had isolated from "blown" tins of condensed milk. These yeasts are capable of fermenting saturated solutions of cane sugar, provided the other substances necessary for their nutrition are present. By their action on the cane sugar, which exists as a saturated solution in the tins of condensed milk, and is added during the process of manufacture, a strong accumulation of gas occurs, so that the ends of the tin become bulged outwards, and the tins are said to be "blown." The two species exhibited had both been proved by experiment to be capable of blowing tins of condensed milk. A full account has been published in the *Econ. Proc. Roy. Dub. Soc.*, vol. i., part 7, 1906.

W. F. GUNN showed seeds of *Nemesia strumosa compacta*, and drew attention to the wing-like appendage with which it is provided. A beautiful network projection runs round the periphery of the seed (which is flatly spherical in shape), and, no doubt, aids in its distribution by wind when the seed is mature.

BELFAST NATURALISTS' FIELD CLUB.

JANUARY 3.—Robert Patterson (Vice-President) in the chair. ALEXANDER MILLIGAN read a comprehensive paper on "Prehistoric Man." The paper was discussed by Mrs. Hobson, W. Gray, R. Bell, and G. Donaldson, and the chairman.

JANUARY 10.—GEOLOGICAL SECTION.—G. C. Gough in the chair. J. STRACHAN read a paper on "The Origin of the Carnmoney Chalcedony." The mineral occurs in veins traversing the denuded plug of a Tertiary volcano. The vein-sides are coated with three layers—first a layer of "Hullite," next a layer of calcium carbonate and zeolites, and finally a layer of chalcedony, often filling the centre of the vein. The reader tried to show from both chemical and geological points of view that the chalcedony and portions of the calcite or zeolitic layer had been deposited by hydrothermal action, as the volcano died out.

JANUARY 16.—W. H. Phillips (President) in the chair. MADAME CHRISTEN contributed "A Summary of the Club's recent Glacial Work."

After a brief reference to the origin of the work some dozen years ago in response to a circular from the Erratic Blocks Committee of the British Association to Corresponding Societies in Ireland, the reader described the manner of investigating each locality, the formation of a collection of Irish rocks and erratics for the Club, the submission of fragments of unfamiliar erratics to members of the Geological Survey and other experts in Dublin, London, and elsewhere, for identification, for the purpose of ascertaining their parent locality, which in conjunction with the study of striæ left by the ice that flowed over Ireland gave valuable information as to its direction. One hundred and seven different erratics occurred in our North-Eastern drifts, many having travelled from Scotland. Special reference was made to the wide distribution of fragments of Ailsa Craig rock over Ireland, England, and Wales, as well as Antrim flints. The occurrence of marine organisms in our drift deposits, studied and recorded in the Club's Proceedings a quarter of a century ago by Mr. Wright and Mr. Stewart, has become another factor of importance in indicating the direction of ice currents, since the conception of great confluent icefields moving outward over Great Britain and Ireland filling the North Channel and Irish Sea, has gradually taken the place of the former hypothesis of a deep submergence under arctic conditions, whose difficulties were ably pointed out by the Rev. Maxwell Close some forty years ago. The description of this work commenced with the supposed intrusion of a mass of Scottish ice in our Ballycastle district, which glaciated the surface of the headlands, scattering erratics from Cantyre, the Clyde, and Ailsa Craig over Rathlin, north-east Ulster, and passing on to meet with similar sheets of Irish origin with their cargo of local rocks streaming on by Lough Neagh, Belfast, and the Mourne Mountains southward over the centre of Ireland. The thirty-six localities investigated are fully described in detailed manuscript schedules in the possession of the Club, tables of the results being compiled for publication in its Proceedings. These thirty-six deposits were roughly grouped together (proceeding from Fair Head southward to Newry and Kilkeel) as inland, sea-shore, or mountain localities, and the special erratic facies of each type pointed out, the constant presence of Ailsa and North Antrim rocks, and the gradual introduction of rocks from the West increasing as the review passes southward, contrasted with the unexpected occurrence of rocks of southern origin north of their parental district. This led up to a mention of Lake Belfast, a great sheet of fresh water depositing sands and gravels described in the recent Memoir on the drift deposits round Belfast published in 1904 by the Geological Survey of Ireland. Further investigations are urgently needed to confirm or refute these interesting speculations, but the importance of careful and detailed local records was strongly insisted upon. A short reference to the fascination of erratic-hunting and the pleasant friendships developed between the members of Field Naturalists' Clubs concluded the paper.

W. J. KNOWLES read a paper on "Stone Axe Factories near Cushendall." The papers were discussed by W. Gray, R. Welch, Joseph Wright, C. M. Cunningham, R. Bell, R. May, and G. C. Gough.

JANUARY 24.—Robert Patterson (Vice-President) in the chair. W. H. GALLWAY read a paper entitled "A chat about British Starfishes," in which he described and illustrated the characters of the different orders of Echinodermata.

FEBRUARY 7.—Robert Patterson (Vice-President) in the chair. Mrs. HOBSON read a paper on "Dene-holes and Souterrains." The paper was discussed by Arthur Deane, Alex. Milligan, Miss Andrews, W. H. Milligan, and the chairman.

DUBLIN NATURALISTS' FIELD CLUB.

JANUARY 10.—NATURAL HISTORY MUSEUM.—Under the guidance of Prof. Carpenter, the Club visited this section of the National Museum. Special attention was directed to the cases illustrating the factors of organic evolution, the distribution of animals, and the Irish collections. When the newest additions to the Museum had been inspected the party viewed the animal remains lately found in the caves of Sligo and Clare, and Dr. R. F. Scharff kindly showed some of the study collections, especially the vast accumulation of bones resulting from the exploration of Irish caves.

JANUARY 13.—The Annual General Meeting was held in the Royal Irish Academy House, C. B. MOFFAT, B.A., in the chair. A vote of condolence, proposed by Dr. G. H. PETHYBRIDGE, and seconded by W. F. GUNN, with reference to the death of the President (F. W. Burbidge, M.A.), was passed. A vote of condolence with reference to the death of Mr. Edward Williams, proposed by R. M. BARRINGTON, LL.B., and seconded by J. de W. HINCH, was also passed. The Annual Report and Statement of Accounts for 1905 were submitted and adopted. The names of the officers and committee for 1906 were then placed before the meeting. The incoming President (C. B. MOFFAT, B.A.), delivered an inaugural address, dealing with "Some different conceptions of the Struggle for Existence," which will be published in the *Irish Naturalist*. The Officers and Committee for 1906 are as follow:—President, C. B. Moffat, B.A.; Vice-President, G. H. Pethybridge, Ph.D., B.Sc.; Hon. Treasurer, H. K. Gore Cuthbert; Hon. Secretaries, J. de W. Hinch, F. O'B. Elison, B.A. Committee:—W. B. Bruce, Prof. G. H. Carpenter, B.Sc., Miss Garner, W. F. Gunn, J. N. Halbert, D. Houston, F.L.S., Miss M. C. Knowles, Miss M'Intosh, B.A., C. Murray, B.A., R. Ll. Praeger, A. Roycroft J. F. Sheehy-Skeffington, M.A.

TYRONE NATURALISTS' FIELD CLUB.

A meeting of the Tyrone Naturalists' Field Club was held in the Technical Institute, Dungannon, on 6th February, when Rev. Samuel Lindsay, B A., occupied the chair. Arrangements were made for a course of public lectures during the next two months, the subjects being "Canterbury, and the Gothic Art of England," by W. J. Fennell, M.R.I.A. : "Primitive Man," by G. C. Gough, Queen's College, Belfast; "The Feathered World," by N. H. Foster, and "The Botanist in Ireland," by R. Lloyd Praeger.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

February 9.—Mr. John Brown, F.R.S. lectured in the Grosvenor Hall on "With the British Association in Africa."

IRISH SOCIETY FOR THE PROTECTION OF BIRDS.

The second annual meeting was held at the Royal Irish Academy on January 26, Dr. James Little in the chair. There was a good attendance. The report contained the following, among other items:—

It has been decided that in future the Society shall be named "The Irish Society for the Protection of Birds." Our main work has been directed towards securing the protection of birds during the close season, and accordingly letters were sent to the County Councils of Mayo, Galway, Donegal, and Kerry, asking them to appeal to the Lord Lieutenant for power to render it illegal to take or destroy the eggs of birds included in a carefully considered scheduled list. At the same time other members undertook to write to influential acquaintances in these counties. The result has been somewhat disappointing. Donegal and Kerry did not reply. Mayo and Galway sent in their papers with some technical informality, and so lost the opportunity for last year, but we hope to gain them safely next spring. Since then Mr. May has spared no pains to procure the protection in Co. Dublin of the eggs of the Peregrine, Kestrel, Raven, Owls, Skylark, Terns, Oyster-catcher, Herring Gull, Green Cormorant, Ringed Plover, and Black Guillemot, and has also been instrumental in having the close time extended to December 1st in every year for the following birds:—Bullfinch, Goldfinch, Siskin, Redpoll, Linnet, Skylark, and Terns. Both orders have now been duly gazetted. Our Society has exercised special care over the young Terns at Malahide, placing a watcher in the neighbourhood of their nests, and it is gratifying to find that the birds have enormously increased in their habitat. The Hon. Secretaries were kindly accorded an interview with Sir Horace Plunkett, who expressed agreement with the objects of our Society from an economic point of view, and has since informed them that a leaflet on the subject has been

prepared, and is to be put into circulation amongst farmers and others likely to be interested, in all parts of the country. A considerable amount of literature on all questions of bird protection was supplied to the stand of the Society for Prevention of Cruelty to Animals at the Horse Show at Ballsbridge, and was distributed amongst the visitors. We hope this may bring our Society before the country in a more extended way than is possible on any other occasion.

In December the Society invited Mr. R. Kearton, F.Z.S., to give a lecture, illustrated by limelight slides, in the theatre of the Royal Dublin Society, lent by the kind permission of the Council. The hall was crowded with an appreciative and enthusiastic audience. We have lately received the satisfactory news that the first of the lessons prepared at the request of our Society is to appear, with illustrations, in the next number of Blackie's "Irish School Journal," and another in the following issue. Later on Mr. Blackie intends to publish the two together in a booklet for the use of the schools. During the spring and summer several of the Associates much enjoyed the Bird Walks—as suggested in our last report—under the guidance of the Hon. Secretary and Mrs. W. Webb. The Associates also sent in their note-books, which showed much care in observation. The prize was won by Miss Frances Hart.

It is satisfactory to be able to state that our list of Members and Associates has been more than doubled during the year. A correspondence with the Game Protection Association was carried on, and Mr. Barrington interviewed some members of the Committee and found they would be pleased to-operate with our Society whenever possible. We have to thank the Press for many encouraging notices of our work.

NEWS GLEANINGS.

The Dublin Museum Staff.

We are glad to record that the old "Technical Assistantship" in the Natural History branch of the Dublin Museum has been transformed into a full Assistantship, and that Mr. Rowland Southern, of London University and the Royal College of Science for Ireland, has been appointed to the new post after limited competition.

Nevin H. Foster.

At a recent meeting of the Council of the Belfast Natural History and Philosophical Society, Nevin H. Foster, M.B.O.U., was co-opted a member of the Council. We congratulate the Council on the wisdom shown by the selection of Mr. Foster, who will undoubtedly strengthen the natural history portion of the Society's work.

CONTENTS.

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The Irish Naturalist

A Monthly Journal

OF

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ORGAN OF THE

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BELFAST NATURAL HISTORY & PHILOSOPHICAL SOCIETY,
BELFAST NATURALISTS' FIELD CLUB,
DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
LIMERICK FIELD CLUB,
ULSTER FISHERIES AND BIOLOGY ASSOCIATION.

EDITED BY

PROF. GEORGE H. CARPENTER, B.Sc., M.R.I.A.

R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.,
AND
ROBERT PATTERSON, F.Z.S., M.R.I.A.

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OPEN AIR TREATMENT OF MONKEYS IN THE DUBLIN ZOOLOGICAL GARDENS.

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

[PLATE 3.]

IN reviewing the Report for 1905 of the Royal Zoological Society of Ireland, the Editors of the *Irish Naturalist* have already referred to the fact that during the past year a group of Rhesus Monkeys has been turned out into an open-air enclosure. As this experiment is a somewhat novel one and has been attended with considerable success, the Editors have kindly invited me to contribute a few further remarks on the subject, which I am very willing to do. I have also ventured to accompany this article by a coloured illustration from the Society's Report, which demonstrates at a glance one of the principal features of the experiment which the Council of the Society have carried out.

The picture shows a number of Monkeys sitting in the snow, and eating their meal apparently in perfect comfort. Until quite recently it was thought that the only way to keep Monkeys successfully in confinement was to cuddle them up in hot houses, so as to imitate as closely as possible the climatic conditions of their tropical homes. But our knowledge of the geographical range of Monkeys has increased considerably within the last few years. Travellers who have visited the inclement regions of Tibet have reported the occurrence of Monkeys. The snow-clad mountains of Northern China and the Dupleix Mountains of Western China up to a height of 13,000 feet are said also to be inhabited by Monkeys, while it has been known for some time that they live in the neighbourhood of Pekin, where the thermometer often registers a temperature of 10 degrees below zero in winter. Now all these cold regions are inhabited by Monkeys belonging to the genus Macacus, a tribe which also formerly lived in Central Europe, and which is still represented on the Continent by the Barbary Macaque on the Rock of Gibraltar. In any experiment of open air treatment, the Council of the Society acted clearly with forethought in choosing a species of this widely distributed genus.

The Rhesus Monkey is, perhaps, the species of Macaque most easily obtainable, as it is common throughout Northern India and is frequently exported to Europe. But it has really a much wider range than that. It has recently been obtained in Kashmir, and occurs there probably up to a height of 10,000 feet, while a colony is said to exist on the hills above Simla which are over 8,000 feet in height. It is there found in herds of considerable size, generally composed of both sexes. As a rule only one young is produced at birth, and they become adult at the age of four or five years.

Since our herd of over a dozen Rhesus Monkeys was put into the open cage last summer, they have thriven well. They have no artificial heat either night or day, and they are frequently seen taking a bath and a swim in the small pond which is in the enclosure. They are fond of fruit, nuts, and most kinds of seeds, of which they can stow away a considerable amount in their large cheek pouches for mastication at leisure. In their wild state they are said to live also upon insects, so that the feeding in confinement has never presented any difficulties. Their prominent superciliary ridges give them rather a fierce look, and they are a particularly quarrelsome species, though also full of fun and ceaseless activity. It is to be hoped that eventually this species will breed in our Dublin Gardens, and that we may be able to supply other gardens with hardy Irish Monkeys just as we have done with our Irish Lions, which are now well known products in the Lion market of the world.

Dublin Museum.

NEWS GLEANINGS.

The Swiney Lectureship.

We are very pleased to announce that Dr. R. F. Scharff, keeper of the Dublin Museum, has been appointed Swiney Lecturer in Geology for the next two years, and that he will consequently deliver two courses in the autumn months of 1906 and 1907 at the Victoria and Albert Museum, London. For his first course Dr. Scharff has chosen the subject of "The Geological History of the European Fauna," which he has made so peculiarly his own.

A NEW IRISH POLYZOON.

Hypophorella expansa, Ehlers.

BY A. R. NICHOLS, M.A., M.R.I.A.

This interesting Polyzoon, which inhabits passages that it forms in the substance of the tubes of certain marine worms (Chætopterus and Lanice), has been found at a few places off the Continent of Europe, but has hitherto only been recorded from British coasts by Harmer, who found it in Chætopterus tubes dredged in 30 fathoms off Plymouth.[1]

I have been working recently on the Polyzoa of the Irish coasts and have examined some tubes of Chætopterus dredged by the late A. G. More in Broadhaven, on the coast of Mayo, in July, 1873[2]. By stripping off thin layers from the inner surface of these peculiar parchment-like tubes and examining them with the microscope, I soon discovered the presence of *Hypophorella expansa* by the delicate thread-like connexions (stolons) between the zoœcia; a few zoœcia in a rather damaged condition and some of the small holes through which the tentacles are protruded into the interior of the worm tube could also be seen. The appearance, under the microscope, of those portions of the layer which contained colonies of Hypophorella, resembled closely the figures given by Joyeux-Laffuie.[3]

This Polyzoon was found by Ehlers in the substance of the tubes of *Terebella* (*Lanice*) *conchilega* and named *Hypophorella expansa*; subsequently it was found in the tubes of Chætopterus by Joyeux-Laffuie, who, not recognizing it as the same species that Ehlers had previously discovered, renamed it *Delagia chætopteri*. Hypophorella was also found in tubes of Chætopterus by Prouho and Harmer, and, as the latter remarks, is probably common wherever this worm occurs. Specimens of Chætopterus have been recorded from various places on the west coast of Ireland, but I have only had an opportunity of examining those from Broadhaven.

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[1] Note on New or Rare British Marine Polyzoa. *Journ. Mar. Biol. Assoc.*, 1897, pp. 51–53.

[2] Life and Letters of Alexander Goodman More. Dublin, 1898.

[3] Description du Delagia chætopteri (J. J.-L.) *Archives de Zool. Exp. et Gén.* (2), vi., 1888.

A SIMPLE METHOD OF REPRESENTING GEOGRAPHICAL DISTRIBUTION.

BY R. LLOYD PRAEGER.

When one is studying or comparing the distribution of animals or plants in small countries, such as this island, a list of the areas in which a species occurs, such as is given in *Cybele Hibernica* or *Irish Topographical Botany*, is not adequate. While the numbers or names convey a general idea to the mind, they leave no definite pictorial impression, and for actual comparison of two distributions we must have recourse to a map, on which we mark the areas in which each species is found.

Similarly, when we come to publish a paper dealing with such problems, the pictorial representation of distribution is very desirable for the sake of clearness, but the trouble and expense of preparing drawings and then process-blocks are practical considerations not to be overlooked. To take an actual example : the small map below is one of a set prepared

Fig 1.—Distribution of *Cicuta virosa* (1902).

in illustration of a recent paper by myself, in which the distribution of plants in Ireland is considered. The drawing of this set of maps involved some 30 or 40 hours of work, and the preparation of process-blocks from these cost the publishing body some £10. Had the maps been redrawn by a draughtsman, as is usually done in such cases, this £10 would have been nearer £25. And this expense, be it noted,

is all additional to the compositor's price per page; for the printer, as all editors know, makes no allowance for the space occupied by illustrations. These considerations lead me to suggest the following plan, which will in most cases serve sufficiently well the purpose stated, and by which the heavy expense referred to above may be practically eliminated.

If we take the map of Ireland with the forty division-numbers set each in the centre of the area to which it belongs (the map in *I.N.*, vol. v., p. 29, will serve the purpose), and shift the numbers so as to bring them within a series of vertical and horizontal lines (still preserving the relative positions as much as possible), the result may be shown by ordinary typography, and will appear as follows:—

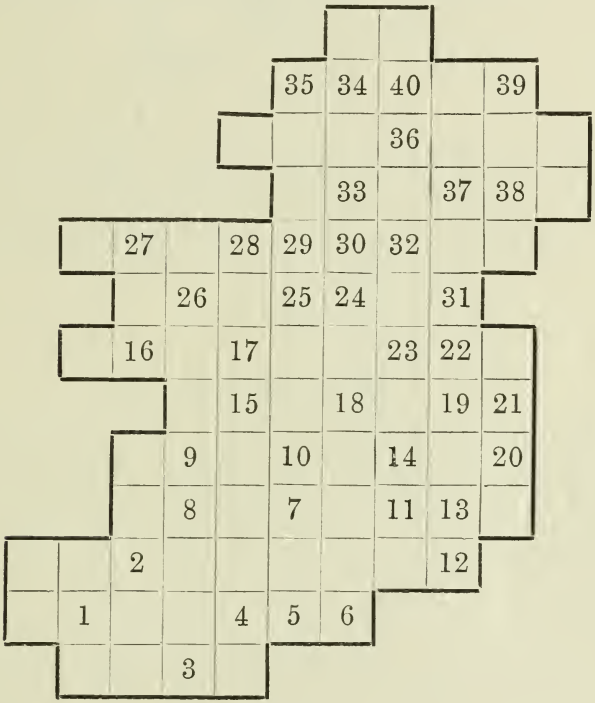

FIG. 2.

It will be seen that here the figure of the country and relative positions of the divisions is tolerably closely preserved. Omitting the enclosing lines, and using dashes for the blank

squares, we have a series of numbers and dashes which present no difficulty to the compositor; and the distribution of *Cicuta virosa*, a characteristically north-eastern species with a continuous range, as shown by this method, appears below, heavy-face type being used for the divisions in which it is present :—

— —
35 34 **40** — **39**
— — — **36** — — —
— **33** — **37** **38** —
— 27 — **28** **29** **30** **32** — —
— 26 — **25** **24** — **31**
— 16 — **17** — — **23** **22** —
— 15 — 18 — 19 21
— 9 — 10 — 14 — 20
— 8 — 7 — 11 13 —
— — 2 — — — — — 12
— 1 — — 4 5 6
— — 3 —

FIG. 3.—Distribution of *Cicuta virosa*.[1]

A disadvantage attaches, however, to this plan : the effect of the padding of blank squares (while it preserves the proportions of the diagram) is to exaggerate the area from which a plant is absent, and to obscure a continuous range. Any further condensation of the figure results of necessity in loss of accuracy as regards relative position of the division-numbers, yet the following development appears advantageous for the reason stated. We eliminate the blanks by pushing the numbers together horizontally; and then restore the general proportions of the figure by omitting the horizontal lines in which "36" and "2 . . . 12" stand alone, transferring these figures into the adjoining lines. The result is a compact figure as shown in figure 4 :—

[1] Since the map (fig. 1) was constructed, Cicuta has been added to 28 (Sligo).

35 34 40 39
33 36 37 38
27 28 29 32
26 25 30 31
16 17 24 23 22
15 18 19 21
9 10 14 13 20
2 8 7 11 12
1 4 5 6
3

FIG. 4.

In this the general proportions of the divisions and relative positions of the numbers are still retained better than might have been expected, and this is the device which I wish to lay before students of distributional problems in Ireland.

35 34 **40 39**
33 36 37 38
27 **28 29 32**
26 **25 30 31**
16 **17 24 23 22**
15 18 19 21
9 10 14 13 20
2 8 7 11 12
1 4 5 6
3

FIG. 5.—Distribution of *Cicuta virosa*.

I give above the distribution of *Cicuta* according to this method which may be compared with the map and diagram on pp. 88–90.

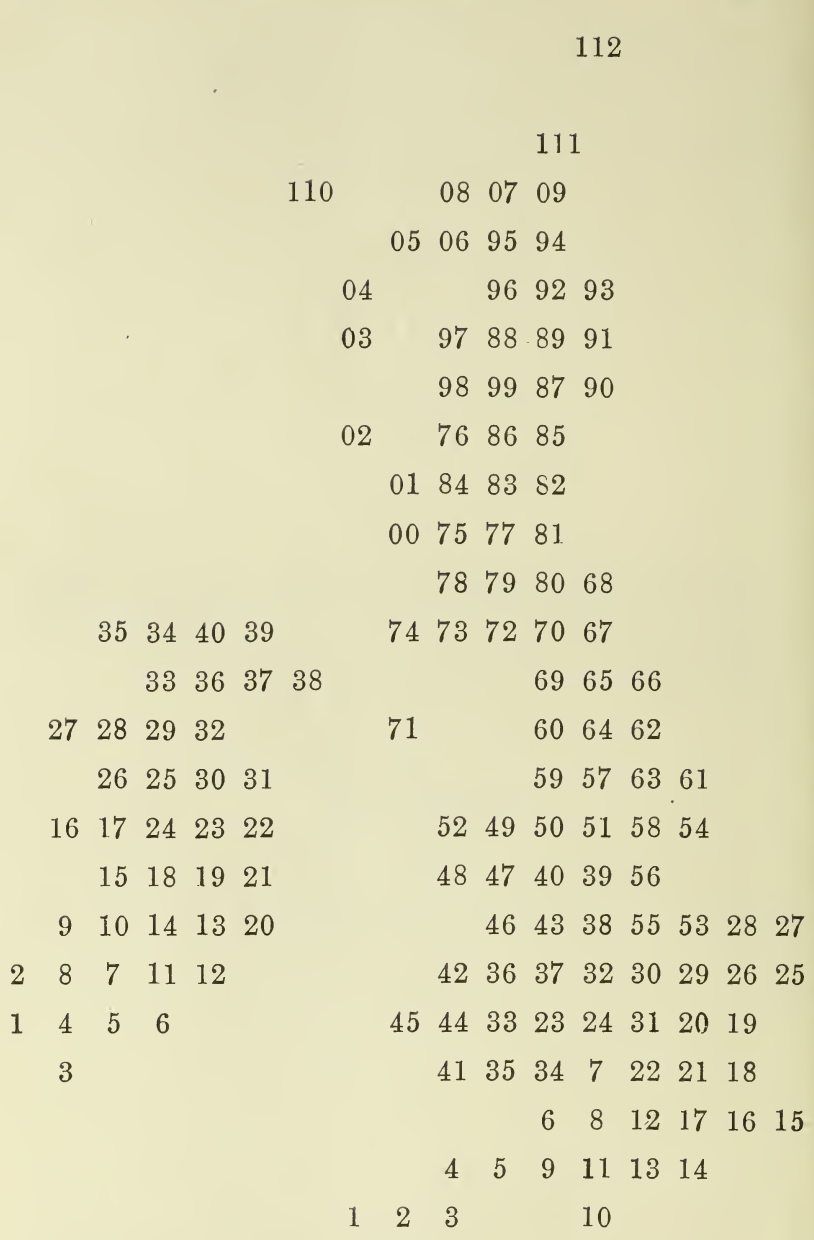
112
111
110 08 07 09
05 06 95 94
04 96 92 93
03 97 88 89 91
98 99 87 90
02 76 86 85
01 84 83 82
00 75 77 81
78 79 80 68
35 34 40 39 74 73 72 70 67
33 36 37 38 69 65 66
27 28 29 32 71 60 64 62
26 25 30 31 59 57 63 61
16 17 24 23 22 52 49 50 51 58 54
15 18 19 21 48 47 40 39 56
9 10 14 13 20 46 43 38 55 53 28 27
2 8 7 11 12 42 36 37 32 30 29 26 25
1 4 5 6 45 44 33 23 24 31 20 19
3 41 35 34 7 22 21 18
6 8 12 17 16 15
4 5 9 11 13 14
1 2 3 10

Fig. 6.

The same plan may of course be applied to Watson's map of Great Britain divided into 112 Vice-counties. Great Britain presents more difficulty than is met with in the case of Ireland, on account of the greater diversity of size of the units of area; and the agglomeration of small counties in North Wales and the East Lowlands tends to distort the positions of the numbers when they are allotted each an area equal to the average. Nevertheless it will be seen from the annexed diagram of the British Islands (fig. 6) that the geographical features as seen on the map are reproduced fairly satisfactorily, and with sufficient accuracy for practical use. But it is possible that some botanist having a fuller acquaintance than I enjoy with the flora and topography of England and Scotland may be able to improve on the arrangement of some of the Vice-counties as given above.

There is of course nothing new in the application of letters or numerals in type to express graphically geographical distribution. So long ago as 1890 Mr. P. Chalmers Mitchell[1] suggested a scheme on this principle for illustrating the distribution of animals in the great zoological regions of the world; but I do not find that any attempt has been made hitherto to use a method of the kind in such detail, or to apply it to our own islands. The advantage of the plan, as I have said, is its ease and cheapness; by it we can, in fact, map without maps.

If we wish a less elaborate scheme for the British Isles on the same principle, we have, as regards Great Britain, Watson's 18 Provinces to fall back upon, and also his 38 Vice-provinces. In Ireland we have the 12 Districts proposed by Babington, and used in *Cybele Hibernica*. These latter correspond more nearly as regards area with Watson's Vice-provinces than with his Provinces, and therefore the Vice-provinces are more suitable for using in conjunction with the Irish Districts. Watson's Vice-provinces and Babington's Districts combine to make an excellent diagram, as shown on next page.

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[1] A Graphic Formula to express Geographical Distribution. *Proc. Zool. Soc. Lond.*, 1890, pp. 607-9.

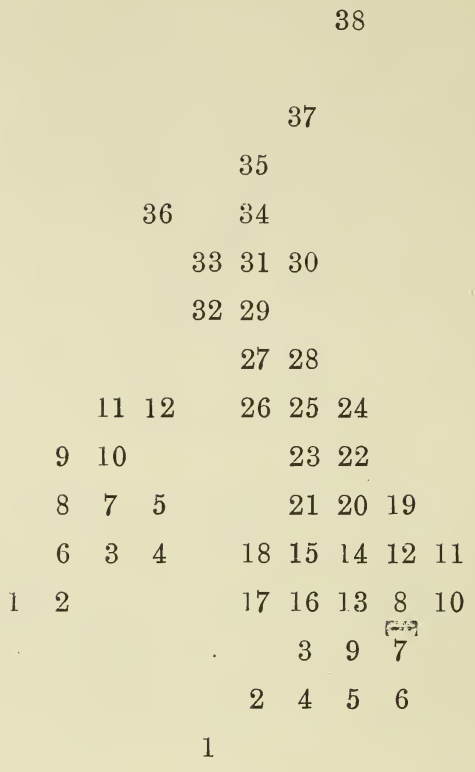

Fig. 7.

This forms a convenient and compact figure, easy to set in type, and sufficient for most purposes.

Any of the diagrams, of course, may be set, without much loss of legibility, in smaller type than is used above, and space saved thereby. The proportions alone must be preserved

Dublin.

THE STRUGGLE FOR EXISTENCE.

[An Address to the Dublin Naturalists' Field Club, 9th January, 1906.]

BY C. B. MOFFAT, B.A.

In thanking the members of the Dublin Naturalists' Field Club for the very great honour they have done me in electing me their President, I cannot but say how deeply I feel conscious of the lack of many of those qualifications which have been conspicuous in former occupants of this chair. With particular sadness at the present moment we must all reflect on the disappearance from amongst us of that distinguished naturalist, who was our President till only a fortnight ago, when we learned with pain that Mr. Burbidge was no more. A few weeks earlier death had deprived the Club of another of its most valued and distinguished members, Mr. Edward Williams, whose wonderful stores of knowledge were always placed so freely at the disposal of his brother-naturalists that it would be hard to estimate what Irish zoology owes him. We meet to-night under a recent sense of both these losses, a sense so keen that I know further words from me would be superfluous on the subject; for I am sure that the Dublin Naturalists' Field Club never before lost two such eminent members within so short a time.

The study of natural history has now become so vast and so complicated that it is impossible to take a bird's-eye view of the field in the hope of arriving at any general conclusions without a great risk of overlooking some really vital fact. The field of the specialist, however limited, is at least clear; but on the question to which I would seek to direct attention to-night, the difficulty is want of clearness. I have no wish to propound theories, but to draw attention to the need for closer study to avoid a confusion which seems to me to be creeping into our conceptions of the phenomena on which the process of evolution depends.

For this purpose, I take the accepted fact of the existence throughout nature of a struggle for existence; and I ask for a clear conception of what that fact means. To explain the meaning of my question I propose to pass in review a few of

the different and, as it seems to me, conflicting conceptions which scientific men have put forward of the nature of the contest which every animal or plant has to sustain with its surroundings and with its own kind.

We must all recognise that the life of every animal is beset with difficulties and dangers. That proposition is so obvious that it has been made the starting point of every believer in the theory of Natural Selection in his efforts to convey a clear idea of what that theory means. Darwin has told us—and has laid it down as a rule to which he says there can be no exception—that all animals are driven into competition with their own kind in consequence of the rate at which they tend to increase. That proposition implies—and Darwin in more than one passage clearly accepts the inference—that there are as many animals in the world as the world can nourish. Every species of living creature, according to the Darwinian view, is at a high-water mark in point of numbers, in fact the world is congested with it, so that whatever number of young it produces during the course of the year, scarcity of food, or scarcity of something else that is competed for with equal keenness, will in the course of an average year have killed off all the overflow and reduced the total number back to what it was in the corresponding season last year.

I do not know that any leading exponent of natural selection directly denies the truth of this conception of the struggle for existence ; but it is very customary to ignore it, and to argue upon an altogether different conception, according to which the natural tendency of animals is not to increase but to decrease. It is rather curious that the strongest upholder, so far as I know, of this anti-Darwinian conception of the nature of the struggle is Professor Weismann, the great thinker and writer, who, in his enthusiastic advocacy of Darwin's main doctrine, is *plus royaliste que le roi*, the proclaimer of the "all-sufficiency of natural selection," while it seems to me that by the view he puts forward of the struggle for existence he cuts away much of the ground on which the most fundamental articles of Darwin's teaching are based.

For we must remember that if there is a "limit of subsistence" for every species—as of course there must be—and if that limit has been reached—as Darwin supposes to be the

case—it does not really matter whether the individuals of this or that species suffer from other perils besides scarcity of necessaries or not. That is, it does not matter except to the mere individual. An animal may be very largely exposed to the ravages of beasts and birds of prey; but these ravages, unless they are on such a scale as would in a few years exterminate the animal, will have no other effect than to ease the situation for the survivors by slackening the competition among them; so that, in the next season of scarcity, fewer will die, and, when that season is over, there should be the same total number of individuals living as if the beasts and birds of prey had taken none.

The same may be said of other forms of peril to which animal life is undoubtedly exposed. For example, birds when on their migration suffer many calamities, the weaker species often dying of fatigue, while those of stronger flight, like the swallow, however fairly they get over their journey in an average season, must now and then be overtaken by tempests in which case, of course, the destruction of life is enormous But this sort of destruction does not tend to affect the permanent numbers of the species. There is still, in every average year—according to our high-water mark conception—a margin left over of birds that must die from competitive causes; and the fewer the storms destroy the greater must be the mortality among the survivors, so that next year the numbers will still be the same as if there had been no storm. In an exceptional year, of course, the destruction might be so great that no competition among the survivors would be necessary; but even in that case, if we accept Darwin's law as to the nature of the limit to multiplication, the loss would very soon be made up, probably in the course of the next breeding season. Whenever the numbers fall below the high-water mark, competition is practically suspended until they have reached it again; and this, on Darwin's supposition, will in the case of any but a very slow-breeding species occur very soon.

Now, Dr. Weismann's highly original views on this subject are conveyed in his interesting essay on the "Duration of Life," from which it appears plain that he looks on every species of animal as limited in its numbers by the very set of

causes which, on the Darwinian hypothesis, should exercise no effect on them whatever. Dr. Weismann adopts the remarkable view that as some kinds of animals are much more exposed than others, in proportion to their fertility, to the attacks of enemies and to other catastrophes, the only way in which these animals can maintain their numbers is to develop a greater average length of life than is enjoyed by the less persecuted forms. This would, no doubt, be a most ingenious way out of a difficulty, if an animal's foes were not those of its own household. But it would, I think, be alike useless and uncalled-for, in fact paradoxical, if we accept Darwin's view that all animals are at a numerical high-water mark, and suffering constant checks in their efforts to surge over it.

To quote Professor Weismann's argument in the case of birds, he says (accepting the correctness of Darwin's and Wallace's view that the number of individuals of each species remains tolerably constant from year to year) that if we assume that "the individuals of a certain species live for ten years, and that they lay twenty eggs in each year," then "of the 200 eggs which are laid during the ten years which constitute the lifetime of an individual, 198 must be destroyed, and only two will reach maturity, if the number of individuals in the species is to remain constant." So far, there is at least no friction between Weismann's and Darwin's points of view; but from this we are requested by Weismann to draw the inference as a mathematical certainty, that if the average life of the individual had been only eight years instead of ten, and only 160 eggs instead of 200 had been laid, the causes which on the one estimate destroyed 198 out of 200 would on the other destroy the same proportion out of 160, leaving a surviving residuum of less than two; so that the survivors would be fewer and fewer in each succeeding generation, and the species would disappear. "It follows," says Professor Weismann, after enumerating the many perils to which they are subject, "that a relatively long life is the only means by which the maintenance of the species of birds can be secured." This most important inference can only be true on the supposition that Darwin was absolutely wrong in his belief that animals are so numerous as to have to compete with one another for means to live. For in that case it would not matter whether the

supposed bird lived eight years or ten years. Living ten years it produces 200 young, of which only two survive, because, on an average calculation, there will only be room for two. But if it lived only eight years, and produced only 160 young, two would still survive; the difference would be not in the number of survivors, but in the amount of the mortality from competition. By increasing either its duration of life or its fertility, an animal would insure the sending forth into the world of a greater number of individuals doomed to premature death, but it would produce only the same number as before of descendants predestined to a term of successful life.

It is, therefore, a matter of much importance to form a clear conception, one way or the other, of what the struggle for existence really means. Does it arise from the earth being crowded? Is Darwin correct in his assertion that "each area is already fully stocked with inhabitants," so that whenever a change of conditions enables one species to increase its numbers "other species must decrease"? If so, it appears to me to follow that no species can do itself an atom of good by an increase in the average length of life of the individuals which compose it.

On the other hand, if animals are permanently kept below their high-water mark by external destructive agencies—if for instance, mice are practically saved from having to compete with one another by the extent to which they are preyed on by cats and owls, and if storms and the other perils of a long voyage yearly destroy so many chiff-chaffs and willow-wrens on their migration that the survivors need never suffer from scarcity of food—we are confronted with what I may call an altogether opposite conception of the struggle for life, a conception in which catastrophe takes the place that had formerly been taken by competition. Let us see how this at once revolutionises the problem, "how can the balance of nature be maintained?" On the competition theory the answer was perfectly simple. Nature was a self-righting machine. Life was kept surging at a certain limit; beyond that limit it could not rise, and below that limit it was much too vigorous to fall. Now, we cannot abolish this limit. There must be a line, a high-water mark, beyond which animal life cannot multiply. But what I call the catastrophe theory

assumes that animals do not reach it. The puzzle then is, why are the animal inhabitants of the globe neither permanently increasing nor permanently decreasing their numbers? Take the case of a bird which escapes the perils of winter scarcity by migrating to tropical countries, but which, during its long journey, is subjected to great fatigue, so that even in calm weather it falls an easy prey to the thousands of carnivorous gulls that are ever on the watch for wearied migrants, while storms every now and then work wholesale destruction among its numbers, and many of those that survive the actual crisis are still so exhausted that they only reach land to die. These things happen. So far, we have fact to deal with, and not hypothesis. But unless they are followed by competition—in which case they have no effect on the ultimate number of surviving individuals—they leave us without a clue to the maintenance of a general average population. It becomes a mere chance whether the destruction is too great or too little for that purpose. The odds would be millions to one—in fact so great as to put the idea completely out of the question—against the chance of the average annual destruction by these catastrophes being exactly equal in amount to what is needed to prevent the species from increasing on the one hand, or from decreasing on the other. Unless, however, the loss is adjusted with this impossible nicety, the species will either decrease and become extinct, or it will increase until it reaches that very limit of subsistence which we are trying to keep out of court. We seem, therefore, to have been brought back against our will to the view on which animal life is at its high-water mark, and competition the ruling factor.

The only escape, so far as I see, is in Professor Weismann's theory that an animal subjected to greater loss than its rate of fertility can afford may save itself from extermination by developing either a higher rate of fertility or a longer average life, which would come to the same thing. Professor Weismann himself thinks that an increase in fertility would in many important cases be impossible, and that the difficulty can only be met by greater longevity. But it seems to me that a decreasing animal would have to modify its constitution very quickly, if it is to become sensibly longer-lived before it becomes extinct. We must remember that natural selection

would work very slowly in the case of a decreasing animal, which would not be engaged in keen competition with members of its own species. The longer-lived females would of course produce more young than the shorter-lived, and thus there would be some scope for natural selection. But the young of the shorter-lived would not be placed at any material disadvantage in consequence, there being no competition to accelerate the selective process. I think, therefore, that extermination would generally arrive before Professor Weismann's remedy could take effect. Still more unlikely does it seem to me that a species subject to a lower rate of destruction than its fertility needed, and which consequently was on the increase, would put a stop to its increase by becoming shorter-lived before it arrived at the high-water mark at which further increase would be checked mechanically. Thus I think we are brought back again to recognising the necessity for competition, in view of which the destructive agencies that are so often quoted as checks on the increase of animal life discharge no heavier function than to vary the method of execution in a certain number of cases.

Now I think I have shown that there are two conceptions which are not in harmony, and which cannot both be true, as to what the struggle for existence means. It is a very common habit among writers on evolution to mix them up—to argue sometimes as if one were true, and sometimes as if the other were true. Darwin himself, in a very well-known passage, has suggested that since cats are destroyers of mice, and mice are destroyers of bumble-bees, and bumble-bees are the principal agents in fertilising the flowers of red clover, the red clover will be better fertilised in a district where there are plenty of cats to keep down the mice, than where there are few cats, and consequently more mice and fewer bumble-bees. But then, we must ask, does not the destruction of mice by cats, however useful in the immediate neighbourhood of the cat's happy residence, benefit the mice a very little distance away by reducing the enormous pressure to which their own habits of rapid increase are constantly keeping them subjected? There is on record a very well-known series of observations made on some captive field-mice by Mr. R. M. Barrington, from which it is shown that a single female produces five or six litters of

young in the course of every four months; and that the young ones are also mothers when five-and-a-half months old. A field-mouse is known to live for about six years, which would give her time, on the most moderate computation, to produce some sixty or seventy litters, or at least 200 young, in her life. Then when we consider her grand-children, great-grand-children, and great-great-grandchildren, by whom she would find herself surrounded when only three years old, we at once find ourselves running into hundreds of thousands, which would become thousands of millions before this venerable lady had finished her pilgrimage at the ripe age of six. Now we know that whether there are cats in a neighbourhood or not, mice do not increase to these enormous, incalculable figures; nor would they do so if stoats and owls and kestrels and all their numerous enemies—including black-headed gulls—were to vanish with poor pussy from the face of the earth. Every one of these creatures in destroying one mouse gives, on Darwin's own doctrine, a helping hand in life to the mouse that escapes it. I am not questioning for a moment the usefulness of these mouse-destroying creatures. They are at work all the summer and autumn, thinning the mice at a time when mice have plenty to eat, and thus they really, during a short season, reduce the total number. But as soon as a time of scarcity arrives, competition steps in to insure that the number of mice which survive it shall be the same number as would have survived it if there had been no preliminary thinning by cats and owls and the farmer's other good friends. So I don't think the red clover, which will not need the good offices of the bumble-bees till the following June, will be much the worse off for the respite the mice have had in the autumn through some temporary scarcity of cats, owls, or stoats. The whole questson is too complicated to allow me to speak very confidently, but I think we should at least endeavour to discriminate clearly between the two points of view.

There are difficulties, no doubt, in the way of our believing that we live in a fully crowded world. One is inclined to argue that it would be injurious, not only to the weaker individuals, whom the competition must kill, but to the health and general physical condition of all the individuals. But

we must remember that it suffices to keep an animal down by the law of competition, if food or some other necessary is scarce for a part of the year, or at some given stage, it may be only a short stage, in the term of the animal's life. For example, I think the frog, however much it is preyed on by enemies, is as common in Ireland as it could possibly be. There may be plenty of feeding-ground for more frogs; but are there any additional nurseries, or any more accommodation in existing nurseries, for more tadpoles? It seems to me that every spring the maximum quantity of frog-spawn that all the shallow ditches and suitable bog-pools can hold is deposited in those places. A great many of these pools dry up, as often as not before any of the tadpoles are able to live out of the water, and even among the pools that don't dry altogether, a great many shrink so much that the poor tadpoles find themselves inhabiting a sort of Black Hole of Calcutta, and very few of them live to become frogs. But allowing that they all became frogs, it still stands to reason that no greater number can be reared the next year or the next year, because there is no room for more spawn. This may keep the number of frogs, as I have before suggested that competition for breeding-grounds may keep the number of birds, permanently fixed at a number possibly somewhat smaller than that which could find subsistence in the country. So, when we talk of a fully crowded world, it does not follow that every or indeed any species of animal, during the greater part of its life, is so numerous as to endanger either the permanence of its food supply or the maintenance of its health.

But that many animals live *near* this high-water mark we also have ample proof. When we look to cases like that of the vole-plague, which occasionally devastates neighbouring countries—for example, the great vole-plague that occurred in Scotland in 1892, and the accounts of which made us all feel thankful for the complete absence of voles from the Irish fauna—we find that though hawks and owls and buzzards and weasels and stoats and foxes invariably multiply round the affected area and prey extensively on the voles, it is not to their efforts that the creatures succumb in the end. The voles apparently go on multiplying till their numbers produce

disease, and then they die off, sometimes so quickly that, as Blasius puts it, the whole race seems to have disappeared from the earth as if by magic. In the same way, it appears that when toads become extremely numerous, as they did in South Wales in 1872, they are attacked by a disease which is believed to be caused—at any rate it is aggravated—by blue-bottle flies. In 1872, according to observations lately quoted by Mr. Distant in the *Zoologist*[1], there was quite an epidemic of this disorder among the toads about Tenby, and in the following year very few toads could be seen; but those that were seen were free from disease. I have a note of my own, taken in May, 1881, that bumble-bees were at that time unusually abundant in Co. Wexford; but they were succumbing in great numbers to the attacks of parasitic enemies, from which none of the bees seemed free; the walks were strewn with dying and helpless bees, whose misfortunes were, I believe, largely a consequence of their own excessive numbers. If the red clover had suffered in consequence, it would have been almost possible to argue that cats, which were rather numerous in the neighbourhood, had done the clover harm by destroying too many of the mice that might otherwise, by their ravages, have prevented the bumble-bees from becoming too abundant for their own health. Then it may be remembered that in the autumn of 1897 there were many letters in the *Irish Naturalist* and elsewhere on the great scarcity of wasps. Most of those who wrote testified that they had never known such a scarcity; but the previous year, the hot dry summer of 1896, had been remarkable for the enormous numbers of wasps, and so had the spring of 1897 itself for the number of queens, of which Mr. R. M. Barrington's figures showed that the number destroyed at Fassaroe that spring broke his record. I may add that a similar superabundance of wasps in the autumn of 1898 and the spring of 1896 was followed by a similar remarkable absence of wasps, at least in Co. Wexford, in the autumn of 1899. I do not think these abrupt changes are accidental.[2] I would go a little further

[1] Vol. ix. (4th ser.) 1905, p. 338.

[2] Mr. Barrington has since informed me that the number of queen wasps destroyed at Fassaroe in the spring of 1905 was yet greater than in any previous year, and during the autumn that followed there were again practically no wasps.

and draw attention to the fact that the disappearance of the quail from Ireland, through causes which have never been satisfactorily explained, was preceded by a great increase in the numbers of that bird. Thompson, when he published the second volume of his "Natural History of Ireland" in 1850, observed that the quail had of late decreased in England, but had somewhat increased, in his opinion, in Scotland, and was "decidedly on the increase" in Ireland. Thirty years later, by common agreement, the quail in Ireland was extinct. From all these cases I think we may judge that sudden increase of any species is very apt to culminate in a great reaction. Animals have, in fact, to compete with one another not only for the bare necessaries of life, but further to secure those conditions which will tend to generate healthy existence.

In connection with this whole subject the field for observation and for constant accumulation of data is very large. Observations are wanted as to the relative density of different species, as to the extent to which that density may vary in different years, and as to the general conditions which seem to accompany or cause variation in a given direction. We have not often opportunities for observing competition of that unrelenting kind which takes place when two species of almost exactly similar requirements and habits are brought into contact. That sort of competition was exemplified when the brown rat arrived in these islands and found them already inhabited by a black rat; the requirements of the two were so much the same that the competition could only end, as it did, in the extermination of the weaker, which happened to be the black rat. But competition of a less obtrusive kind is always to be observed. For a number of years I was annually struck by the fact that the swarms of wasps which gather nectar so abundantly from the flowers of the figwort were not the common wasp, but the tree wasp (*Vespa sylvestris*), while around any other flower or fruit at which wasps assemble I might search all day and not find a tree wasp at all. I was led to the conclusion that the ground-building common wasp did not care for figwort. But in the autumn of 1900, for some reason, there were scarcely any tree wasps, and the figwort (about Ballyhyland) was as full of wasps as ever, all belonging to the ground-building kinds (*Vespa vulgaris*, *V. germanica*,

and *V. rufa*), that were absent from it in other years. There could be no explanation except that their absence in other years was due to fear of the stronger tree wasp. That, I think, is a very curious case of unobtrusive competition, in which things are so adjusted that physical mastery remains with one side, while that other form of success which results in numerical preponderance lies overwhelmingly on the other; for ground wasps, as every one knows, are extremely common, while tree wasps are at least comparatively scarce.

The universality of this tendency to compete seems to me unfavourable to any doctrine which would make the great struggle of the animal world a struggle with outside forces; but my object to-night has not been to go into the question exhaustively, but to ask attention to the discrepancies that have, I think, rather seriously prejudiced attempts to comprehend it.

Ballyhyland, Co. Wexford.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of Swans from Mr. Bolton, and a pair of European Cranes from Mr. J. N. Lentaigne. Two very small Shetland ponies have arrived, and it is hoped that they will be of service during the summer in carrying children through the Gardens.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

MARCH 6.—The President, Professor Symington, F.R.S., in the chair. R. M. HENRY, M.A., read a paper on "Magic in the Greek and Roman World." Professor GREGG WILSON, D.Sc., read a report on the work of the Marine Laboratory at Larne. He stated that research work had been steadily gone on with, old investigations having been continued and new started. Work at the Herring had been continued, and the investigations into sea drift had been continued, with interesting results. He explained the great and increasing need for a properly-equipped sea-water aquarium, and appealed to the public of the North of Ireland for funds to build a modern laboratory and aquarium at Larne Harbour, or at some other seaside resort in Down or Antrim.

IRISH SOCIETY FOR THE PROTECTION OF BIRDS.

This Society has issued in pamphlet form the address on the history and present state of bird protection delivered at the annual meeting in January by Mr. George May; and also in very handy form a little leaflet summarizing and explaining the various bird protection Acts, and instructing persons interested in birds as to how they can assist the cause of bird protection. Copies of both may be obtained from Miss Constance Pim, Hon. Sec., Charleville, Blackrock, Co. Dublin.

BELFAST NATURALISTS' FIELD CLUB.

FEBRUARY 14.—GEOLOGICAL SECTION.—The Chairman of the section (G. C. GOUGH, B.Sc., F.G.S.) gave a talk on the "Age of the Earth," the President of the Club (Mr. W. H. Phillips) being in the chair.

After the address a long discussion took place, those taking part being C. A. Cunningham, W. Gray, W. J. C. Tomlinson, John Carson, and T. Anderson. Mr. Gough having replied, the proceedings closed.

FEBRUARY 20.—The President (W. H. Phillips) in the chair. A. DEANE, the Curator of the Municipal Museum, lectured on "Wood, its Natural History and Identification," illustrated by specimens of timber and lantern slides. The physiology of the structure of wood was thoroughly explained in minute detail. The lecturer laid stress upon the fact that any one taking up the classification of wood, as a study, would have the satisfaction of finding himself practically on untrodden ground. A scientific key was wanted, but until more investigation was accomplished, such a key could not be attempted in a satisfactory way. R. Welch, W. Gray, and H. L. Orr spoke to the paper, and the lecturer replied.

FEBRUARY 28.—Robert Patterson (Vice-President) in the chair. HUGH LAMONT ORR read a paper on "Simple Mounts for Common Objects," and showed a large number of specimens which he had mounted by his method, including birds' eggs, birds' nests, butterflies, beetles, etc. He gave a practical demonstration of how to make one of his mounts, which was much appreciated by the members present. The Vice-President, W. Gray, W. H. Gallway, N. H. Foster, R. May, and W. H. Robinson, all spoke after the demonstration, testifying to the value of Mr. Orr's paper and to the neatness of his mounts. G. Donaldson (Hon. Sec.) afterwards gave a demonstration of another method of mounting specimens.

MARCH 7.—The President (W. H. Phillips) in the chair. J. C. TOMLINSON read a paper on "The Evolution of the Mourne Mountains." He referred to the origin of this group of granite mountains, and contrasted their mode of formation with that of the basaltic hills of Antrim, and went on to point out the subsequent causes to which they owed their present form. W. H. Milligan, W. Gray, J. Strachan, R. May, Rev. P. Quail, and Robert Patterson, discussed the paper.

TYRONE NATURALISTS' FIELD CLUB.

FEBRUARY 23.—Mr. James Dickson, J.P., in the chair. NEVIN H. FOSTER, of Hillsborough, lectured before a large audience on the "Feathered World," dealing especially with Irish birds and their habits.

DUBLIN NATURALISTS' FIELD CLUB.

FEBRUARY 10.—EXCURSION TO KILLINEY.—The Club, under the conductorship of J. de W. Hinch, visited the junction of the granite with the Silurian slates. The section on the sea-shore yielded a number of minerals, including andalusite, microcline, etc. Return to Dalkey Station was made over Obelisk Hill.

FEBRUARY 13.—The third meeting of the Session was held in the Royal Irish Academy House—G. H. Pethybridge in the chair. C. MURRAY, B.A., read a paper on "The Occurrence of Animal Remains at Loughshinny." F. O'B. ELLISON, B.A. (Hon. Sec.), then read a paper on "Bacterial Disease in Plants." Mr. Willcox displayed a number of minerals obtained on the previous Saturday at Killiney.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY 14.—The Club met at Leinster House. Dr. R. F. Scharff (President) in the chair.

JOHN A. CLARKE exhibited films prepared from blood of cattle suffering from red-water, stained to show the sporozoan parasite *Piroplasma bigeminum* in the red corpuscles.

Prof. G. H. CARPENTER showed eggs of the Ox Warble fly (*Hypoderma bovis*) and demonstrated the small, ovoid, grooved process by means of which the eggs are fixed in rows to the hairs of the cattle.

A. R. NICHOLS showed specimens of the polyzoon *Hypophorella expansa*, Ehlers, discovered by him in tubes of Chaetopterus dredged by the late A. G. More in Broadhaven in 1873. This interesting addition to the Irish marine fauna is described at length on p. 87 *supra*.

F. W. MOORE exhibited a section through a piece of wood of the Victoria plum. The section was taken from a twig which had been cut back in April, 1905. The wood just below the cut had become coloured bright red, the colour extending about half way through the shoot, and for less than quarter of an inch in length. The rest of the shoot being normal in colour the contrast was remarkable.

J. N. HALBERT exhibited mounted specimens of a common and destructive mealy bug (*Dactylopius citri*) found in numbers on grapes.

Dr. G. H. PETHYBRIDGE showed sections of the leaves of *Andromeda Polifolia*, L. attacked by the parasitic fungus *Rhytisma andromedae*, Pers., recently recorded as new to Ireland (*Proc. R.I.A.*, xxv., B. no. 6, p. 164).

NOTES.

BOTANY.

Porella lævigata Lindb., var. nov. killarniensis.

In the *Journal of Botany* for March, Mr. W. H. Pearson describes under the above name a plant collected by S. A. Stewart and G. A. Holt at Muckross in 1885, and by himself in Torc Wood in 1905.

ZOOLOGY.

New Crustacea from the West Coast.

Mr. S. H. Kemp describes in the *Annals and Magazine of Natural History* (vol. xvii., 7th ss., 1906) two new species of Carida from deep water, one of these belongs to a genus (Leontocaris) which had only recently been founded by Stebbing for some species from South Africa. The other, which the author has named *Aegeon Brendani*, after St. Brendan, was obtained in about 300 fathoms off the Tearaght Lighthouse in Co. Kerry. Only short descriptions without figures are given, but the author promises a full illustrated account in the forthcoming Report of the Sea and Inland Fisheries of Ireland.

Buccinum and Patella Kjökken-mödding at Cranfield, Co. Down.

Kitchen middens of the shells of various species of marine mollusca are common on the sandhills of North Down, Antrim, Derry, Donegal, Galway, &c. The great mass of material present with broken bones is usually a mixture of Littorina, Patella, Mytilus, Ostrea; and occasionally broken Purpura, as in the case of the Dogs' Bay[1] and Melmore, Rosapenna shell-mounds. Much smaller proportions of other species occur, including sometimes a few *Buccinum undatum*. While searching for land shells lately on Cranfield Point with J. N. Milne and A. W. Stelfox, we came on a shell-midden composed mainly of the last, with a proportion of Patella and an odd *Mytilus edulis*. Some bones were present in the "black band" in a very friable condition, much more so than usual, this likely due to the fact that the dunes here are not high and are highly silicious. The percolating water in that case would be more likely to dissolve the lime than if the dunes were mainly calcareous as in many west coast sandhills. No flints or pottery fragments were noticed, though Mr. Robert Bell tells me that many stone implements are found in the ploughed fields of this south-east corner of Down.

Belfast. R. Welch.

[1] Standen, Journ. of Conch., vol. viii., 1896. Plates v., vi. and vii.

Helicella zakarensis in Co. Down.

Some years ago, while staying at Rostrevor, I collected some land mollusca in the ruins of a cottage about a mile from that place, on the road to Rathfryland *via* Mayobridge. The majority were *H. rufescens*, but among these was a shell which, at the time, I thought was a specimen of *H. pisana*, and knowing that this species was found on the Louth and Meath coasts, it seemed to me more than probable that it had come from there. It did not happen to attract my attention again until about a year ago, when I came across it, and noticed that it was much flatter than *H. pisana*, finely striated, and had a very wide umbilicus, more like that of *H. itala* (*ericetorum*). In colour it was pale brown, with darker blotches of the same, in that respect somewhat like var. *ornata* of *H. virgata*. The striations were its most distinguishing characteristic, being very regular and fine. The specimen was alive, but not full grown, being about 15mm. in diameter, and having five whorls, whereas a *H. pisana* of the same measurement has only four whorls. None of the other xerophile species which are common on many parts of the Irish coast are found at Rostrevor, though two of them have been found lately at Cranfield Point, about ten miles further south. Not being able to name the shell myself, I passed it on to Mr. Welch, and he forwarded it to several experts, finally sending it to Messrs. Kennard and B. B. Woodward, of London, who compared it with specimens in the Norman collection at the British Museum, and came to the conclusion that it was a young specimen of *Helicella zakarensis* Kobelt. The following is an extract from a letter of Mr. A. S. Kennard's to Mr. Welch:—"We at once rejected *H. virgata* as clean out of it. It was a young shell, perhaps two-thirds grown, so it could not be that species, and when we got a lens on it and saw the fine striæ, perfectly regular, we rejected *H. pisana*. Then came the great question—what is it? Our first surmise was *Helicella affinior*, Debeaux, from Oran, but it could not be that, though near to it, and a similar result was meted out to *H. cyclostoma*, Bourg., from Oran. We could see at once that its true affinities were North African, and then we spotted *Helicella zakarensis*, Kobelt, from Drab-el-Mizan, Kabylie (Algiers), and we cannot separate it from this form." Mr. Welch also had some correspondence with Dr. W. Kobelt, of Schwanheim, the original finder of the shell in Algiers, and I quote below his description of the habitat—"I described *Helicella zakarensis* in the fourth volume of the 'Iconographie,' second series, p. 77, pl. 110, figs. 659–660, together with the next allied forms, *H. calopsis*, Bourg., and *H. calida*, M. The three species form a group confined to Mount Zakar, and are not found eastward or westward, where I also collected for some weeks. At Cherchel, near the coast, only *H. calopsis* is found, and I doubt whether the species may have been transported to Ireland from the summit of Mount Zakar, as there is no communication between the bains of Hammam Rizka or Milianoh on the Zakar and the coast." Mr. Welch and myself paid a special visit to Rostrevor, and searched the spot carefully, on 17th September, 1905, but found no trace of any colony. Several theories have been advanced in order to

account for these southern shells turning up now and then in Ireland. The finding of *Helix limbata* at Belfast (*I.N.*, vol. vii, p. 150) is a case in point, but there the animal was living on a hedge bordering a nursery that imports plants from southern France, and it was comparatively easy in this instance to imagine eggs, or even the shells themselves, being carried in the roots of these plants. At Rostrevor, however, the conditions were quite different, the habitat being among nettles growing on the ruined wall of the cottage, and a fair distance from any garden or demesne. Rostrevor House, the most likely place in the neighbourhood to which foreign plants might have been imported, is almost a mile away, and Sir John Ross of Bladensburg, who has taken a keen interest in the find, states that although he has imported plants from Rovelli, and from Pallanza on Lago Maggiore, in Northern Italy, he has not received any from more southerly localities. He states, however, that the nurseries at these places are often stocked with plants from Algiers and other parts of North Africa If the shell had been found in or close to the demesne one might have thought this a most likely method of introduction, but the distance seems to make this doubtful. Of course, there still remains the old theory of carriage attached to a bird's foot, but this does not seem feasible in a case where the distance is so enormous as that between Algiers and Rostrevor, unless it was only thus carried from the demesne after being introduced there with plants.

A. W. Stelfox.

Belfast.

Helix virgata in Co. Down.

Well over half a century has now elapsed since the only other xerophile mollusk hitherto known to live in Down (*Helix acuta*) was recorded. *H. virgata* was known to live in the adjacent counties, north and south, but the keenest search failed to discover any trace of it in the area between Ballycastle, in North Antrim, and Greenore, Co. Louth, a coast line of about 270 miles, till a month ago, when another Antrim locality was found at Magheramorne. During recent years A. W. Stelfox and R. Welch made careful search for it in many localities in the north and east of the county, but without success. They finally concluded that unless it lived between Greencastle and Cranfield Point (the only limestone area of the county) it was unlikely to be found. I joined them in a special search for it, and we paid a visit to Greenore on 13th February, and crossed by the steam ferry to the Co. Down side. Almost at once we found *H. virgata*. It is abundant along the edge of the raised beach, also among the sand-hills all the way to Cranfield Point. Many were alive, and evidently feeding on the plants of the sand-hills.

It may interest the student of variation to know that, unlike the Ballycastle *H. virgata*, the shells are much varied in size, colour and markings. Some specimens are almost black, others are white, with translucent bands, but all have the dark nucleus. They seem also more variable than those on the opposite Co. Louth coast.

J. N. Milne.

Belfast.

Little Owl in Ireland.

A specimen of the Little Owl (*Carine noctua*, Scop.) was presented to the Natural History Museum, Dublin, in November, 1903, by Sir Anthony Weldon, Bart., on whose property at Kilmorony, Athy, Co. Kildare, it had been caught the previous June in a trap set for hawks, &c. The bird had been observed in the neighbourhood in February of the same year, but Sir Anthony would not allow it to be shot.

Although the Little Owl is a common European species, it is only an accidental visitor to England, and there is no record of a specimen having been previously obtained in Ireland. Little Owls are sometimes kept in confinement, and it is possible that the bird had escaped from captivity.

A. R. Nichols.

Dublin Museum.

Pied Blackbirds near Poyntzpass.

While driving in this neighbourhood I have noticed three Blackbirds with white markings—one had the whole back and part of its wings white, the second part of the wing and tail, and the third part of its tail, white. It seems remarkable that there should be so many pied birds in one locality, and I think it worth noting. I am afraid the first has been shot for I have not seen it latterly. I may mention that Blackbirds are very numerous here.

W. F. Johnson.

Acton Glebe, Poyntzpass.

Lapland Bunting in Ireland.

On the 27th January a bird catcher brought me a bird taken in his net with some common Linnets near Kilbarrack Churchyard, Co. Dublin. I showed the bird next day to Mr. R. M. Barrington, who confirmed my opinion that it was a Lapland Bunting (*Plectrophanes lapponicus*), a male in winter plumage. This is the second recorded instance of this rare Bunting in Ireland; the first was found dead at Fastnet Lighthouse 16th October, 1887, and is now in Mr. Barrington's collection; the present specimen has been secured for our National Museum.

W. J. Williams.

Dame Street, Dublin.

A Corncrake in February.

A Corncrake in fat condition was shot at Markethill, Co. Armagh, on the 2nd February. On carefully examining the specimen the wing was found to have been broken, but the bones had joined and all outward signs of wound had disappeared. This no doubt accounted for the bird wintering in Ireland, although it was well able to fly.

W. J. Williams,

Dame Street, Dublin.

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DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
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SOME POINTS REGARDING ANIMAL COLORATION.

BY PROFESSOR RICHARD J. ANDERSON, M.D., M.A.

Most people who are interested in the relations of things in nature know the main facts bearing on mimicry and protective coloration. The shapes of animals and plants serve also in the same direction, as is well known, and even the character of the shading helps to make a curved animal look flat and thus escape notice. The following notes will appear not unworthy of attention, because of the great importance one attaches to the general facts regarding mimicry and coloration.

Taking conspicuously coloured objects, it is evident that the colour is more or less conspicuous, the more or less the colour has free room to assert itself by contrast or individual assertion, or by the object receiving light from a differently coloured surface, provided the colour reflected approaches the complementary colour. It is obvious that green and red are complementary provided the proper shades be taken. If the light be so arranged that the red object receive green rays reflected or rays transmitted, then, very obviously in the latter and less so in the former case, the red colour becomes dark. Hence a red object may seem dark or even black. If the medium be blue or green water, red may be as effective as black. Red rays may as effectively disguise a green object as if it were black. It is said that *great thickness* of a blue medium may give a red character to the transmitted rays. Whatever the advantage that may accrue to an animal possessed of conspicuous spots, it seems clear that the spots may be affected by the nature of the light through which these spots must make themselves felt. If the spots be rendered very dark whilst the ground harmonizes with the medium, then these spots may be the only clue to the whereabouts of the animal. It happens, however, that scent and hearing are both useful adjuncts of unquestionable importance in mammals. A hint soon becomes sufficient for the trained eye of the bird.

A number of pictures representing flags of various nations were taken. The light was such that one could read words half an inch and an inch in size. The blues in the Stars and Stripes were pale, and the red dark—nearly black. The Union Jack gave the crosses black, the blue a dark gray, while the white became dirty white. The Royal Standard showed red as black; blue as gray; yellow as dark gray. The dark green of the Irish flag and the corner Jack get black, and the harp appears light in colour. The Lion of Scotland looked very black, whilst the yellow got pale, two dark lines appearing round the border. The American Jack showed white points on a dark ground, whilst the Standard showed black and white stripes, and in the corner greyish white spots on a dark ground; all this in a dull light of the nature referred to above. One may enlarge the series, but enough has been said to show that light colours are in some cases scarcely distinguishable from white and gray, whilst dark colours are as difficult to distinguish from black. Hence may come a condition in which things harmonize with the sky on the one hand or with a black background on the other. It is of course scarcely possible to draw an animal against a dull background without a contrast. I think Ruskin speaks generally against drawing figures in a landscape with a background of mountain or trees. It is evident enough that the sky appearing through trees will disguise gray, bluish, or other pale colours, whilst a shady wood prevents dark objects from being seen distinctly, if at all, just as much noise prevents one from distinguishing sounds agreeable or the reverse; so that considerations of safety may suggest to some animals the advantage of hiding near a place whence loud sounds arise. And so darkness or dulness—an advantage produced by a different light—helps the disguise. The advantages are not learned by those animals, which often escape, but become ultimately caught by trying the same plan "once too often" for the trained eye of a bird.

There comes in also the question of brilliancy. The mean standard, under ordinary circumstances, is the colour as it appears in a white or pale yellow light, but there are then light shades of red and dark shades. These shades, conspicuously different in a bright white light and recognizable, are still different but not easily recognized when the light diminishes

much beyond dusk. The same holds for shades of blue and several other colours. Thus, pink paper appeared pale pink with a light (white) which is noted as "dusk," "dirty" white was the colour with still less light, whilst the colour is marked as "pale," when all trace of red had disappeared. Smooth orange-coloured paper seemed bluish in a "dusk," and soon became black. This colour it assumed when pink became a dirty white. Rough orange paper appeared even darker, whilst green paper was in "dusk" yellow, then in increasing darkness white. Red became darkish and even blackish. Yellow, which is almost as conspicuous as white, became whitish, which was succeeded by pale white. The disadvantage of colouring walls red has been long recognized. Red walls do not help one to find a gate on a moderately dark night unless the gate be painted white. White, in any case, is much better to mark walls or wires, or, failing this, a pale colour. When we take a greater series of colours—say, forty fairly well known colours—the general facts are the same. Colours that in bright light seem so important become less conspicuous in the dusk and lose their character before we are unable to distinguish between black and white sufficiently well to identify printed words that indicate the name.

Cardinal gets crimson and black, but scarlet gets light crimson and then dark red. The darker shades of terra cotta become black soon, but the lighter get brown before they get black. Navy blue gets soon black. Light blues become dark and gradually black, or pale according to the degree of lightness. Thus, palest blue gets first pale blue; turquoise gets pale blue, then pale; dark green grows black in the failing light; and palest green becomes bluish white and then pale.

When we try to apply observations to animals without actually noting the demeanour of the animals, then indeed is it difficult to be sure that the results are correct, for the mode of aggregation of the coloured particles in the skin, hair, or feathers affects the result. It has been proved that the superficial layer alone may not produce the full effect observed. One notices that the same surface may appear to reflect and absorb in an irregular manner, and this may be due to the aggregation of the particles.

One may begin by noting the effects of increasing darkness on the landscape and the animals. The dark foliaged trees become darker and not distinguishable from black. Where these trees cast a shade or appear against a dark rocky ground, the intervals between the branches may get quite dark first. The dark red coloured cattle get black and may become with their darkening colour quite inconspicuous. If they are partly white the white shows long after the red disappears in the shade of trees; if the incidence of the light be favourable the oxen may be unrecognisable, when a white wall or even white sheep show against a dark ground. The incidence of the light of course tells. In early morning dark red cattle are not at first recognised, nor dark coloured animals, which commonly select this time for grazing. The period of rest is, for some animals, the brightest time of the day and as we know, it is by no means unusual for animals both wild and tame to seek a shady dark place so that the dulness helps more than their colour to disguise the mammals or birds, in the thickets where they rest.

A large number of museum birds were taken and viewed in bright and dull lights—red and green parrots, woodpeckers, kingfishers, jungle-fowl, and others. The colours grew, generally speaking, darker, and became black if they happened to be of darker hue when beginning the observations, but white spots (*e.g.*, in Pomatorrhinus) and pale yellows and whites were visible as pale or grey spots after their recognition was impossible. Pigeons of different colours were noted as they appeared when the twilight was advancing into darkness. Light lavender owls get pale, but the form was not easily recognised. White fantails seemed bright, after copper-coloured Jacobins and Archangels were unrecognisable. The darker pigeons became soon inconspicuous in the shade. It is evident that the reflection from the leaves of trees may contribute to render birds of a complementary colour much less conspicuous.

It becomes impossible to distinguish dull white long before white houses or walls are invisible, so that sheep get dull and indistinguishable before a white wall or white house is, so that in the late evening and early morning the ordinary light is an effectual disguise. Sheep prefer the bare places in fields; in

such places gray rocks or white ones enable sheep to escape detection, even when things are fairly clear. Umbrageous foliage serves animals of darker hue. It is well known however that suggestions have been made with reference to the protective effect of light and shade for some animals. This problem has been discussed by most competent authorities, who have pointed out that the effect of light passing through trees is to throw a pattern on the ground that may serve the animal that is particularly coloured. It is suggested, however, that light and shade may not be simple in its origin and reflection, perhaps refraction of colours may lead to a disguise in animals that have a complementary coloration. It is only necessary to suggest that an animal if colour-blind would not be able to distinguish red from green, even though the light green of grass were the colour complementary to the red of certain animals.

It would seem that the bright, central portions of the spectrum retain their characters longer and show later than the colours at either end. The yellow and green seem more persistent than the light blue and orange. The yellow and green seem much more penetrating. It will be seen that the larger question which has received attention from so many competent authorities has not been touched upon in the present paper. Sensitiveness is so different in different animals and animal groups, whether we take the power of seeing with a greater or smaller amount of light, or the ability of distinguishing objects in light that may have an ultra-violet character, or with rays that are of any lower degree of refrangibility, that one cannot do more than allude to a subject the fringe of which only has been touched.

Queen's College, Galway.

SOME IRISH BRAMBLES.

BY R. A. PHILLIPS.

DURING the summer of 1905, I devoted some little time to a further study of the Rubi of the South of Ireland, and in the following notes record the results of the season's collecting.

All the specimens, which numbered about 170, were submitted to the Rev. W. Moyle Rogers who, with his usual kindness, has critically examined, named, and reported on each.

Most of the specimens were gathered within a radius of four miles from Cork city, the remainder being from the neighbourhoods of Glengarriff and Limerick. A large number, as the notes will show, are additions to the lists for these districts, while two (*R. curvidens* and the typical form of *R. longithyrsiger*) are certainly, and another (*R. Boreanus*) is probably, new to Ireland.

As is usually the case with collections of Irish Rubi, many of the specimens differ so much from recognized British forms that identification is at present impossible; further material and study may prove that some of them are new species or varieties. Hybrids are numerous, but their parentage is in nearly all cases more or less doubtful.

Mr. Rogers writes of one set of remarkable-looking specimens from Glengarriff—"it strongly recalls the plant named *R. Briggsii* and described by the late Rev. A. Bloxam in Jour. Bot. 1869, 33, and as represented by Mr. Briggs's own specimens now in my herbarium. Mr. Briggs, however, before his death had ceased interesting himself in this plant as probably an anomalous form or hybrid"

In the following, additions to the county or vice-county lists of "Irish Topographical Botany" are indicated by having the county names printed in capitals. Most of the species new to the divisions of Cork are also additions to the flora of the county as a whole.

Rubus argenteus, Wh. & N. (*R erythrinus*, Genev., auct. brit. prius).

4. CORK MID. By the Lee at Carrigrohane.

R. dumnoniensis, Bab.

5. CORK E. By the side of a field near Queenstown Junction.

R. pulcherrimus, Neum.

8. Limerick. By the White River at Loghill, and by ditches near the Ballinacurra estuary.

R. Selmeri, Lindeb

9. Clare. Near Kilkee, Dr. George Fogerty.

R. Godronl, Lee and Lam. (*R. argentatus,* P. J. Muell, auct. brit prius)

4. CORK MID. By the Lee at Carrigrohane, an exceptionally glandular form or variety.

5. CORK E. The Glen, Cork (forma *glandulosa*).

8. Limerick. Roadside near Limerick.

R. robustus, P. J. Muell.

3. CORK W. Glengarriff and near Schull

5. CORK E Near Ballyvolane, Cork.

R. silvaticus, Wh. & N.

3. CORK W. Woods at Glengarriff.

4. CORK MID. By the River Lee at Carrigrohane.

5. CORK E Near Glanmire.

8. LIMERICK. By the White River, Loghill.

R. myricæ, Focke, var. **hesperius,** Rogers.

5. CORK E. The Glen, Cork, and between Mayfield and Glanmire. An interesting extension of the range of this plant, found last year in Co. Limerick, previously known only from Lough Corrib in Galway and Mayo.

R. Questierii, Lefv. & Muell.

3. Cork W. Woods at Glengarriff.

5. CORK E. Woods at Glanmire, and The Glen, Cork.

R. Sprengelii, Weihe.

5. Cork E. The Glen, Cork

R. hypoleucus, Lefv. & Muell. (*R. micans,* Gren. & Godr., auct. brit. prius).

5. CORK E. Near Ballyvolane, Cork.

R. pyramidalis, Kalt.

3. CORK W. At Glengarriff (forma *hirsutissima*).

5. CORK E. Fields between Mayfield and Glanmire.

R. leucostachys, Schleich.

4. CORK MID. Hedgerow at Douglas.

R. Boreanus, Genev.

4. CORK MID. Near Douglas.

5. CORK E. The Glen, Cork. Mr. Rogers writes of these specimens—"A variety with exceptionally broad and abruptly cuspidate leaflets. Record for Cork, and perhaps for Ireland; see *Jour. Bot.*, 1901, 381, for the only Irish example (?), much more doubtful than this."

R. curvidens, A. Ley.

5. CORK E. Lota Wood, Glanmire. New for Ireland, but not identical with the English plant. Mr. Rogers says of it—"In panicle undistinguishable from Mr. Ley's "Sellack, Meadow Place Wood" plant, but differing from his specimens in glabrous stem and shorter, roundish-obovate leaflets, but I believe it cannot be kept from it specifically."

R. infestus, Weihe.
8. Limerick Near Foynes.

R. echinatus, Lindl.
5. Cork E. The Glen, Cork.

R. oligocladus, Muell. & Lefv.
4. Cork Mid. By the River Lee at Carrigrohane.
5. Cork E. The Glen, Cork (f. *umbrosa*). These specimens were seen by the Rev. A. Ley, who agreed with Mr. Rogers in thus naming them.

R. Babingtonii, Bell-Salt.
5. Cork E. The Glen, Cork, where it seems to be plentiful.

R. mutabilis, Genev.
5. Cork E. Between Glanmire and Mayfield, and plentiful in the Glen, Cork, where I first found it in 1904. A distinct and striking species.

R. scaber, Wh. & N.
5. Cork E. The Glen, Cork.

R. longithyrsiger, Bab. (type).
3. Cork W. Woods at Glengarriff. The first record for Ireland.

R. foliosus, Wh. & N.
3. Cork W. Woods at Glengarriff.
5. Cork E. Lota Wood, Glanmire (probably). New to Co. Cork, and hitherto recorded only from Down and Derry.

R. cognatus, N. E. Brown.
4. Cork Mid. Hedgerow near Douglas.
5. Cork E. Fields between Mayfield and Glanmire.

R. dasyphyllus, Rogers.
10. Tipperary N. Near Templemore. Specimens weak and uncharacteristic. A provisional record.

R. Marshallii, Focke & Rogers.
4. Cork Mid. Fields near Carrigrohane. Previously noted only from Co. Down.

R. dumetorum, Weihe.
5. Cork E. Glanmire and Queenstown Junction.
8. Limerick Near Newtown.

R. dumetorum, Weihe, var. **raduliformis,** A. Ley.
4. Cork Mid. By the Lee Fields near Cork.
5. Cork E. Glanmire and The Glen, Cork.
8. Limerick. By the Shannon near the Ballinacurra estuary. A variety not previously recorded for Ireland. All my specimens of this were shown to Mr. Ley, the original describer, who agrees with Mr. Rogers in their identification.

R. cæsius, Linn.
3. Cork W. Near Glengarriff.
5. Cork E. Near Ballyvolane, Cork. This is apparently a rare plant in Co. Cork.

Cork.

REVIEWS.

EVOLUTION FOR THE PEOPLE.

Darwinism and the Problems of Life: A Study of Familiar Animal Life. By CONRAD GUENTHER, Ph.D., Professor at the University of Freiburg in Baden. Translated from the third edition by JOSEPH MCCABE. Pp. 436. London: A. Owen & Co., 1906. Price 12*s.* 6*d.*

In this book the author seeks to bring before the average intelligent reader, who has no special knowledge of zoology, the evidence for the evolution theory that may be derived from a survey of the field of animal life. As might be expected from a colleague of the great Weismann, the presentation of the subject is frankly "neo-Darwinian." Not the Lamarckian factors only, and De Vries' doctrine of mutations, but Darwin's theory of sexual selection, and even Weismann's own contribution of germinal selection, are all rejected as needless accretions to that process of natural selection by which alone, so the author believes, the whole course of organic evolution can be explained.

The book begins with a vivid account of animal life in a continental forest, and from this starting-point the reader is led to a survey of the principal groups of animals from the Mammalia to the Protozoa. Unfortunately the chapters containing this survey are marred by such an array of errors that the book (which is entirely without illustrations) will prove most misleading as regards zoological facts to any non-scientific reader. For example, we are told (p. 155) that "frogs have only one chamber to the heart"; that in birds (p. 102) there is a "rigid pelvis formed by the fusion of a number of vertebræ," and that 'the crop supplies the place of teeth." Then, turning to the insects, we learn that (p. 202) "masticators" are present in "locusts, moths [!], and beetles, because they chew their food," and (p. 187) that in moths "the larva does not differ so much from the imago." Yet a few lines lower down we read, "it is otherwise with butterflies," and two pages further on we meet with "nocturnal butterflies (or moths)."

It would be insulting to Prof. Guenther to believe him capable of such blunders, and the use of the word "moths" in the two contradictory senses just quoted shows that the translator has but a scant knowledge either of zoology or of common English animal names. He calls the harmless Ring-snake, for example, an "adder." Yet there are not a few erroneous statements that can hardly be mistranslations. The footnote on pp. 202-3 implies that the triungulin larva of Strepsiptera enters the imago and not the larva of the hymenopterous host. The bird's wing is said (p. 157) to possess "rudiments of five fingers, though the archæopteryx had them well-developed and active." And it is stated incidentally that there are "many species" of Dipnoi (p. 151). Furthermore, the author is not sufficiently careful to distinguish between facts and theories in his

pleadings for the neo-Darwinian position. It is positively stated (p. 240) that the sessile condition of the eyes is a primitive character in the Crustacea, whereas evidence for the appendicular origin of these organs is constantly becoming stronger. Again (on p. 264), the author, stating that the Peripatids are "the most typical instance of a transitional form that we know," implies that the family represents a direct link in the descent of myriapods and insects from annelid worms. No zoologist doubts that the Peripatids are, in several respects at least, transitional forms, but there are many reasons for disbelieving that they stand in an ancestral position to the tracheate Arthropoda. The paragraph on p. 37, summarizing the geological history of animal life, is seriously misleading, for the author states that "nowhere [in the strata] do we find the animals of our own time, or, at all events, only in the very latest periods of the earth's history." The persistence of certain generic types through many of the great periods to the present day—a fact which tells strongly in favour of the Darwinian position—would certainly not be inferred from such a sentence by the average reader. And despite the clearness of his style and the assurance with which he writes, considerable doubt as to his views on the course of evolution may remain in the student's mind. For while in many passages he rejects the theories of mutation and of discontinuous variation, he tells us (p. 158) that "the ancestors of all reptiles consisted of a pair of amphibians that reached special conditions, and so their offspring formed a new class. These amphibians lived about the end of the Carboniferous period." The conception of the evolutionary process implied in such a statement as this, can only be matched in the writings of some extreme modern neo-Lamarckians, or in the famous "Vestiges" of sixty years ago.

The zoological portion of the book must thus be pronounced to a great extent untrustworthy. In the philosophical chapters with which it concludes, the translator seems to be more at home with his subject, and the author's arguments on the relations of Darwinism to the "problems of life," are put before the reader in a manner both forceful and vivid. Life, with its accompaniments of mind and will, is explicable, so our author urges, on mechanical principles, and since the whole organic world has become what it is by the unaided action of natural selection on fortuitous variations, any teleological factor is rigidly dismissed from the scientific conception of the evolutionary process. In our judgment, the neo-Darwinian position (in the author's sense of the "all-sufficiency of natural selection") is farther than ever from general acceptance, and we believe that were Darwin with us to-day, his reception of the light thrown on the course of variation by the work of De Vries and the Mendelians would be very different from that of the naturalists who claim to be exclusively his disciples. But despite his exclusively mechanical theory of evolution, Prof. Guenther admits that consciousness must ever be at the root of all human experience. Dismissing with some impatience the ethical systems founded on biological theory, he warns science not to overstep her proper sphere of enquiry; and, assuming finally a strongly

idealist position, he declares that the idea of duty is the beginning of all knowledge. Thus the impression left on the reader's mind as he closes the book is one of sharp antithesis—two apparently irreconcilable conceptions of his own being both claiming his allegiance. For the reconciliation and harmonizing of the material and the spiritual outlooks we need what underlies even the idea of duty—the faith that behind and working through that material universe which is possibly, though not certainly, explicable on the mechanical principles for which our author pleads, is the Divine Spirit to whom the spirit of man is akin.

G. H. C.

THE MOLLUSCA.

A Treatise on Zoology. Edited by E. Ray Lankaster, LL.D., F.R.S. Part V. **Mollusca.** By Paul Pelseneer, D.Sc. London: A. and C. Black. 1906. Pp. 355. Price 15*s*. net.

Prof. Pelseneer is best known among malacologists as the originator of the most recent and most reliable classification of the Lamellibranchia. At the suggestion of his former teacher, Prof. Ray Lankaster, that the gills might furnish characters of classificatory value, he worked out the anatomy of the group with considerable skill and patience. He constructed on this basis a new classification dividing the Lamellibranchia into five orders. Further researches convinced him that one of these, the "Pseudolamellibranchia," should be suppressed, and the suborders it contained be merged with the Filibranchia and Eulamellibranchia. This he has carried out in the present work. While these anatomical researches are of the greatest value to the systematist, it must not be forgotten that the shell of most Mollusca, with its infinite variety of valuable characters, will probably always remain as a basis for specific determination for palæontological purposes and for the general conchologist. It may be worthy of note that Prof. Pelseneer revived Goldfuss' old name of "Pelecypoda" for this class, which designation has since been largely adopted in text-books, though he himself now reverts again to De Blainville's name of "Lamellibranchia."

The system of the gill structure and the fundamental character upon which the classification is based are somewhat difficult to understand, and it would have been well if the author had given us a series of good diagrams representing the main features of the system.

Many excellent new figures have been introduced, and some attention at least has been paid to the life led by the living animal in the chapters on bionomics. This is a distinct improvement on some of the previous works of the series. Some of the illustrations, however, might with advantage have been left out. It is difficult to understand why the old and badly drawn figures of Férussac, Pfeiffer, and Reeve on page 183, which we have seen before in so many text-books, should have again been reproduced, when better ones might so easily have been obtained. The

slug with a tiled body and the common Roman snail, which is scarcely recognisable, are not in keeping with the other up-to-date figures.

A new feature in the work is the praiseworthy attempt to acquaint the student with such genera as he might procure in the British Islands, by marking them "British" (which we presume includes Irish). The author, however, does not seem to be thoroughly at home in the science of the geographical distribution of Mollusca, as he includes Zonites among the British genera, while the genus Hyalinia, or Vitrea, as it is often called, is not referred to at all. Moreover none of the following genera (all of which are British) are mentioned as such, viz., Amalia, Agriolimax, Punctum, Buliminus, Balea, Azeca, and Testacella.

These are probably slight oversights scarcely detracting from the real merit of the book, which is full of interesting and reliable matter. The text throughout never betrays the fact that the manuscript was written in French, the credit of the excellent translation being due to Dr. Gilbert Bourne of Oxford.

R. F. S.

THE BIRDS OF MAN.

The Birds of the Isle of Man. By P. G. Ralfe, M.B.O.U. Pp. lv. + 321. Fifty illustrations, and two maps. Edinburgh: David Douglas, 1905. Price 18*s.* net.

Mr. Ralfe has placed "Britannic" ornithologists under a debt of gratitude by the issue of the most excellent volume before us. An account of the birds of Man has been long required, and the expectations we had formed of the promised book have been realised on the whole. The introductory portion deals with a topographical description of the island. brief accounts of previous publications on Manx ornithology, and migration in Man, comparative notes on the birds, Manx bird-names, and a list of birds which are ascertained to have occurred in Man within the last century. Then follow 286 pages of detailed accounts of each species, and a bibliography, copies of local wild birds protection acts, addenda and index complete the volume. In the space of a brief notice it is not possible to exhaustively review the book, but some of the results of a careful study of it may be given. The volume treats of 183 Manx species, roughly classified as follows:—Resident and breeding 75; Regular Summer Migrants breeding 18; Regular Autumn, Winter or Spring Migrants not breeding 45; Occasional Visitants, 45. It will be seen how far these figures fall short of our Irish lists. Man agrees with Ireland, and differs from the opposite English counties, in the absence or rarity of various summer migrants, such as the Blackcap, Garden Warbler, Wood Warbler, Redstart, Lesser Whitethroat, Yellow Wagtail, and Tree Pipit; and of the Marsh Tit, of the Carrion Crow, of the Woodpeckers, of the Tawny Owl, and of the Jay. It also agrees with

Ireland in the position, as breeding species, of the Grey Crow and the Black Guillemot. Curiously enough Man agrees with England and differs from Scotland and Ireland in the status of the Common Gull, though perhaps further investigation may modify this conclusion, as is hinted in a note in the addenda. It is surprising to find that the Barn Owl is almost unknown to Man, and there is no proof of it being anything but a mere straggler to the island. Only a few miles off—in Down and Antrim—the Barn Owl is so common as to be a recognised "ornament" in houses. On the other hand we find the Tree Sparrow resident and fairly well distributed in Man, and yet quite unknown on the shores of Ireland, 26 miles away. Similarly, it is strange to read that the Heron, which used to breed in Man, has now ceased to do so, although during the greater part of the year it seems to be far from uncommon. Several dissimilarities in the avifauna of the two islands could be noted of other species, but enough has been said to show how interesting the comparison is. One striking feature is that the "Manx" Shearwater does not now breed in the island at all.

Incidentally we may mention that Mr. Ralfe gives some information on the Land Mammals, Fresh-water Fish and Reptiles of the island. The Mammals are the Common and Long-eared Bats, the Lesser Shrew, the Irish form of the Stoat, the Long-tailed Field Mouse, the House Mouse, the Brown Rat, the Common Hare, Rabbit and Hedge-hog. The Fresh-water Fish are two varieties of the Stickleback, Salmon, Sea Trout, Trout, Eel, and Lampern. The Common Frog is said to have been introduced about two hundred years ago, and Man possesses two Lizards (*Lacerta vivipara* and *L. agilis*). Newts, Snakes, and Toads seem to be unknown. Regarding the Irish information contained in the book, we note that most of it has been taken from Ussher's "Birds of Ireland;" but we cannot understand how it is that the Guide issued by the Belfast Naturalists' Field Club in 1874 should have been consulted (according to the Bibliography), while the much fuller information contained in the Guide published by the same Club in 1902 seems to have been overlooked. Consequently, there are several misstatements and omissions concerning Down and Antrim which a reference to the latter book would have obviated. It is pleasing to see frequent reference made to the late A. G. More, and to our valued contributor Mr. C. B. Moffat. It is a pity that Mr. Ralfe did not adopt Mr. Ussher's method of conveying the gist of each article in a few lines at the beginning. One has to read through the whole description before one finds whether a certain bird really breeds or not, and indeed in several instances, the reader is left somewhat in doubt upon this point. On page liv. there is a curious error, where the Little Tern is put down as a resident.

These few blemishes do not, however, seriously detract from the value of a work which we can cordially recommend to the attention of all students of British and Irish Birds. The book is well printed and produced, and the numerous photographs add not a little to the interest of the volume.

R. P.

PLANT FORMATIONS OF THE DUBLIN MOUNTAINS.

The Vegetation of the District lying South of Dublin. By G. H. Pethybridge, Ph.D., B.Sc., and R. Lloyd Praeger, B.E., M.R.I.A. *Proceedings of the Royal Irish Academy*, xxv., B. Dec., 1905. Pp. 57. Coloured Map. Five plates. Price, 2*s*.

The publication of this paper marks the opening of a new era in the investigation of the plants of Ireland. The collector and enumerator of species has placed on record what plants are to be found, and during the last decade one of the authors of this paper has perfected the fragmentary county lists until they are now a representative census. The Watsonian side of distribution has also received attention, and the great botanical divisions of the Irish flora are known, as well as something of their origin. Here and there a County Flora deals specially with the plants of a district and their distribution. Thus, from the oft deprecated collecting of plants and making of lists, there has arisen a record of the plants of Ireland which has claims to be considered at least fairly complete. The progress, like that in most countries, has been mainly along floristic lines. Meanwhile, another branch of the out-door study of plants has been opening from a prolonged bud-stage, and the authors of this paper decided to test the merits of this recent growth, the study of plant associations. It is unnecessary to define or to describe this study, because in the introduction to the paper under review there is an excellent summary of the objects and the development of the subject. This introduction, although it forms the first part of the paper, was probably the last part written, because the authors state (p. 138): "We decided . . . to avoid reading up the detailed work done in Scotland and England, and thus to start devoid of preconceived notions as to what the associations (if any) might, could, would, or should be, and to let them force themselves upon us as they actually existed in this area." This was the best test to make, and the result was:—"We were not long in recognizing that associations did exist, and in deciding that they could be mapped, but only on a map of a fairly large scale." The writer of this review was in some measure the means of suggesting the study of Irish vegetation on these lines, for one of the authors was present at the Glasgow meeting of the British Association (1901), when an attempt was made to explain the work of Robert Smith (died 1899), and to encourage its development in Britain. The criticism of one who had already done so much topographical work as Mr. R. Lloyd Praeger was awaited with somewhat mixed feelings, and it was a relief when, in course of time, one learned that the method was approved, because from his many-sided investigations on the Irish flora, Mr Praeger was better prepared than most men to judge of its value. Hence, though at first sight "The Vegetation of the District South of Dublin" may appear to be merely of local interest, it has a much wider value as a study in plant geography, and is in reality an important contribution.

The district chosen for the survey is a good one for examining zones of vegetation. Starting from sea level, it includes a plain of cultivation which changes in the south into the granitic mass of the Wicklow Mountains, and rises to 2,473 feet on Kippure. A short account of the geology and physiography, and a general floristic account forms an Introduction. The main part of the paper is concerned with the plant associations. These fall into four zones—Seaside, Agrarian, Hill Pasture, and Moorland. The sea coast of this particular area is not, however, a good example of this zone, but it is satisfactory to find that in the area north of Dublin, which will, we hope, be the subject of a further paper, the authors will be able to deal more fully with this interesting form of vegetation. From our own experience, we are not surprised that the authors have decided to leave out of this paper the peculiar problems of the Agrarian or Farmland. The chief interest, therefore, centres in the zones of Hill Pasture and Moorland, where the influence of man is less evident. This is just the kind of vegetation which has been most thoroughly examined elsewhere, and one turns to the results of the Dublin District with interest. The results may be considered from three aspects:—(*a*) the methods of survey, (*b*) the map, (*c*) the text and illustrations descriptive of the plant associations.

The Methods of Survey.—The survey of this area of about 200 square miles was carried out during four years, and the authors point out the advantages and disadvantages of this system. The conclusions arrived at after several years are, we consider, more valuable than if they were the result of a short vacation study, such as some workers consider sufficient to grasp the vegetation of a district. If the work extends over a long period much depends on the method of taking notes. The system used in the Dublin District has been carefully thought out, and is a model for future workers. The authors used "six-inch" Ordnance Survey maps, and, by means of a system of initial letters, they record on the map the plants found; we have seen some of their field maps, and can vouch for the very careful way in which the area has been traversed acre by acre, and we can picture the wading over wet bog and the scrambling on rocky hill-sides in all kinds of weather. In addition to map records, a system of lists was also kept, and from these the plants of each association were finally determined. An example of these comparative results is given, which shows at once how the final lists of a plant association are arrived at. The system is that generally used, but it is a distinct advantage to have it described in detail, and a similar precision is strongly to be recommended to all who carry on this work.

The Vegetation Map.—The maps in papers of this kind always attract attention, and there, we believe, the interest of many a reader ceases. We have said before, and say again, that the map is only "the principal picture" illustrating the paper, and is *not* the paper. The map of the Dublin District has the particular interest that it is the first vegetation map printed throughout at the Ordnance Survey Office The colours

have been printed on the "one-inch" Ordnance maps, and the result is so satisfactory in clearness and detail that it is to be hoped the method will be followed in all future vegetation maps. The colour scheme has been adopted by the authors after careful consideration, and on grounds stated (p. 177). It differs to some extent from that used by other workers, and will probably be criticised on this account. It must be borne in mind, however, that the earlier colour-schemes were experimental, and that a standard scheme can only be prepared after the vegetation of the British Isles is better known than it is. The vegetation maps published up till now fall into two groups—those published on the "2 miles to an inch" maps (1 : 126720), and those on the "one inch to a mile" (1 : 63360). The Dublin District belongs to the "one inch" group, along with the maps of Westmoreland (*Geographical Journal*, March and Sept., 1904). Two different systems are represented on these maps : the "solid," where each association has a distinct colour (Dublin map), and the "dot and dash" system, where a few ground colours are used, and differences are indicated by dotting and cross-hatching. The "solid system" is certainly the most distinct on a map, but the other system aims at grouping the associations. Comparing the "one-inch" maps with the "half-inch," it is evident that the former allows of much greater detail being shown; thus, the associations designated as Pteris, Juncus, and Ulex in the Dublin map are too small to be separately coloured in a "half-inch" map, and are there included under some other colour, although described as separate associations in the text. It is easy to criticise, but it is no easy task to fix on a definite colour scheme. The Dublin map has many points of value which will aid in fixing such a system.

The Zones of Vegetation.—The district south of Dublin has not many features of interest as a woodland area, and in itself is not large enough to allow of much discussion regarding the distribution of trees. Compared with England and Scotland, we find a general agreement. Oak forest in the main valleys gives way to a Birch scrub in the uplands, with remains of Birch in the peat up to 1,700 feet. The existing plantations of Scots Pine are found on the moorland edge, but the existence of an earlier forest is indicated by stems found in the peat up to 1,250 feet. The occurrence of Ash with a Hazel scrub on the Mountain Limestone recalls what has been observed in the valleys of this geological formation in Yorkshire.

The Hill Pasture forms a zone on the upper limits of cultivation. In the earlier "half-inch" maps this was represented by one colour, but in the Dublin District map it is broken up into Pteris association, Nardus Heath, and two Ulex associations The main interest centres round the Bracken and Gorse associations, none of which have been so fully dealt with in any of the preceding British papers, but the limited extent of the Nardus Heath will be noted by workers in areas where this is a prominent association. The authors note a strong competition between Bracken and Gorse in which the Bracken is the aggressor.

Again, Bracken and Ling are competitors on undulating ground; Calluna occurs on the slopes exposed to the prevailing westerly winds, while Pteris occupies the sheltered slopes. There is evidence that the Bracken requires a fairly deep, well-drained soil, and, given this, its deep rhizomes, with their rapid apical growth, are capable of invading the more primitive Calluna and Gorse vegetation. These conclusions, arrived at on a favourable area, will serve as useful guides to other workers. The paper on the South Dublin District will be a landmark as a study of *Ulex Gallii* and *U. europæus*. The authors have demonstrated that over a wide area these form two distinct zones, *U. Gallii* the higher, *U. europæus* the lower. The reasons for this are suggested, but we hope that the authors will be able to make it the subject of more detailed study. The same distribution was pointed out to me some years ago by Mr. C. E. Moss as a result of his observations in Yorkshire, but the limited amount of Gorse did not allow of any definite conclusion being drawn up. Some readers of this paper may think that the distinction by colour on a map of this scale of two plants so closely allied as to be almost varieties is rather "fine." If such be the first impression, a careful reading of this paper will correct it. The two dominant plants—*U. europæus* and *U. Gallii*—are, as it happens nearly related, but the ecological features of the two associations are distinct in regard to plants present, and, better still, on comparing their growth—"The most marked change (in the *U. Gallii* association) is the smaller structure of the plants, the absence of tall-growing species, and of such as have large leaves; in short, a tendency to more pronounced xerophytism in character" (p. 154). Cases of nearly allied plants forming dominant species in associations characteristic of very different conditions are by no means rare, and our general impression is that varieties and sub-species of the systematists are in most cases the outcome of growth of the parent species under different external conditions. The study of the two Ulex associations in this paper will serve one good purpose if it only directs the attention of systematists to this aspect of ecology.

The Moorland zone includes the vegetation which caps the mountains. The six most important associations shown by colours on the map are:—Calluna, Vaccinium, Juncus, Eriophorum, Scirpus, and Racomitrium. The Calluna association is a familiar one in Britain, and in Dublin District occupies the greater part of the moorland. The authors record observations on its conditions of life, the chief of which is that it requires a well-drained, peaty soil. Vaccinium, which forms an association covering square miles in the Scottish Highlands, occurs only in a few places in the Dublin District, although the species of Vaccinium and other plants of the association are common in the other hill associations. The Juncus associations, which have already been referred to in other papers, were found so extensive in the Dublin District that a special colour has been assigned to them. The authors distinguish a Juncus-Polytrichum association, generally in wet places where springs emerge

on the hill sides, and a second Juncus association in the lower grounds. The distribution of species of Juncus and the plants occurring with them is another example of survey work where systematists would find a relation between the species and the soil-conditions. Where the peat bog becomes ill-drained and wet, Calluna loses its dominant place and gives way to other plants better adapted to the conditions. The authors record three of these associations—Eriophorum, Scirpus, and Racomitrium moors,—of which the two latter are new. The distinction between the Eriophorum and Scirpus moors does not appear to be strongly marked in this district, except in regard to abundance of cotton-grass in the one, and the Scirpus-sedge in the other. The authors are, however supported in their distinction of a Scirpus moor by some later observations made in the North-west of Scotland, and criticism which might be made ought to be reserved until greater areas of these inaccessible and difficult peat bogs have been surveyed. The Racomitrium association occupies small areas near the summits of the hill mass. The name is used to designate a somewhat mixed vegetation of Calluna, Eriophorum, and Scirpus, which has one common feature, the abundance of the moss *Racomitrium lanuginosum*. The association occupies bosses of peat with intervening wet hollows, and its characteristic appearance is shown by an excellent photograph It is an association which is probably not uncommon on summit peat-bogs, and we suspect that the recording of it has been overlooked by other workers. This paper has therefore added materially to our knowledge of the plants, which by their growth and decay have made most of our peat deposits, and it shows how much may be expected from future work on the vegetation of peat. Ireland, above all, offers such opportunities for observing plant life on peat-bogs, and for investigations on the history of peat, that it is to be hoped that Messrs. Pethybridge and Praeger may not only be enabled to give more time to this work, but may also be supported by assistance from others. The investigation of peat bogs is slow and arduous work, hardly to be undertaken seriously in snatches of leisure. In the peat we have a record of the succession of recent plant growth on the earth, and so far as Britain is concerned, the work of reading the record has scarcely begun. The "Vegetation of the District South of Dublin" in many other ways opens out a new field for the out-door botanist in Ireland. The Royal Irish Academy are to be congratulated on the excellent way in which this paper has been illustrated. If our hearty appreciation of the work of the authors is not obvious, then this review has failed in its object. To one who has watched the various papers on botanical survey in Britain grow in the field and come into print, it is interesting to see how each one opens out new questions and improves on its predecessor; this, the latest, has repeated history and stands as a model.

W. G. Smith.

The University, Leeds.

SPORT AND BIOLOGY

Recreations of a Naturalist. By JAMES EDMUND HARTING. Pp. xvi., 343. With eighty-one illustrations. London: T. Fisher Unwin. 1906. Price 15*s.* net.

The versatility of Mr. Harting's pen is well exemplified in his latest collection of essays, in which he touches in a pleasantly instructive manner on a number of the heterogeneous topics with which his experiences in out-door life and his extensive reading have brought him into contact. From the fascinations of falconry and the delights of deer-stalking Mr. Harting readily passes on to describe the pleasures of an ornithological ramble through the marshes in May, or of a day's punting in the "reedy labyrinths" of the Norfolk Broads. The author's special interest in the various old-fashioned devices for taking or killing wild creatures appears in his very readable article on the Pyrenean method of netting Woodpigeons, and still more strongly in that of the now much-decayed Wheatear-trapping industry that formerly brought such profits to the shepherds of the Sussex Downs. From another article we find that Mr. Harting believes in the fact of the Adder's taking her young for safety into her mouth, though a majority of English zoologists still doubt the reliability of the evidence for this habit. Taken all round, the volume is one that may be read with combined pleasure and profit; and it has also the merit of containing some excellent and dainty illustrations. On the special province of the *Irish Naturalist* the author hardly attempts to touch, and where he does so he shows that his reading on that subject has been singularly desultory. For instance, there is a chapter on the question what is the true Shamrock; but the principal recent authority referred to on that question is Messrs. Britten and Holland's "Directory of Plant Names" (1878–1886); and though there is a reference to Mr. Colgan's statement in the "Flora of County Dublin" that *Trifolium repens* and *T. dubium* are both worn extensively on St. Patrick's Day and in almost equal proportions, Mr. Harting has evidently not seen Mr. Colgan's important articles in the *Irish Naturalist* for August, 1892, and August, 1893, in which the subject was much more fully gone into than would have been in keeping with the plan of a county flora. Mr. Colgan's Royal Society of Antiquaries paper[1] on the Literature of the Shamrock would also have furnished Mr. Harting with much interesting matter of which readers of his book will now unhappily lose the benefit.

C. B. M.

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[1] *Journal*, R. Soc. Ant. Ireland, 1896, pp. 211–226, 349–361.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Silver Pheasant from Mr. C. G. Townsend, and a pair of Arctic Knots from Mr. H. B. Rathborne. Two Sooty Monkeys, two Yellow Baboons, three Mungooses, and two Shetland Sheep have been purchased; also three Penguins, which have been placed in the lake. A Black-striped Wallaby has been born in the Gardens.

The alterations to the Monkey House are in progress. When finished, there will be proper accommodation for Anthropoids, to whose quarters sufficient air and sun does not penetrate under existing conditions. A house for small Mammals is also being erected, which will lessen the crowding of various species in the present Monkey House.

DUBLIN MICROSCOPICAL CLUB.

March 14.—The Club met at Leinster House. Dr. R. F. Scharff (President), in the chair.

Dr. G. H. Pethybridge exhibited a section of a tomato fruit showing parasitic bacteria *in situ* in the cells. This form of tomato disease is characterised by the appearance and gradual spreading of a black spot at the stigmatic end of the fruit. The disease was first recorded from the north of France in 1895 by Prillieux, and was proved by him to be due to bacteria. It is known in America, has been noticed in a few localities in England, and last summer came into the exhibitor's hands for the first time for an Irish locality (Co. Cork).

W. F. Gunn showed seeds of *Arctotis grandis*, a composite recently introduced from the Cape. The achenes are crowned with a pappus of membranous scales, and from the base of the fruit a dense tuft of hairs proceeds, which are reversed and point in the same direction as the coronal scales.

F. W. Moore exhibited a section of the flower of *Sarmienta repens*, a scarce little creeping plant from Chili, belonging to the order Gesneriaceae. The flower is bright red in colour, and the corolla is covered with little glandular hairs. The section showed the colouring matter extending into these hairs to the base of the round glandular head.

Prof. G. H. Carpenter showed specimens of a new species of Halobates found by Prof. W. A. Herdman on the coast of Ceylon. Special attention was drawn to the structure of the ovipositor in the female, and to a "comb and file" arrangement on the foreleg in both sexes, which appears to be a stridulating organ. An account of the insect will shortly be published by the Royal Society in the Supplementary Reports on the Ceylon Pearl Oyster Fisheries.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 10. EXCURSION TO LOUGHSHINNY.—Members took the 12.30 train from Amiens Street to Skerries. The party then walked along the seashore to Loughshinny, where the Conductor (C. Murray, B.A.) discussed the formation of the contortions in the Carboniferous limestones and shales, which are so well developed in this locality. After tea at Loughshinny village the members returned to Skerries after a successful afternoon, in spite of the heavy rain which fell during the whole day.

MARCH 13.—The fourth business meeting of the session was held in the Royal Irish Academy. G. H. Pethybridge (Vice-President) in the chair. Dr. PETHYBRIDGE delivered a lecture on the Survey of Vegetation. The lecturer gave an account of the methods adopted in the survey of vegetation, and then, taking South Dublin as an example, pointed out the different vegetation zones lying between sea level and Kippure, viz.:—The littoral, the agrarian, the hill-pasture, and the moorland zones. The lecture was illustrated by a large series of lantern slides and maps. The following spoke at the conclusion of the lecture:—R. Ll. Praeger, J. Wilcox, and W. B. Bruce.

TYRONE NATURALISTS' FIELD CLUB.

MARCH 23.—R. F. Dill, M.A., in the chair. G. C. GOUGH, B.Sc., of Queen's College, Belfast, lectured on "Primitive Man." The lecture was illustrated by limelight views, and there was a large audience.

APRIL 6.—J. W. Leebody in the chair. R. LLOYD PRAEGER gave a lecture, illustrated by lantern slides, on "The Botanist in Ireland." A good discussion ensued.

ULSTER FISHERIES AND BIOLOGY ASSOCIATION.

JANUARY 31.—Annual meeting. Sir OTTO JAFFE (in the chair) moved the adoption of the Report, which was seconded by the Rev. President HAMILTON, who pointed out the excellent work both in pure and applied biology carried on at the Larne station and at Lough Neagh. Prof. GREGG WILSON mentioned that papers on Co. Antrim Seaweeds by J. Adams, and on Irish Copepods, by J. Pearson, had already been published, while a memoir on the Foraminifera of the Larne district by G. C. Gough is in the press. The naturalist in charge of the marine station, Mr. H. J. Buchanan-Wolleston, is working at the Tunicata of the Antrim coast. The investigations at Larne Lough had been interrupted through the sinking of the launch—appropriately named the *Mysis*—which had to be raised and repaired.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 14.—The Vice-President (Robert Patterson, M.R.I.A.), in the chair. W. H. ROBINSON read a paper on "Coins," dealing largely with those minted for Ireland.

MARCH 20.—The President (W. H. Phillips) in the chair. The Hon. Secretary, G. C. GOUGH, A.R.C.S., B.Sc., lectured on "Spiders" to a large audience. After dealing with their anatomy, various remarkable spiders were mentioned, and their courtship and other interesting habits dealt with. The lecture was illustrated by lantern slides, and was spoken to by the President, Rev. C. H. Waddell, John Hamilton, and C. M. Cunningham. One new member was elected.

MARCH 28.—The President (W. H. Phillips) in the chair. The American Consul in Belfast, Mr. S. KNABENSHUE, delivered a most interesting lecture on "American Mound Builders."

NEWS GLEANINGS.

George C. Gough.

George C. Gough, F.G.S., Demonstrator in Natural History in Queen's College Belfast, has been appointed Professor of Natural History in the Royal Agricultural College, Cirencester. Professor Gough's departure from Belfast will be deeply regretted, not only in Queen's College but in the Naturalists' Field Club and other organisations, where he has been a very diligent and useful worker. Fortunately, he does not give up duty in Belfast till the latter end of May.

Aquatic Birds.

We notice with pleasurable anticipation the announcement of a comprehensive work on the Aquatic Birds of Great Britain and Ireland, by our contributor, Prof. C. J. Patten, of Sheffield University. Mr. R. H. Porter will publish the book shortly.

NOTES.

The Use of the Word "British."

The proposal to restrict the use of the word "British" to Great Britain, convenient as it might be, does not appear to me to be possible, even if it were advisable. The word has been used too long in the wider as well as in the restricted sense to make this possible. The course of words, like that of streams, cannot be diverted at will and confined to certain channels.

There might be more chance of success if it were decided to use "Britannic" in the restricted sense, since it is not such a common word as the other; but I am doubtful if even this change could be effected in popular usage.

I can offer no other solution of the difficulty unless some other new word could be found which would not be ambiguous.

C. H. WADDELL.

Saintfield.

In thanking Mr. Waddell for his courteous comments, I should like to point out that my proposal for limiting the meaning of the word "British" refers to its use in a definite geographical sense *by naturalists*. And this restriction of meaning is all the more possible because it is (as I have shown) often adopted in popular speech and writing. An exact scientific nomenclature depends very largely on such a voluntary restriction of the meaning of words. For example, the words "fish" and "Ethiopian" convey to the naturalist clear and definite meanings, although in common speech they are used widely and loosely.

G. H. CARPENTER.

Dublin.

I have been much interested in the discussion in the *Irish Naturalist* as to the use of the word "British." As an Englishman abroad, I have often needed a word to distinguish between a person from Great Britain and one from the British Isles. In the United States the term "blooming Britisher" is usually employed to imply anyone from the British Isles, but clearly the word "Britisher" is ambiguous. Unfortunately Professor Carpenter's word "Britannic" does not lend itself for use in the case of persons. A great service would be done to residents abroad if two distinctive terms could be suggested applicable to persons.

J. E. DUERDEN.

University College,
Grahamstown, South Africa.

Irish Biological Futilities.

Our attention has been called to a paper by R. Drane, F.L.S., with the above title, published in 1904 in the *Transactions* of the Cardiff Naturalists' Society, vol. xxxvii. The writer's "futilities" include the finding of *Erica ciliaris* in Mayo, *Oxytropis uralensis* in Aran, and a breeding colony of Sandwich Terns (of which only two Irish breeding stations are at present known) on Lough Mask. While envying such successful field work, we fear that futile Irish biologists will ask some proof before admitting the above-named plants to the Irish flora, or accepting this new station for one of our rarest breeding birds. We are left wondering what the "polyporous form of *Allium ampeloprasum*" may be, and what young ducks look like when "speaking to us in syllables which angels use."

ZOOLOGY.

Remains of Hawfinch in Co. Clare Caves.

The mandible figured in the County Clare Report (*Trans. R. I. A.*, February, 1906), and which had been referred to Hawfinch by Mr. E. T. Newton, has, at his request, been submitted to Professor Newton at Cambridge. He says that this bone has, without any doubt, been truly assigned to *Coccothraustes vulgaris*, though it is perceptibly larger than one in the collection at Cambridge, and is bigger still than that of the American *C. vespertinus*, with which he has also compared it.

Professor Newton adds:—"This seems to me a very interesting occurrence. Eighty years ago or thereabouts Hawfinches were accounted scarce *visitors* to England, and it was only a few years after that they were found to breed here. We do not know now what it is that tempts them, but it must be connected with new woodland growth, and it is instructive."

The mandible of Hawfinch occurred at Newhall in the upper stratum of the cave-deposits, which yielded six bones of Jay (four at Edenvale and two at Newhall), while in each of those places a bone of Great Spotted Woodpecker was found, also in the upper deposit; the bones of Crane, however, came chiefly from the lower stratum at Edenvale, though the femur referred to this bird occurred in the upper stratum at Newhall.

The rarity of these species at the present day in Ireland, and especially in the County Clare, makes the finding of these remains of much interest, the caves that contained them having yielded some very unexpected mammals, as Dr. Scharff's admirable portion of the report has shown.

R. J. Ussher.

Cappagh, Co. Waterford.

NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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G. H. CARPENTER,
Royal College of Science, Dublin.

R. LLOYD PRAEGER,
National Library, Dublin.

ROBERT PATTERSON,
Glenbank, Holywood, Co. Down

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The Irish Naturalist

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BELFAST NATURAL HISTORY & PHILOSOPHICAL SOCIETY,
BELFAST NATURALISTS' FIELD CLUB,
DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
LIMERICK FIELD CLUB,
ULSTER FISHERIES AND BIOLOGY ASSOCIATION.
TYRONE NATURALISTS' FIELD CLUB.

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THE AMERICAN SNOWBIRD IN IRELAND.

BY R. M. BARRINGTON, LL.B., F.L.S.

WHEN the Fourth International Ornithological Congress was held in London in June last year at the Imperial Institute, I had the satisfaction of showing to many friends at this interesting meeting a bird not only new to the British Isles, but also to Europe. It was shot within fifty yards of Loop Head lighthouse, Co. Clare, on May 30, 1905, by Mr. J. Watson.

It arrived when I was absent from home, and my wife having compared it with the description of every European Finch and Bunting, failed to locate the species. My old friend, the late Edward Williams, was puzzled, but suggested a melanism of the Chaffinch. To this I demurred—though its size and shape and slate-coloured appearance would perhaps come near such a variety. At the Congress I opened the box containing the specimen in the presence of one of our best British ornithologists. He hesitated momentarily, and Mr. Seth-Smith, editor of the *Avicultural Magazine*, coming past, instantly recognized the bird as *Junco hiemalis*, Catesby—the North American Snowbird. Chapman, Dwight, and other American representatives present, confirmed this opinion, and were greatly interested in the specimen, which probably crossed the Atlantic about the same time as they did. It was, they said, the common eastern form of this variable species. Seth-Smith, who is so familiar with aviaries, said he had never seen this species in confinement, and that in the United States it is not caged. The specimen was just in right plumage for a wild bird at the time of year.

The adults of the genus *Junco* (pronounced *yoon-co*), are unspotted and unstreaked, and have the colours massed in large definite areas. It is a more homogeneous group than many recognized genera, and confined to the American continent. *J. hiemalis* is found chiefly in the Eastern states, where it is a familiar bird from October till April—bright and cheery, and coming fearlessly to the threshold and window-sill

in bad weather. In spring it migrates northward, or to more mountainous districts, to breed, and is said to nest on or near the ground—being a semi-terrestrial Finch.

When Mr. Watson sent the bird, he said it was a "very rare" one; and without telling the name, I enquired why he so described the specimen. He replied :—

"I surmised that the bird I sent you was very rare, as I do not remember seeing one like it before. Please name it for me. I first saw it at 8 a.m., and it was then in a cow-house, and flew out when disturbed. At 9 a.m. it was perched on an out-house, and when I tried to approach, it flew away when I was forty yards distant. About an hour afterwards it was perched on a wall, and I got within twenty yards of it and saw clearly it was an uncommon bird. It then flew to a field, and I shot it when rising."

I once was sent "a very rare bird" from an island on the north coast of Ireland, and the lightkeeper alleged that neither he nor any one of the islanders had ever seen "the like of it" before—it was a common Rock-pipit! From another station a "Woodcock" was once forwarded—it was a common Song-thrush! It is only fair to say, however, that Irish lightkeepers rarely make such bad blunders—and one wonderful identification was made by Mr. James at the Tearaght, Co. Kerry, in 1890, when he recognised that tiny Asiatic wanderer, the Yellow-browed Warbler (*Phylloscopus superciliosus*) for the first time in Ireland.

But, to return to *Junco*. It may have received an assisted passage, but if so, how is the almost annual appearance of the Greenland Redpoll, *Linota* (*Acanthis*) *rostrata* on the west coast of Ireland to be explained? Has *it* been assisted? I am inclined to suspect that the White Wagtail and Water-rail cross the North Atlantic to Iceland annually; the former passing up our west coast every year about the first week in May, and the latter bird (which one can hardly make fly thirty yards over land)—striking our north-west coast lanterns in the autumn, probably on the return journey. Are these assisted also? I, for one, am very doubtful.

Fassaroe, Bray.

COLEOPTERA FROM CO. FERMANAGH.

BY REV. W. F. JOHNSON, M.A., F.E.S.

I HAD the pleasure of spending a few days in the early part of December at Summer Hill, the beautiful seat of Major H. St. George Richardson. There were not, of course, many insects about, but I succeeded in obtaining several examples of *Scaphisoma boleti*, Panz., in fungus on a fine beech. There are only two other records of this beetle in Ireland—viz., Clonbrock, Co. Galway, and Dundrum, Co. Dublin.[1] It is somewhat sluggish in its movements, and was mostly on the surface of the fungus. I should have obtained more specimens, but not having a proper collecting bottle several escaped me. On the same tree I found a dead specimen of *Mecinus pyraster*, Herbst. Under stones in a wood I met with several *Leistus fulvibarbis*, Dej., and *Loricera pilicornis*, F. The main portion of my captures were obtained in a large bag of moss. The moss was of the most luxuriant character, such as is only to be obtained in old demesnes, where the ground has been undisturbed for generations. Summer Hill is a short distance from Clones, but in Co. Fermanagh; the surrounding country is pretty, being of an undulating character, with numerous small lakes, and a considerable amount of woodland; the rock of the district appears to be limestone.

In the list which follows of my captures I have marked those not previously recorded from Fermanagh with an asterisk.

Notiophilus biguttatus, F.

Dyschirius globosus, Herbst.—A single specimen. I got this species freely in moss at Armagh.

***Badister sodalis**, Duft.—I only obtained one example of this handsome little beetle, which is not at all common in Ireland, although it is pretty widely distributed through the country, being recorded from Antrim, Down, Roscommon, and Galway.

Pterostichus strenuus, Panz.
P. diligens, Sturm.
Anchomenus gracilis, Gyll.
Bembidium Mannerheimi, Sahl.
} All plentiful.

[1] Johnson and Halbert, *Proc. R. I. Acad.* (3), vol. vi., 1902

***Hydroporus angustatus,** Sturm.—I was rather surprised to find this water-beetle in the moss; it had probably crawled into that which I took from the edge of small drains, some of which was very wet. The species is not at all common in Ireland, and hitherto recorded only from Donegal, Antrim, and Armagh.

Helophorus brevipalpis, Bedel } I obtained only these two com-
Cercyon melanocephalus, L. } mon species of Hydrophilidæ.

Oxypoda longiuscula, Er.

Homalota circellaris, Grav.

H. analis, Grav.

***H. fungi,** Grav., var. **clientula,** Er.

Tachyporus obtusus, L.

var. **nitidicollis,** Steph.

T. hypnorum, F.

Tachinus rufipes, L.

Mycetoporus splendidus, Grav.

Quedius fuliginosus, Grav.

***Q. rufipes,** Grav.

Philonthus politus, F.

P. marginatus, F.

P. sanguinolentus, Grav.

Xantholinus linearis, Ol.

Othius melanocephalus, Grav.

O. myrmecophilus, Kies

Lathrobium longulum, Grav.—It is noticeable that most of the captures of this beetle hitherto recorded have been on lake shores.

Cryptobium glaberrimum, Herbst.—There are but four other localities of this species in Ireland—viz., Armagh; Belleisle, Co. Fermanagh; Leenane, Co. Galway; and Kenmare, Co. Kerry. It is very local, but the wide range indicated by the above localities points to its probable occurrence in many other places.

***Evæsthetus ruficapillus,** Lac.—The only other record for this species is my own from Armagh. It inhabits wet moss, and, being very small and sluggish, is easily passed over.

Stenus Juno, F.—I got a number of this fine Stenus.

S. speculator, Er.

***S. lustrator,** Er.—This is a new record, not only for Fermanagh, but for Ulster, the only other record is by Mr. Halbert from Achill, where he took it on the summit of Slievemore. The species is remarkable for the long, curled pubescence which runs in two lines down the centre of the abdomen.

S. nitens, Steph.—There is only one other record for this species from Ireland—viz., Armagh—taken by Mr. W. E. Sharp in flood rubbish. It appears to be local in England.

***S. fuscipes,** Grav.—Another interesting little beetle, which, though widely spead, does not appear to be at all common in Ireland.

S. brunnipes, Steph.

Oxytelus rugosus, Grav.

O. tetracarinatus, Block.

***Trogophlæus corticinus,** Grav.
Megarthrus depressus, Lac.
***Pselaphus Heisei,** Herbst.—Present in numbers, but I could not find a specimen of *P. dresdensis*, though the locality being very suitable I hoped to meet with it. As it was in January that I took it in such numbers at Armagh, possibly it is either in the larval or pupal stage in December.
***Bythinus puncticollis,** Denny.
***B. bulbifer,** Reich.
Scydmænus collaris, Müll.
Silpha subrotundata, Steph.—Of course abundant in both black and brown forms.
***Halyzia conglobata,** L.—A single specimen.
***Scymnus suturalis,** Thunb.
*var. **limbatus,** Steph.—There are no recent records of these insects in Ireland; the type has been taken near Belfast and at Portmarnock, and the variety at Waterford; the habitat among fir trees. The dark legs, and complete raised lines round the post-coxal foveæ separate this insect from its nearest allies.
Cercus pedicularius, L.
***Cryptophagus scanicus,** L. var. **patruelis,** Sturm.
***Atomaria basalis,** Ex.
} Single examples of each of the three occurred.
Cyphon variabilis, Thunb.—The only representative of its family.
Hydrothassa marginella, L.—Only one specimen.
Galerucella calmariensis, L.
G. tenella, L.
} Both pretty abundant.
Longitarsus luridus, Scop.
L. melanocephalus, All.—Very plentiful.
Phyllotreta undulata, Kuts.
***P. exclamationis,** Thunb.
Plectroscelis concinna, Marsh.
Apion apricans, Herbst.
A. dichroum, Bedel
A. ervi, Kirby.
Strophosomus coryli, F.
Sciaphilus muricatus, F.—Very numerous.
Sitones regensteinensis, Herbst.—Only a solitary specimen.
Hypera nigrirostris, F.—I obtained several of this handsome though common little beetle.
Orchestes fagi, L.
Erirrhinus acridulus, L.
Ceuthorrhynchidius troglodytes, F.
Rhinoncus pericarpius, L.

I have given the full list of captures in order to show the capacities of the locality, which is, in my opinion, an exceedingly promising one. I have no doubt that in the months of

May and June, when the sweeping-net and water-net could be used with advantage, the above list would be greatly enlarged, and there is every probability of good species been found in a locality of the sort.

Acton Glebe, Poyntzpass.

WOODLICE IN CO. CARLOW.

BY DENIS R. PACK-BERESFORD, D.L., M.R.I.A.

In the *Irish Naturalist*, vol. iv., p. 319, Dr. Scharff gives a list of Woodlice taken by him at Borris in this county. I now give a list of those I have taken here, which includes four species not previously recorded from this part of Ireland. They were all taken round my house with the exception of *Trichoniscus vividus*, which I found on the banks of the River Slaney, about ten miles from here, and about eighteen miles from Borris, where it was found by Dr. Scharff in 1895.

Trichoniscus pusillus, Brandt.—Common everywhere.

T. roseus, Koch.—Generally distributed, but not numerous.

T. vividus, Koch.—On the banks of the River Slaney in a very damp situation. Only recorded twice previously in the British Isles, namely, from Portlaw, Co. Waterford, and Borris, Co. Carlow.

Porcellio scaber, Latr.—Common.

P. pictus, Brandt.—A good sized colony found in a stack of tiles, but nowhere else. The species in Ireland has only been recorded previously from Dublin, Belfast and Galway.

P. dilatatus, Brandt.—In greenhouses and garden frames only, and not very common. Previously recorded as Irish only from Dublin, Galway and Newtownards.

Metoponorthus prunosus, Brandt.—In considerable numbers in garden frames. Previous Irish records are from Dublin, Galway and Down only.

Oniscus asellus, L.—The commonest species of all.

Philoscia muscorum, Scop.—Very common.

Armadillidium vulgare, Latr.—Common but not very numerous.

Dr. Scharff has very kindly looked at all the specimens for me and confirmed my identifications.

Fenagh House, Bagenalstown.

A CONTRIBUTION TOWARDS THE ALIEN FLORA OF IRELAND.

BY M. C. KNOWLES.

WHILST English, and more particularly Scotch botanists, have been paying attention of late years to the numerous foreign plants that are introduced into these countries by the importation of foreign grain and in other ways, in Ireland, so far as I have been able to find out, very little has been done in this matter.

Occasionally isolated but obtrusive visitors, such as *Crepis biennis*, *Matricaria discoidea*, *Linaria viscida*, and others, have made themselves so much at home, and have so evidently come to stay, that we have been obliged to take note of them; but of the fluctuating sets of foreign plants that spring up around flour mills, in the neighbourhood of distilleries, docks, and on hen-runs, very few lists have been published. Two lists, one of some fifty plants collected by Mr. Richard Hanna in the neighbourhood of the Belfast Distillery, and the other, a smaller one, from Greenisland, collected by Mrs. White Spunner, are given in the 'Supplement to the Flora of the N.E. of Ireland.' These, together with a number of aliens from the docks and Cary's Road quarry, Limerick, mentioned in Mr. Praeger's paper "Notes on the Limerick Flora"[1]; a number of additions from these same places collected two years later by Mr. R. D. O'Brien, and recorded in my paper "Additions to the Flora of Co. Limerick"[2]; Mr. Scully's short list from a rubbish heap beside the River Lee in the city of Cork[3]; and "Notes on some casuals in Co. Antrim" by Mr. J. H. Davies[4], sum up all the published matter I can find. Yet, as some of these foreigners may in time become more or less permanent members of our flora, it seems desirable that the date of their

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[1] *I.N.*, vol. ix., p. 260.
[2] *I.N.*, vol. xii., p. 249.
[3] *I.N.*, vol. iv., p. 20.
[4] *I.N.*, vol. v., p. 309.

arrival in this country, as well as the manner in which they have been introduced, and the sources from whence they have come, should be put on record when these can be obtained. A short account, therefore, of a bed of aliens that I have had under observation for the last two seasons may be of interest.

During the summer of 1904 I spent several Saturday afternoons in the country around Lyons and Straffan in the county of Kildare, looking up some plants that had been recorded from that neighbourhood by Mr. James Douglas. On one of these occasions, towards the end of July, taking a short cut to the railway station along the canal, my attention was attracted by a fine bed of tall weeds—thistles, burdocks, wild mignonette, white daisies, and yellow crucifers, &c.—on a small strip of ground by the side of a vacant cottage on the canal bank. As I had a little time to spare before train time, I went over to examine it, and I found to my astonishment an undergrowth of *Lepidium campestre*, *Thlaspi arvense*, *Silene noctiflora*, *Medicago denticulata*, several Malvas, *Amsinckia lycopsoides*, all in abundance, besides many others that I did not know. This strip of ground was a little bit of waste land by the tow-path that had been railed off. It had not been cultivated in any way, but the end furthest from the house was strewn with cinders, and it was on these cinders that most of the plants I have mentioned were growing. Nearer the cottage it was in grass, and led into a small yard at the back. This was also overgrown with weeds, among which there was even a greater variety of foreigners than on the piece of ground by the side of the house. Under the windows in front there was a very narrow flower border, the only piece of cultivated ground near; in this there were two or three Pansies, several plants of *Linaria vulgaris*, a few Nasturtiums, all evidently planted, and four or five plants of *Rumex Hydrolapathum*, a curious species to find in such a dry sunny situation. The last also occurred in the yard in several places. I had only time for a very hurried survey of the place on this occasion. At the railway station I made inquiries, and learned that the cottage had been vacant for some time, and that the last occupant was a clerk in the Lyons flour mills, but I could learn nothing more. Suspecting from the feathers, &c., which were strewn about the yard that he had

kept hens, I wrote to Mr. Shackleton, of Anna Liffey House, one of the owners of the mills, to make inquiries ; and I give an extract from his interesting letter :—

"It is very amusing your finding so many casuals on the canal bank ; your surmise is right—our clerk, living in the cottage you speak of, did keep hens when he lived there, which he fed partially on screenings and dirty stuff from the mills, Lyons mills, which were burned curiously enough on the night of the 5th of November. After that we brought him down to work for us here. I have just been speaking to him, and he was rather astonished at the result of his fowl feeding. In our mills the wheat that we grind comes from all parts of the world—for instance, from India, Russia, Australia, the eastern States of America, California, Canada. The Caspian is what we call the dirtiest, that is, it contains most seeds and other foreign substances. The Australian is the cleanest, and so gives you least amusement. We also got a lot of wheat from Buenos Ayres latterly."

This supplied me with the information I wanted, and I paid several visits to the place during the autumn of 1904, and made a collection of all the species in flower. Each time I went I expected to find a new tenant in the cottage and the place swept and garnished, but this calamity had not happened up to December, 1905, the last time I was there. These aliens seem to flower late in this country, and I had evidently come in for the first crop of plants that had sprung up after the cottage was vacated. There were a good many, however, that had not flowered before the winter came on. Some of these flowered in the following year, and several new species appeared, but the summer of 1905 was an exceptionally dry one, and the drought killed off many of the plants that had appeared the year before, and several of the more abundant species had greatly decreased. The following table shows the plants that were found in each year, and also whether they were increasing or decreasing in the second season. There were many others besides those mentioned in this list that may or may not have been introductions here, but as they occur in cultivated and waste places all over Ireland I have made no mention of them. I have confined myself to the certain introductions.

NAME.	1904.	1905.
Reseda Luteola, L., .	abundant.	abundant.
Papaver Rhœas, L., .	2 poor plants.	a few small plants.
Brassica sinapioides, Roth.	several plants.	only 3 or 4 plants.
B. Napus, L., . .	—	1 plant.
B. juncea, Coss., .	—	1 plant.
Barbarea stricta, Andr.,	—	2 or 3 plants.
B. arcuata, Reichb., .	1 plant.	none.
B. præcox, R. Br., .	2 plants.	none.
Eruca sativa, Mill., .	about 20 plants.	not so many.
Camelina sativa, Crantz.,	—	1 plant.
Lepidium campestre, R. Br.	very abundant.	decreasing.
L. ruderale, L., . .	1 or 2 plants.	several plants.
L. perfoliatum, L., .	1 plant.	none.
Neslia paniculata, Desv.,	1 or 2 plants.	none.
Sisymbrium pannonicum, Jacq.	2 or 3 plants.	none.
S. orientale L., . .	3 plants.	none.
S. Sophia, L., . .	—	1 plant.
Thlaspi arvense, . .	abundant.	still plentiful.
Erysimum cheiranthoides, L.	several plants.	1 plant.
Silene noctiflora. L., .	many plants.	many plants.
Saponaria, sp., . .	—	1 small plant.
Malva rotundifolia, L., .	plentiful.	plentiful.
M. parviflora, L., .	several plants.	several plants.
M. borealis, Wall., .	1 or 2 plants.	1 or 2 plants.
M. verticillata, L., .	1 plant.	1 plant.
M. nicæensis, All., .	1 plant.	1 plant.
Tropæolum majus,	several plants in yard and flower border, no doubt planted.	several plants.
Melilotus officinalis, L., .	several plants.	1 plant.
M. parviflorus, Desf., .	several plants.	1 or 2 plants.
M. gracilis, D.C., .	1 plant.	none.
Medicago denticulata, L.,	abundant.	still plentiful, though much decreased.
M. denticulata, var. *apiculata*,	several plants.	several plants.
M. sativa L., . .	2 plants.	none.

NAME.	1904.	1905.
Coronilla sp., . .	1 plant.	1 plant.
Potentilla norvegica, L., .	1 plant.	4 or 5 plants.
Œnothera sinuata, L., .	1 plant.	1 or 2 plants.
Œ. biennis, L., . .	—	1 plant.
Galium tricorne, Stokes,	—	2 plants.
Ambrosia artemisiæfolia, L.	2 plants not in flower.	several in good flower.
A. trifida, L., . .	plentiful.	still plentiful.
Anthemis arvensis, L., .	—	several plants.
A. Cotula, L., . .	one of the most abundant species.	still abundant.
Artemisia biennis, Willd.,	1 plant not in flower.	several in flower.
Chrysanthemum Parthenium, Bern.	several plants (planted ?)	several plants.
C. segetum, L., . .	—	2 plants.
Hemizonia Kelloggii, Greene.	1 plant.	none.
Lactuca Scariola, L.,	1 plant.	none.
Madia glomerata, Hooke,	1 plant.	none.
Campanula rapunculoides, L.	1 plant.	none.
Vinca major, L., .	a bank of it (planted probably).	still there.
Amsinckia lycopsoides, Lehm.	plentiful.	decreasing.
Echinospermum Lappula, Lehm.	plentiful.	decreasing.
Lithospermum arvense, L.,	—	1 plant.
Echium pustulatum, Sibth.	—	1 fine plant.
Solanum tuberosum, .	1 plant (probably thrown out with refuse).	1 plant.
Linaria vulgaris, Mill.,	several plants (planted ?)	several plants.
Marrubium vulgare, L., .	abundant.	abundant.
Mentha piperita, L., .	1 plant.	none.
M. gracilis ? . .	—	1 plant.
Dracocephalum parviflorum, Nutt.	—	2 or 3 plants.
Amarantus albus, L., .	several plants.	1 or 2 plants.

Name.	1904.	1905.
Amarantus retroflexus, L.,	3 plants.	1 plant.
Chenopodium leptophyllum, Nutt.	several plants.	1 or 2 plants.
C. opulifolium, Sched.,	several plants.	several plants.
C. polyspermum, L.	several plants.	several plants.
C. ambrosioides, L.,	2 plants.	none.
C. murale? L.,	1 plant.	none.
Salsola Tragus, L.,	1 plant.	none.
Polygonum Raii, Bab.,	1 large plant.	—
Rumex Hydrolapathum, L.	several plants.	several plants.
Asphodelus fistulosus, L.,	3 or 4 small plants on cinders.	none.
Agropyron caninum, Beauv.	plentiful.	plentiful.
Ægilops comosa, Sibth.,	—	1 plant.
Avena fatua, L.,	1 or 2 plants.	1 or 2 plants.
Bromus secalinus, L.,	2 plants.	none.
B. commutatus, Schrad.,	1 plant.	none.
B. tectorum,	1 plant.	none.
Eragrostis major, Host.,	2 plants.	none.
Elymus canadensis, L.,	several plants.	several plants.
Hordeum jubatum, L,	plentiful.	decreasing, though still plentiful.
Panicum miliaceum, L.,	1 plant.	none.
P. capillare, L.,	1 or 2 plants.	none.
Phalaris paradoxa, L.,	several plants.	several plants.
Setaria viridis, Beauv.,	several plants.	decreasing.
S. glauca, Beauv.,	2 plants.	several plants.

As was to be expected, most of the plants on the above list are cornfield weeds. With the help of 'Index Kewensis' and Mr. Dunn's 'Alien Flora of Britain' I have arranged them below under the countries of which they are native. Among them are plants from nearly all the countries mentioned in Mr. Shackleton's letter. The greater number are from S.E. Europe and West Asia, which bears out his statement that the Caspian grain is the dirtiest. There is no plant that can be identified as peculiarly Australian on the list, which also

agrees with the tribute he paid to the cleanliness of the Australian grain.

CENTRAL ASIA.

Brassica juncea.
Lepidium ruderale.
Malva rotundifolia.
Malva verticillata.
Setaria viridis.
S. glauca.

NORTH AMERICA.

Œnothera sinuata.
Œ. biennis.
Ambrosia artemisiæfolia.
A. trifida.
Hemizonia Kelloggii.
Madia glomerata (prairies).
Amsinckia lycopsoides (California).
Dracocephalum parviflorum.
Amarantus albus (Mexico, South States).
A. retroflexus (Mexico).
Chenopodium ambrosioides (Mexico).
C. leptophyllum.
Elymus canadensis.
Hordeum jubatum.
Panicum capillare.

SOUTH AMERICA.

Tropæolum majus (probably planted).
Solanum tuberosum (probably thrown out with refuse).

NORTHERN EUROPE.

Erysimum cheiranthoides.
Malva borealis.
Melilotus officinalis.
Medicago denticulata.
M. denticulata, var. apiculata.
Potentilla norvegica.
Echinospermum Lappula.
M. gracilis.
Salsola Tragus.
Festuca pratensis.

S. E. EUROPE AND W. ASIA.

Papaver Rhœas.
Barbarea arcuata.
B. præcox.
Eruca sativa.
Sisymbrium pannonicum.
S. orientale.
Camelina sativa.
Lepidium perfoliatum.
Neslia paniculata.
Silene noctiflora .
Malva nicæensis.
Medicago sativa.
Melilotus gracilis.
Galium tricorne.
Anthemis arvensis.
Chrysanthemum segetum.
C. Parthenium.
Campanula rapunculoides.
Vinca major.
Lithospermum arvense.
Echium pustulatum.
Veronica Tournefortii.
Chenopodium opulifolium.
C. polyspermum.
Asphodelus fistulosus.
Ægilops comosa.
Phalaris paradoxa.
Avena fatua.

As the Lyons mills have now ceased to be a means of introducing aliens into the country, it is worth noting that in the Douglas Herbarium there are quite a number of foreign plants, some twenty of which are from the neighbourhood of Straffan and Lyons, and it is possible that some of these may have been brought in with the grain coming to these mills.

I have to thank Mr. N. Colgan, Mr. E. G. Baker, Mr. R. Ll. Praeger, and the Keeper of the Kew Herbarium for help in naming some of the plants in the above lists.

Dublin Museum.

REVIEW.

BRITISH AND IRISH LIVERWORTS.

A Revised Key to the Hepatics of the British Islands. By Symers M. Macvicar. Pp. 20. Eastbourne: V. T. Sumfield, 1906. Price 9*d.*

This useful work, a first edition of which was issued in 1901, appears now in an improved form. It has been completely revised, many new British species added, the arrangement in the "Moss Exchange Club Census Catalogue of British Hepatics" followed, and so many alterations and improvements made that we advise everyone interested to obtain a copy.

The study of Liverworts is difficult for a beginner. This Key is intended to help him to make out the species. It is an aid to the use of a larger work. There is first a dichotomous key to the genera, and a new feature in the present edition is the use made of the underleaves for diagnostic purposes.

This is followed by a similar Key to the species. Plain and naked-eye characters, as opposed to microscopic, have as far as possible been used, avoiding those drawn from perianth, inflorescence, or cell-structure.

In its previous form this Key was found most helpful, not only by beginners but more advanced students The value of the new edition can only be properly tested by use, but we believe it will be found an invaluable aid to the use of Lett's or Pearson's larger works on this group. We notice that many small alterations, suggested no doubt by experience, have been made in the salient characters given for each species.

There is a short introduction, in which some practical hints are to be found for the examination of these plants. So much variation prevails even in the same plant, we are advised to examine several stems and several leaves, and take the average as our type.

C. H. Waddell.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a pair of Tiger Cubs from H. R. H. the Prince of Wales; a tame Leopard, two years old, from Capt. MacCarthy; a pair of Swans from the Board of Works; two Finches from Constable J. O'Shaughnessy, and three Swans from Mr. H. B. Rathborne. A pair of Marmosets, ten Jackass Penguins, and a King Vulture have been purchased, and a Barbary Lamb has been born in the Gardens.

DUBLIN MICROSCOPICAL CLUB.

APRIL 11.—The Club met at Leinster House, Dr. R. F. SCHARFF, President, in the chair. Dr. G. H. PETHYBRIDGE exhibited sections of the haustoria on the roots of Cow-Wheat (*Melampyrum pratense*). This plant is one of the group of semi-parasitic Rhinanthaceæ, and although green, and thus able to manufacture its own food, it is partly dependent for its nutrition on other plants, to the roots of which it attaches itself by the absorbtive suckers on its own roots.

H. C. DRAPER, F.C.S., showed a "dark-room" lamp of somewhat novel construction, suitable for use in micro-photography. A four-volt "Osmi" lamp, in connection with a portable accumulator, is immersed in a glass cell containing a saturated solution of potassium bichromate, and the novelty consists in surrounding the lamp and lamp-holder by an air-bell, preventing contact of the solution with the fittings. An "Osmi" lamp mounted in a rectangular wooden case, open on one side, grooved to take a quarter-plate focussing screen, was also shown. This arrangement gives a soft diffused light, suitable for microscopic illumination. By substituting photographic plates, cleared and stained with suitable tints, the light may be modified.

H. W. DARLASTON sent for exhibition an interesting series of botanical and zoological slides.

BELFAST NATURALISTS' FIELD CLUB.

APRIL 10.—WILLIAM GRAY, M.R.I.A., submitted his report as delegate to the meeting of the British Association, and made some valuable suggestions as to how the Club might help the Association's work.

APRIL 25.—The Annual Meeting was held in the Museum, the President (W. H. Phillips) in the chair. There was a fair attendance of members.

A short notice of the occurrence of foraminifera in gravels was given by JOSEPH WRIGHT, F.G.S., who said he had recently received from Mr. John Brown, F.R.S., a ball of rolled clay taken from a gravel pit at his

residence, Longhurst, Dunmurry, which he thought might yield foraminifera. On examination he found that it contained a large number of foraminifera mixed with shell fragments, &c. These foraminifera numbered 1,475 specimens belonging to 35 species, and of which 950 were referable to *Nonionina depressula*. This clay must have been in a soft condition when the gravel was deposited, as the stones were both deeply imbedded and scattered through it. Through the kindness of Mr. Brown he was enabled to visit the gravel pit himself, and was shown several of these balls lying loose upon theground, whilst one was *in situ* in a layer of coarse gravel. The gravel was stratified horizontally, the seams varying largely in character, some being composed of fine, others of coarse or medium-sized stones. From a sample of fine gravel interstratified between two coarser layers he obtained four foraminifera, also shell fragments. In the overlying Malone Sand foraminifera were comparatively frequent. From such results it seemed strong evidence in favour of these gravels being of marine origin.

The paper was discussed by G. C. Gough, Wm. Gray, G. Donaldson, S. A. Stewart, R. Welch, and R. Bell.

The Secretary (Professor G. C. GOUGH), read the Annual Report for the 43rd year. The number of members was 396 at the 1st of April, 28 new members having been elected, and 28 members were lost through deaths and resignations. During the year nine Committee Meetings were held. The summer programme, as usual, consisted of excursions, eight being arranged for as follow :—Dungannon, 20th May ; The Gobbins (half-day), 10th June ; Diamond Rocks (Mourne Mountains), 1st July ; Dundalk (long excursion with D.N.F C.), 12th to 14th July ; Magheramorne (half-day), 29th July ; Ballinderry, 12th August ; Church Hill, County Armagh, 26th August ; The Knockagh (half-day), 9th September, These were duly carried out, with the exception of the last, which was postponed owing to unfavourable weather, only one member meeting the secretaries at the station. The attendance at the excursions was scarcely as good as it has been in former years, the largest attendance being at the ever-popular Gobbins excursion, when 126 were present.

The Winter Session began in the usual way by a conversazione in the Exhibition Hall. Over 400 members and friends attended. Besides the ordinary monthly meetings, the informal meetings commenced last session on Wednesday evenings were continued this session, and were well attended. Two of the papers read were deemed by the Committee worthy of being printed *in extenso*, and will be issued as appendices to the Proceedings. In connection with the effort to improve the equipment of the Queen's College, the Club collected the sum of £20, which was sent to the College. Delegates from the Club attended the meeting of the Irish Field Club Union Committee in Dublin, and the British Association Corresponding Societies Committee in London. Among the honours to members must be placed Professor Gregg Wilson's election as a vice-president of the Royal Irish Academy. The Treasurer's statement shows a deficit of £11 10*s.* 5*d.* after all accounts have been paid. No collections were submitted in competition for the Club's prizes.

The Treasurer's report having been submitted by W. H. Phillips, the reports of the Librarian and botanical and geological sections were read by J. L. Jackson and A. Milligan, and were then adopted, on the motion of the President, seconded by W. J. Fennell, M.R.I.A.

The election of officers and committee was then proceeded with. On the proposal of R. Patterson, seconded by W. H. Gallway, W. H. Phillips was elected President, both speakers referring to the valuable services which he had rendered the society in the past.

The other office-bearers appointed were as follow:—Vice-president, N. H. Foster; treasurer, W. H. Phillips; librarian, J. L. S. Jackson; secretaries, W. H. Gallway and W. J. C. Tomlinson.

A cordial vote of thanks was passed to the outgoing secretaries, G. C. Gough and George Donaldson.

The Committee were re-elected, H. C. Marshall and N. Carrothers taking the place of A. Milligan and J. Orr.

One new member having been elected, the proceedings terminated.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

APRIL 27.—W. C. MARTIN lectured on the teleautograph and Frahm's speed indicator, illustrating his subject by experiments.

DUBLIN NATURALISTS' FIELD CLUB.

APRIL 7.—EXCURSION TO GLENDHU.—Members and visitors assembled at Terenure at 2 p.m. where cars were taken for Rockbrook. Here the party, under the leadership of W. B. Bruce, proceeded to study the plant associations of the district—principally the hill-pasture and moorland zones. An ascent of Tibradden was made during which the members had viewed the associations of the moorland zone in detail. Descent was made into Glendhu, and the party returned to Rockbrook for tea.

APRIL 10.—The President (C. B. Moffat, B.A.) in the chair. The Hon. Secretaries brought the Report of the Corresponding Societies of the British Association for 1905 before the meeting. An animated discussion on the Report followed, in which the following members took part:—R. Ll. Praeger, W. F. Gunn, C. Murray, J. Wilcox, and H. E. Wilkins. The principal feature of the evening was Collections of Exhibits and Demonstrations which included:—W. F. GUNN—Collection of British and Exotic Shells. C. MURRAY, B.A.—Carboniferous Fossils, Curkeen Hill. R. LL. PRAEGER, B.A.—Specimens illustrating Vegetative Reproduction in Plants. Mr. A. H. MacWilliam was elected an Associate Member.

NOTES.

BOTANY.

Mercurialis perennis and Draba muralis in Co. Antrim.

The two stations—one in Down and one in Antrim—given in *Irish Topographical Botany*, seem to be the only ones in the north-east where *Mercurialis perennis* has been seen recently. On the 25th April I had the pleasure of meeting with it in fair abundance in another Antrim locality. This was on the steep, shady banks of the Craigban burn where the latter joins the Glenshesk river, about half a mile below the Glen viaduct. As the exact spot is rather inaccessible, the plant may easily escape notice. The station, however, is, I am certain, merely a re-discovery, for the plant was recorded over forty years ago in the *Flora of Ulster* from "Altaferna Glen, near Ballycastle," and the place where I found it is not only within four miles of Ballycastle, but I find from the old 6-inch survey map of the period that the Craigban burn is, in its upper part at least, described as "Altiffirnan Glen." The re-finding, however, is an interesting verification. With regard to the Co. Antrim station in *Irish Topographical Botany*, it should read Glynn rather than "Glenoe." The plant occurs on the south bank of the Glynn river, near the village, and almost opposite the church. It is a couple of miles east of Glenoe proper.

On the same day I had the good fortune to see for the first time that very rare plant *Draba muralis*. It occurs abundantly on an old wall at the bridge over the Bush river, a short mile east of Armoy, and not far from the round tower. It seems to have been in an equally plentiful and luxuriant condition on the same wall ten years ago when it was first discovered by the Belfast Naturalists' Field Club. It was in full flower when I saw it, and a very pretty sight. Its situation here seems to favour strongly the supposition that the plant may perhaps be truly indigenous to Ireland.

W. J. C. Tomlinson.

Belfast.

A colour-variety of Pinguicula grandiflora.

Miss Lucila O'Connell sends a fresh blossom of a beautiful pale lilac form of *Pinguicula grandiflora*, of which she has found three plants on the shore of the Lower Lake of Killarney. I do not find any mention of colour variation in this species, though I have notes of white, lilac, and white-tipped varieties of its ally *P. vulgaris*.

R. Lloyd Praeger.

Dublin.

Erophila præcox in Ireland.

Early in April I found this little plant growing abundantly on walls and rocks at Ennistymon and Kilfenora, Co. Clare, and a week or so later met with it again in the neighbourhood of Galway. It is quite a distinct-looking plant, and seems to be scarce in Ireland, as it is in England. I have not seen it in any other locality, although its near relation, *E. vulgaris*, which is apparently absent from the above districts, is common in most parts of the country. Without having any doubt as to its identity, I sent a specimen for verification to the Rev. E. F. Linton, whose kind reply states that it is "thorough" *præcox*. I can find no previous mention of its occurrence in Ireland, and have much pleasure in now recording it.

R. A. Phillips.

Cork.

Melittis Melissophyllum in Co. Cavan.

Miss Sarah Blackwood has favoured me with a specimen of this fine labiate. She writes:—"I found it last August in Co. Cavan beside one of the smaller lakes, about three miles from the town of Cavan, in the direction of Farnham. It was not near a village or cottage, so I do not think it can be a garden escape. There was not much of it growing where I got this specimen, and although I looked for it beside any other lake I came to, I did not find any more. It was growing quite near the water in the soft ground, and seemed in a healthy condition."

The species is S. European and S. English, haunting woods and copses. It cannot, of course, be claimed as either native or naturalized on the present evidence, but the occurrence is interesting, especially as the plant has not apparently hitherto occurred in Ireland, even as a casual. It is to be hoped that its Cavan home will be further studied.

R. Lloyd Praeger.

Dublin.

ZOOLOGY.

An Irish Geometrid Moth.

In the *Entomologists' Record* (vol. xviii., 1906, pp. 85-9), Mr. J. E. R. Allen discusses the moth described by Mr. L. B. Prout as *Oporabia dilutata*, var. *Christyi*, which he has found at two localities near Enniskillen, and gives reasons for believing that it should be considered a "good" species. Mr. Allen lays stress on the constant (if slight) difference of marking in the wings, and the extreme localization of the moth to a restricted habitat.

Large Fox Shark on the Coast of Donegal.

A photograph was sent to me recently by Mr. R. J. Moss, of a Fox Shark (*Alopias vulpes*), caught at Port-na-Blagh last summer. I am assured that it was carefully measured with a tape, the length being 16 feet. This is an unusual size for a Fox Shark; about half that length is the usual record.

R. F. Scharff.

Dublin Museum.

Great Grey Shrike in Co. Meath.

On 23rd March a bird of this species was shot in Co. Meath and submitted to me, proving on dissection to be a female, being the first time the species has been recorded from this county. The specimen had the white bar on the primaries only, characteristic of *Lanius major* of Pallas; whereas the typical *L. excubitor* has white bases to the secondaries, forming a double wing bar; but Mr. Howard Saunders notes that the birds obtained in this country which exhibit the double wing bar have usually proved to be males, while those with the single bar are generally females.

Nevin H. Foster.

Hillsborough, Co. Down.

Birds of Donegal.

To the *Zoologist* for April, Mr. J. Steele-Elliott contributes a note in which he records the more noteworthy birds seen in the Narin district in the early summer of the previous year.

NEWS GLEANINGS.

Belfast Municipal Museum.

We have received "Quarterly Notes," No. 1, issued by the Belfast Municipal Art Gallery and Museum. These consist of articles reprinted from the *Belfast Evening Telegraph*, and deal with the art and science collections housed in the handsome library in Royal Avenue.

Royal Botanic Gardens, Glasnevin.

A handy halfpenny guide to the gardens has been issued officially, in which an itinerary of the grounds and houses is described in popular fashion.

NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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Natural History Specimens sent to the Editors will be referred to authorities for identification.

G. H. CARPENTER,
Royal College of Science, Dublin.

R. LLOYD PRAEGER,
National Library, Dublin.

ROBERT PATTERSON,
Glenbank, Holywood, Co. Down

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THE MELODIOUS WARBLER IN IRELAND.

BY RICHARD M. BARRINGTON, LL.B, F.L.S.

On September 23rd, 1905, Mr. P. Pavlosky of Old Head lighthouse, Kinsale, Co. Cork, wrote:—"Enclosed you will find a bird which I have shot, and I think it is a very rare one." When the specimen arrived it was evidently something good. Being too much damaged for stuffing, it was made into a skin by Edward Williams and forwarded to London for identification, as the series of European Warblers in the Dublin Museum is far from perfect. The longer and flatter bill and larger size of the bird at once separated it from the Willow Wren and Wood Warbler—and as the bastard primary exceeded in length the primary coverts it probably was not an Icterine Warbler.

The books led me to suspect it was the Melodious Warbler (*Hypolais polyglotta*)—though the specimen agreed rather better with a skin of *H. pallida* in the Dublin Museum. However the matter was settled by Mr. Ogilvie-Grant who, writing from the Natural History Museum, said "undoubtedly *Hypolais polyglotta*."

Though the bird is new to Ireland and has only been added to the British list of late years—having probably been confounded with *Hypolais icterina*—it is a species which might be expected to occur having regard to its continental distribution. Mr. Aplin[1] and Mr. Howard Saunders[2] suggest that the bird heard on May 29th, 1886, at Coolattin, Co. Wicklow, by Rev. A. Ellison[3], may have been this species. *S. polyglotta* does not penetrate as far north as *S. icterina* and its range in France is more western. It is satisfactory to have its occurrence in Ireland authenticated by an undoubted specimen in spring rather than by an immature autumn straggler returning south, for the problem of its summer residence is more interesting.

Fassaroe, Bray.

[1] *Irish Naturalist*, 1897, p. 222. [2] Manual of British Birds. [3] *Zoologist*, 1886, p. 333.

A MOREL NEW TO IRELAND.

BY D. M'ARDLE.

In May last I received from the Hon. R. E. Dillon, D.L., a single specimen of a Morchella which was found about a mile from the only British station where *M. elata* grows, on the Clonbrock estate,[1] and where it has appeared this year, but more stunted in stature on account of spring frosts and cold winds.

As I was acquainted with *M. elata*, the specimen sent to me looked different from any Morel I had ever seen. The long Phallus-like stipe, small rotundo-conical pileus, free to about the middle, were remarkable; probably the true shape of the pileus is conical where a series of mature specimens is available. I thought it might be *M. esculenta* var. *rotunda*, Pers., but the long stipe and the large smooth oval sporidia separated it from that form at once.

So through the courteous Director at Kew I sent it to Mr. Massee, one of the best authorities on such matters, and he named it *Mitrophora semilibera*, Lev.[2] a native of Britain, France, Netherlands, Germany, Scandinavia, and Italy. Mr. Greenwood Pim, F.L.S., states that he has not heard of its previous discovery in Ireland.

The pileus when young is conic or sub-globose, yellowish olive, the reticulations formed by ribs running down with tolerable regularity from the apex, oblong with a few wrinkles within. The pileus when mature is 1½ inches high, nearly as broad, darker, free for rather more than half its height, with reticulations oblong or rhomboidal; the sporidia are large, oval, yellowish; the stem is 5 inches or more high, 1 inch thick at the base, hollow, pitted and wrinkled below,

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[1] *I. Nat.*, vol. iii., p. 155.

[2] *Ann. Sci. Nat.*, 1846, v. 250.

I append some of the names it is also known by.

Morchella semilibera, De Cand., Fl. Fr. ii, p. 212.
Cooke, Mycographia, vol. i., Plate 85, Fig. 321.
Cooke, Handbook Brit. Fungi, vol. ii., p. 656.
Helvella hybrida, Sowerby, Fungi, tab. 238.
Morchella hybrida, Pers., Saccardo, Sylloge Fungorum, vol. viii., p. 13.

more or less grooved through its whole length, flexure slightly tinged with reddish brown, decidedly furfuraceous, crisp, taste pleasant (Engl. Flora). Found on a grassy bank by the Clonbrock River, Co Galway. by the Hon. Ethel Dillon, who called her brother's attention to it while he was fishing, 8th May, 1906.

Glasnevin.

THE BIRDS OF IRELAND AND THE ISLE OF MAN.

BY ROBERT PATTERSON, M.R.I.A., M.B.O.U.

THE publication of Mr. P. G. Ralfe's recent work on the Birds of the Isle of Man makes a comparison of the avifauna of Ireland and Man now possible; and some of the results of a close study of Ussher's "Birds of Ireland" and the volume mentioned above will be found in the following pages.

At first sight the comparison of the avifauna of so large an island as Ireland, with its 20,300,000 acres, with that of so small an island as Man, with its 145,325 acres, may seem futile, but if we eliminate all of the *very* common species found in both places, the result may be worth considering. The topographical features of a country affect its bird-life so profoundly that we must first find the most striking point of difference, as giving the key to the situation. Mr. Ralfe devotes twenty-two pages to a very clear description of the physical features of Man, and these can be briefly summarised. "The Isle of Man consists of a main central mass of high-land, to which, at the north and south, are appended much smaller tracts of marly level country.

I. THE NORTHERN LOWLAND forms a well-defined district, about one-fifth of the island's total area, sharply bounded by the wall-like face in which the central mountain range rises from it." This level district is crossed by a line of low hills of sandy cultivated soil, north of which lies the Ayre, forming the point of the island, a sandy and gravelly waste, ending in

a very steep beach of large shingle, and containing one or two patches of marshy land. South of the sandhills this northern tract has many ponds, which are elsewhere rare, and here also lies the Curragh, formerly an extensive marsh, but now drained to the condition of damp meadow-land, except at its west end, where a patch of unreclaimed land contains many ponds and trenches of varying size, forming a refuge for some marsh birds.

II. The Central Hill District—Inland. South-west of the northern plain is the main central mass of hills, the highest elevations occupying the centre, with spurs running down to the coast on either side. The range is divided by a well-defined valley, and is everywhere split and pierced by glens. North of this cross valley are some twenty summits exceeding a thousand feet. These mountains are chiefly covered with grass, but there are tracts of heather and blaeberry; they are very devoid of bird-life at all seasons. The highest point is Snaefell (2,034 feet). The glens are usually cultivated in the lower portions, but their higher and steep slopes are covered with heather and bracken, with rocky scarps here and there, seldom of much height or extent. The streams and rivers of these glens often flow through fern-clad gorges, while their swampy sources afford breeding ground to a few Curlews. Some of these glens are absolutely treeless, while others have belts of plantations and pleasure-grounds. South of the central valley the mountains are lower. There is in proportion more cultivated land, and the valleys have a more open character. The summit of Crouk ny Irey Lhaa (1,449 feet) falls abruptly to the western sea, and a steep and waste mountainside is continued for some miles south along the coast.

III. The Central Hill District—Coast. The coast of the whole main central district is high, rocky, bold, and clean-cut, broken into by curving, shallow bays, with shores usually of the same bold features. The larger of these bays have beaches of hard sand, but the muddy reaches which attract many Waders and Ducks are nearly absent. Along the west from Peel to the Calf is the chief seat of Man's varied sea-bird life. The Calf is an islet of 616 acres separated from the main island by a sound 500 yards wide. It rises to 421

feet and its cliffs, precipices, caves, and stacks, harbour an immense number of rock-loving birds. The one little ravine, with its few low trees and bushes, is much prized by migrating small birds. The greater portion of the south shores of Man is devoid of cliffs, but we meet them again in the east, low to Santon Head, and higher north of that point, to Douglas Bay, and again high but interrupted from that to Maughold Head, beyond which the rocks gradually subside into the sands of Ramsay Bay, which begins the northern level portion mentioned at first.

IV. THE SOUTHERN LOWLAND. At the south of the mountain district, as at the north, is a level tract, in this case much smaller and apparently quite devoid of water. The coast is low, rocky, and weedy, and this is the best ground for Waders and Ducks. There are two fine stretches of sand, with shingle banks, and on one of them the Sheldrake is resident.

From the above condensed summary of Mr. Ralfe's description, two points at once strike us; (1) the absence of timber (2) the scarcity of fresh water. Timber is scarce and comparatively small owing to the high winds, while only 314 acres are under water. When we come to examine the wood-loving and water-loving birds, it will be seen how much the avifauna of Man has been affected by the want of trees and lakes.

Taking the breeding birds first, (residents and migrants) and omitting the *very* common species which are found in both islands, we come upon some noteworthy differences. The central hill district would appear to offer many places suitable for the nesting of Ring Ouzels, and yet "the Ring Ouzel has never hitherto been recognised here as anything but a passing migrant" (page 12), though it must be added that a subsequent paragraph states that nests and young have been seen in the Maughold district; but the eggs do not appear to have been actually obtained yet. In Ireland there are only four counties from which this bird is excluded, and these are not mountainous. Almost the same could be said of the Wheatear in Man, which "though common and plentiful as a passing migrant, is scarce as a nesting-bird," (page 14), although in this case a few nests have been found. In Ireland Wheatears are not uncommonly seen in March, but on 17th *February*, 1887, several were noted at the Chickens Rock

lighthouse near the Calf—a remarkably early date. The Whinchat, which breeds regularly, though in small numbers, in about fifteen Irish counties, has only occurred four times in Man as a straggler, and the Redstart, which breeds in two Irish counties at least, has only been seen a few times. The Blackcap is unknown, and the Garden Warbler has only once been identified in Man; in Ireland both are local summer visitors, the latter especially so. The Wood Warbler seems to occupy almost the same position in both islands; though its nest has not been taken yet in Man, it has bred in two Irish counties. Owing to absence of suitable ground the Sedge Warbler is not common in Man and was quite overlooked for a long time. Up to 1903 the Grasshopper Warbler had only occurred once (at a lighthouse), but in the summer of that year it was found in some numbers on the turfy wastes of the Curragh, where it probably breeds, though no nest is mentioned as having been found. Here it is wide-spread and common in many places. The Dipper is so common and widespread in Ireland, it is strange to read that Mr. Ralfe never saw a living Manx specimen until 1903. It now appears to be resident in small numbers. Lack of old timber doubtless accounts for the position of the Tits in Man. The Great Tit is the only fairly common one, and it and the Blue Tit breed, (but the Long-tailed and Coal are chiefly known as winter visitors, though the latter will probably be found breeding there soon). Of the Wagtails, the Pied is a common resident, and the Grey is found in small numbers, but becomes decidedly scarce in summer. The Swallow is stated to be "distinctly scarce" as compared with the mainland, and the House Martin even more so, their breeding-habits closely resembling those observed in Ireland. The Goldfinch is resident in small numbers and seems to be increasing as a breeding species, but it is not nearly so well known as it is here. The Tree Sparrow is resident in the southern part of the island, but Mr. Ralfe considers it will be found over the whole island. It seems to be increasing rapidly. In Ireland it is resident in Co. Dublin, but appears to be spreading, as it has been seen in Mayo and elsewhere.

The position of the Twite in Man is peculiar, as there does not seem to be any record of its breeding since 1862, when it was reported to the late A. G. More by Dr. Cullin, who ap-

parently found it breeding in small numbers both in the north and south of the island. In Ireland it breeds in about twenty-two counties, and is "a common and characteristic bird of wild and exposed parts of our island" (Ussher). It seems very likely that the Crossbill may breed in Man, though actual proof is yet wanting. The scarcity of conifer woods will account for this, as it breeds in small numbers in each province of Ireland. The Reed Bunting, here so common near water, is a scarce and local bird in Man, as would be expected. The Chough seems to be generally distributed over the island, and it and the Hooded Crow occupy the same position as they do on the Irish list. The Raven has fifteen nesting places and is apparently commoner in Man (for its size) than in Ireland. It is hard to explain the scarcity of the Swift in Man, and strange to say the breeding of the Kingfisher has never been recorded! It is probably resident in small numbers. Of the Owls, the Long-eared is common and resident, the Barn is almost unknown, though Owls of this species *may* have nested in ruins and in a hollow tree on two occasions, but it is not proved; while from the fact that on four occasions owls' nests with eggs have been found on the ground "in open gorsy spots amid young plantations," the breeding of the Short-eared "seems to be pretty well settled." Definite proof would be desirable, however, more especially as the Long-eared Owl has been known to nest on the ground elsewhere, and the scarcity of suitable trees in Man might have turned a chance occurrence into a habit. It is only right to add that Mr. Ralfe saw a Short-eared Owl flying about the rocks at Langness on 3rd July, 1898. As is well known, the two first Owls are resident and widely distributed here, and the Short-eared (which has never been known to breed) occurs more or less commonly in winter. The White-tailed Eagle seems to have bred in Man (perhaps two eyries) up to 1820 or 1830; it is now quite unknown, and the Golden Eagle may have been seen on two or three occasions. In Ireland a few pairs of each still survive in the wildest districts. The Peregrine has ten or eleven nesting places (which are very properly not named) all on the coast of Man, where it does not breed inland, and strangely enough does not seem to occur in winter. It is much commoner in Ireland, where it is found

throughout the year and breeds on inland cliffs as well as on the coast. The somewhat extensive moorland of the centre of Man would seem to be well suited to the Merlin, and yet we read that its breeding is a rare, and indeed, casual occurrence, though several instances are given. In Ireland it breeds regularly in twenty-four counties. Although the Cormorant is a common bird all round the coasts of Man, Mr. Ralfe only knows two nesting colonies of about twelve nests each. The Shag is much more abundant and breeds numerously on the cliffs on the east, west, and south of the island. On most parts of the Irish coast the Cormorant is more abundant than the Shag, but the latter is the more numerous on the wild western side. The Heron during most of the year is far from uncommon in quiet and suitable places, and yet "whatever may have formerly been the case its status as a breeding species is now uncertain, and we cannot positively assert that any Herons now breed in Man." Particulars are given as to former breeding places, in willow bushes and clusters of ivy, owing to want of suitable trees, but there is nothing to show why these colonies have been deserted. In Ireland, the Heron is resident and common, breeding in every county, there being sixty-six heronries in the County of Cork alone.

Of the Ducks, the Sheldrake, Mallard, and Teal are the only species that breed in Man, and only in *very* limited numbers. The former breeds in fifteen counties, and the two latter in every county in Ireland, as one should expect.

The Ring-Dove breeds freely in such woodland as exists in Man, but strange to say although the rocky coast seems particularly suitable to it, and where it formerly was found in great numbers, the Rock Dove seems to be now extinct as a breeding species, though there is a doubt as to a few Pigeons which breed on Maughold Head. On the other hand, the Stock Dove is resident and increasing, and "the coasts of Patrick, Maughold, and Stanton, all once strongholds of the Rock Dove, have all been colonised by this species." This is quite in keeping with the northern and western extension of its breeding range lately. In Ireland the two former Pigeons are common residents, and the Stock Dove is spreading its range, but it is not found nesting on sea cliffs as is apparently the case in Man.

The Red Grouse became extinct in Man between 1830 and 1840, but was re-introduced about 1880 and is now resident in limited numbers. The Pheasant has been introduced at various times, but does not seem to succeed in Man. "Stray birds possibly still survive," about half a dozen at Bishop's Court and a few at Maughold. Mr. Kermode's remark upon this species, "Introduced at different times for the amusement of poachers," probably puts the cause of failure in a nut-shell. Both of these birds are resident here and breed in every county. Partridges in both Man and Ireland are decreasing, being resident in limited numbers. The history of the Quail in Man is practically the same as in Ireland: common up to 1850 or 1860, it then became extinct, but re-appeared in 1892, and was much more numerous in 1893, and has occasionally been recorded as shot and as breeding since then. It is called "Wet-my-lip" in Man, "Wet-my-foot" in the North of Ireland. The Water-Rail, Moor-Hen, and Coot are as numerous in Man as the limited extent of water and marsh will permit, all three breed in small numbers. They are common residents in Ireland, the last two especially so. "In his list of 1888 Mr. Kermode notes that the Woodcock has occasionally been known to breed in Man; he does not repeat this in his later account, and there is no evidence known to me, though it seems not unlikely." Doubtless the want of suitable plantations in Man is the cause of its absence as a breeding species; in Ireland it has long been known to breed, and its increase has been rapid. The Snipe breeds very sparingly in Man, as would be expected; the mountain bogs and marshy lands of Ireland, where it breeds freely, being wanting. For the same reason only a few pairs of Curlew nest in Man, although large numbers are found round the coast at different times of the year. In Ireland it breeds extensively. Coming to sea-birds, it is hard to understand why there should be only *one* colony (of under forty pairs) of Arctic Terns in Man (the exact locality being carefully concealed), one colony of Little Terns, of about the same size (unknown until 1898), and why the Common Tern should be merely an uncommon straggler, not breeding. In Ireland all three are numerous, though the last two are rather local; there are some immense colonies of Arctics. The absence of the

Black-headed Gull as a breeding species at the present day is explained by the want of lakes and bogs, where immense colonies exist in Ireland. It is abundant in Man during all the year except summer. In the body of the book Mr. Ralfe says of the Common Gull, "It does not seem probable that any nest in Man, though it has colonies very near our coasts," but from a note in the Addenda (p. 315) we learn that on 23rd June, 1904, an undoubted egg of the Common Gull was taken on the Manx coast from a nest containing three eggs. The date is very late; in Ireland the young are sometimes hatched the first week in June; and further confirmation of this very interesting and important point will be looked for. Although the Lesser Black-backed Gull breeds in some numbers in Man, the Greater Black-backed is not yet known to do so, though there must be many suitable places for it. In Ireland both are resident, the latter in very much smaller numbers however. In Man there is only one comparatively small colony of Kittiwakes, on the Calf, although suitable nesting places must be numerous. In Ireland, though local, it breeds in some vast colonies. The Herring Gull seems to be the dominant sea bird of Man.

The Razorbill, Guillemot, Black Guillemot, and Puffin all seem to occupy relatively the same position in Man that they do in Ireland. The Little Grebe is as plentiful in Man as could be expected.

If we now take the "Types of Distribution" as detailed by the late A. G. More in his valuable paper "On the Distribution of Birds in Great Britain during the nesting season[1]" we get the following result, taking only those birds which *undoubtedly* breed in both islands and leaving out all "not proven" cases.

—	British Type.	English Type.	Germanic Type.	Atlantic Type.	Scottisl Type.	Highland Type.	Total
Ireland,	74	12	1	4	31	1	123
Isle of Man,	64	3	1	1	15	–	84

[1] *Ibis*, 1865.

The following birds on the Irish breeding list do not appear to breed in the Isle of Man :—

Whinchat.
Redstart.
Blackcap.
Garden Warbler.
Long-tailed Tit.
Coal Tit.
Yellow Wagtail.
Siskin.
Twite.
Bullfinch.
Crossbill.
Jay.
Carrion Crow.
Woodlark.
Kingfisher.
Barn Owl.
Marsh-Harrier.
Hen Harrier.
Golden Eagle.
White-tailed Eagle.
Gannet.
Heron.
Shoveler.
Pintail.
Pochard.
Tufted Duck.
Common Scoter.
Red-breasted Merganser.
Rock Dove.
Turtle Dove.
Spotted Crake.
Golden Plover.
Red-necked Phalarope.
Woodcock.
Dunlin.
Common Sandpiper.
Redshank.
Sandwich Tern.
Roseate Tern.
Common Tern.
Black-headed Gull.
Great Black-backed Gull.
Red-throated Diver.
Great Crested Grebe.
Storm Petrel.
Fork-tailed Petrel.
Manx Shearwater.

A glance at this list will show how much Man is affected by the absence of "wood" and "water," taking these in general terms. Of course some species, such as Crossbill, Kingfisher, Barn Owl, and one or two others *may* breed in Man, but the information to hand does not prove it. The details of the actual breeding are much fuller and clearer in "The Birds of Ireland" than in "The Birds of Man."

One of the longest and most interesting articles in Mr. Ralfe's book is that on the Manx Shearwater (pp. 259 to 270). Willoughby described it in 1676 from a specimen taken on the Calf of Man, but the colony had been already briefly mentioned by Camden in 1586, and Chaloner, in 1656, had given a quaint account of the "Puffines," and from that time down various writers on Man have described them with more or less fantastic details as to habits. "In the account of 'The Profits of the Calve Island this year' (1708) is included 'the Puffins of ye sd Isle this year being 2,618 birds at 1*d.*, £13 5*s.* 6*d.*' (Manx Note-Book No. 8, p. 190)." Bishop

Wilson (1797) tells us that the young were ready to fly by the middle of August ; and that great numbers, few years less than 4,000 or 5,000, were then captured, to be salted for food. When we think of the vast numbers of Shearwaters that must have bred in the Isle of Man, it is astonishing to find that for many years the species has been extinct there, certainly some time before 1827. Various causes are given ; the ravages of rats that escaped from a wrecked Russian ship, the rivalry of the Common Puffin, now so very dominant, on the Calf, the settlement of man and the building of the lighthouse. A few Shearwaters are occasionally seen in summer in the sea round the island, as if to remind us of their once former greatness in the annals of Manx Ornithology.

We now come to the autumn, winter, and occasional visitors to the Isle of Man, and these may for convenience be divided into three groups—(1) land birds, (2) swimming birds, and (3) wading birds, using the last two terms in the widest sense possible.

1. Redwings and Fieldfares are regular winter visitors and fairly plentiful, the former frequenting the lowland pasture-lands, and the latter keeping to the uplands unless driven down by a spell of frosty weather, which is not common in Man. Both are widely distributed and common in Ireland. The Brambling being partial to woods, it is not surprising to find that in Man it is a scarce and uncertain winter visitor. In a phenomenal year of frost and snow (1897) a flock of fifty was seen. Flocks of thousands have been seen in the north of Ireland. The Snow Bunting is a regular winter visitor to both islands, though only in small numbers to Man. The Short-eared Owl has been mentioned before ; it is only necessary to add that it is a regular and by no means scarce visitor to Man, as it is to Ireland.

2. Not much can be said of the winter " swimming " birds of Man. The island not possessing lakes of any size, or sheltered marine loughs, the ducks and geese that frequent our Irish waters are conspicuous by their rarity, as would be expected. The following is a condensed summary of their occurrences :—

Grey Lag-Goose—Rare, 1 specimen recorded.

White-fronted Goose—Rare, 4 specimens recorded.

Bean-Goose—Probably not infrequent.
Barnacle Goose—Rare, 1 specimen recorded.
Brent Goose—A few, not infrequently.
Whooper Swan—Rare.
Bewick's Swan—Rather less rare.
Shoveler—Uncommon, about a dozen specimens recorded.
Pintail—Rare, a few recorded.
Wigeon—Fair numbers regularly.
Pochard—Small numbers regularly.
Tufted Duck—Perhaps occasional visitant.
Scaup Duck—Little known.
Golden-eye—Perhaps commonest of the diving Ducks.
Common Scoter—Probably a few each year.
Goosander—Very rare.
Red-breasted Merganser—Scarce, but perhaps regular migrant.
Great Northern Diver—Probably small numbers annually.
Black-throated Diver—Two occurrences.
Red-throated Diver—Probably small numbers annually.
Great Crested Grebe—One occurrence noted.
Red-necked Grebe—*Five* occurrences of this rare bird recorded.
Sclavonian Grebe—One occurrence noted.
Black-necked Grebe—One occurrence noted

This list of Grebes is remarkable from the fact that the Red-necked Grebe, the rarest of the larger Grebes, having only ten or eleven Irish records in seventy-five years, has occurred off the Manx coast five times in thirteen years; while the Great Crested Grebe, which in Ireland is resident and breeds on numerous lakes in many counties, has only occurred once in Man.

3. Again, owing to comparative absence of suitable mud-flats and large sandy bays, the list of "waders" is almost equally meagre in numbers. For instance, the Knot, which occurs regularly in Belfast Lough, sometimes in immense numbers, is practically unknown in Man, only five occurrences being recorded, two of these being merely "seen." Some of the other commoner Irish species are only found in small numbers in Man, but others, such as Redshanks and Dunlins, seem to be more frequent and better known It is quite pos-

sible that these two species may in the future be found breeding in Man in small numbers, although Mr. Ralfe does not hint at such a thing. It is scarcely worth while to enumerate the ten or twelve other waders I had noted as being found in small numbers. Enough has been said to indicate the general character of the avifauna of Man.

Finally, there is a long list of rare and occasional stragglers to both islands, which need not be considered at all here. Probably the Manx list would be extended if the same attention was paid to migration at the local lighthouses and light-ships as has been so conspicuously successful in Ireland under the guidance of Mr. Barrington.

Holywood, Co. Down.

NOTES.

BOTANY.

Cardamine amara in Co. Derry.

The occurrence of *Cardamine amara* in Co. Derry rests on the authority of the late Dr. David Moore, one station in Moyola Park, and another near Toome, being noted in *Cybele Hibernica*. As no recent botanists appear to have recorded the plant from these localities, it may be of interest to note that I found it on the 28th May growing in a wooded marsh on the edge of Lough Neagh, immediately north of Ballyronan, between four and five miles south of Toome. There was just one good patch of it, about seven feet in diameter, and it was in full flower on the date mentioned. It was easily seen from the public road in passing.

W. J. C. Tomlinson.

Belfast.

Leucojum æstivum in Co. Antrim.

It affords me pleasure to record the occurrence of *Leucojum æstivum* in a boggy wood, on the margin of Lough Neagh, two miles or so south of Antrim town. I came across it there on Saturday, 28th April. Being in full flower, the few plants there growing formed a very pretty sight, so unlike were they to the spongy marsh and tangled wood in which they grew. The existence of such a beautiful flower in such surroundings puzzled me; and it was not until I afterwards traced its identity (kindly

confirmed by Mr. Praeger), that I was aware of its importance and place in the flora of Ireland. The plant occurs about the centre of the wood which borders the lough shore, between the water's edge and the deer-park wall, and is very inaccessible. The ground is thickly covered with a stunted wood consisting mainly of Alder, Birch, and Sallows, with a dense undergrowth. Between it and the edge of the water it becomes more marshy, and is the haunt and breeding-ground of Ducks, Coots, and Moorhens. With this rare plant there grows an abundance of such common forms as *Caltha palustris*, *Ranunculus Flammula*, *Scilla nutans*, and *Orchis mascula*, the two latter in great plenty. The only rare plant I have found in the vicinity was *Sisymbrium Alliaria*; this occurs on drier ground at the edge of the wood towards the deer-park. I only observed a few plants, but they were deeply rooted and apparently long established. If native here, it is just such a plant as would suffer from the attentions of transplanters, who in all likelihood would be utterly unconscious of their vandalism. On the other hand, if we are to assume that it was originally of *castaway* origin, the question arises, how did it find its way to its present habitat? It could not have been by storm-floods as the lough now stands, for the sinuous line of cast-up refuse is twenty yards away at least towards the existing water, and the plant several feet above the highest reaches of storm periods. But about the middle of the last century, during some navigation works, the general level of the water in the lough was lowered, so that at its former level it may have reached the ground on which *Leucojum æstivum* is now established. Another possible source of origin may have been some garden (there is not one now within a mile or two) attached to a residence long since demolished to make way for the present very extensive deer-park. I offer these suggestions, but its occurrence is a matter for authoritative Irish botanists to ponder over with a view to solution. In this station it is decidedly sparse in quantity, but otherwise seems native enough in habit and environment. At all events, this first record of its existence in the North-east is noteworthy, and may prove of some assistance to botanists in tracing its history in Ireland.

W. J. C. Tomlinson.

Belfast.

Erinus alpinus and Galium cruciatum at Downpatrick.

On Whitmonday (June 4th), when visiting Downpatrick, I had the good fortune to see the above two rare plants in full bloom and very fine condition, in their already reported stations.

Erinus alpinus has spread in abundance all over the outside and inside of the gaol wall, and in a good many places on to the walls and roofs of the old houses adjoining. As this S. European plant has all the appearance of having come to stay, its future progress should be noted, as it may repeat the history of *Linaria Cymbalaria*, and find its way all over our country.

Galium cruciatum still holds on to its original station, and is growing in quantity and splendid condition at short intervals all round the side of the rath, for which place it seems to have a special liking, as I could not find it in any of the adjacent hedge banks.

N. CARROTHERS.

Belfast.

ZOOLOGY.

New Marine Mollusca for Co. Dublin.

Examination of some samples of shell-sand gathered in February last at various points on the Dublin coast has had the unexpected result of adding four species to the well-explored molluscan fauna of the county. None of the four species now recorded are mentioned in Mr. A. R. Nichols' "List of the Marine Mollusca of Ireland" as occurring anywhere in his Marine Province No. II., which stretches from St. John's Point in Down to Carnsore Point in Wexford, and embraces two-thirds of the east coast of Ireland.

Odostomia rissoides, Hanley.—A single specimen occurred in shell-sand from the North Bull. This I was inclined to name *O. eulimoides* of Hanley, but on sending the shell to Mr. Nichols he suggested *O. rissoides*, which name was confirmed by Dr. Chaster. The species is now on record for all six of the Irish marine provinces.

Philine pruinosa (Clark).—A single well-grown, and almost unworn specimen in shell-sand from the North Bull. This is apparently a very rare species in Ireland, but has perhaps been overlooked on account of its small size. Hitherto recorded only from the south and west of the island. My naming is confirmed by Dr. Chaster.

Cerithiopsis tubercularis (Montagu).—Two specimens of this species, which has not hitherto been recorded for Marine Province II., were gathered on the North Bull in February last. It is no doubt often confounded with *Cerithium reticulatum*, and is probably not uncommon in east Ireland.

Mytilus phaseolinus (Philippi).—A very juvenile state of this species, scarce one-twentieth of an inch in the longer diameter, turned up frequently in February last from the following stations—The north spit of Portrane peninsula, Portmacomoge Point, the South Bull, and the North Bull—no less than twenty-four specimens occurring in siftings from the last station. Failing to identify the specimens with any confidence, I sent them to Dr. Chaster, with a suggestion that they might be an immature *Arca*, but he named them without hesitation *M. phaseolinus*.

I am indebted to Dr. G. W. Chaster and to Mr. A. R. Nichols for kind assistance in the naming of these interesting species. The nomenclature used here is that of Jeffreys' "British Conchology."

N. COLGAN.

Sandycove, Co. Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include Badgers from Lord Wicklow, Mr. O. Murphy, and Lieut. M. I. Lakin; Green Monkeys from Capt. MacCarthy Morrogh and Mrs. L. G. Harkness; eight Ruffs and a pair of Godwits from Mr. H. B. Rathborne; five Rudd from Mr. F. Godden; an Angora Rabbit from Miss D. Pilkington; a Kestrel from Miss E. Kelly; a Sparrow-hawk from Mr. J. Johnston; a female Japanese Deer from the Duke of Bedford, and two young Leopard cubs from Major Bensley. Two Prairie Marmots and a Golden Agouti have been born in the Gardens. A pair of the Dublin Lion cubs have been purchased for the Victoria Memorial Park at Rangoon.

DUBLIN MICROSCOPICAL CLUB.

MAY 9.—The Club met at Leinster House, Dr. R. F. SCHARFF (President) in the chair.

Prof. HENRY H. DIXON showed sections of the anthers of *Lilium Martagon*, illustrating the various phases of heterotypic mitosis in the pollen-mother-cells.

L. B. SMYTH exhibited seedling of *Drosera rotundifolia*, showing linear seed-leaves, and the first foliage leaf with large glands.

Dr. G. H. PETHYBRIDGE exhibited a series of photomicrographs, in the form of lantern slides, of plant tissues, and called attention to the superiority of photomicrographs to the ordinary wall diagrams for use in teaching. The slides were arranged in a specially devised frame with grooved bars permitting the easy interchange of slides, and provided with a transparent but matt background against which the slides are viewed by transmitted light.

DAVID M'ARDLE exhibited *Lejeunea flava*, Swartz, bearing the pear-shaped perianths and antheridia. The specimens were collected on Lambay, Co. Dublin, on 14th April last, and are typical when compared with South American specimens. This locality marks the second station for this rare liverwort in the Co. Dublin, it having been found in Howth demesne in 1897. Its geographical distribution is interesting; it is found in South America, Rio Janeiro, Cuba, &c. For comparison *Lejeunea Holtii* was shown, which is also a remarkable plant, and differs from every other *Lejeunea* in having the female flowers borne on short branches which put forth no subfloral innovations, and in all the world has only been found in Co. Kerry. The specimens exhibited were collected at Anascaul, near Dingle, in May, 1894.

W. F. GUNN showed a longitudinal tangential section of the wood of the common fig, *Ficus carica*, under polarized light. The use of a selenite

plate produced a very complete differentiation of the tissues of the wood, the result being equal to that obtained by multiple staining.

BELFAST NATURALISTS' FIELD CLUB.

May 19.—The first excursion of the 44th year was held to the district between Leitrim and Castlewellan, opened up by the new branch line of the Great Northern Railway. About seventy members attended. On arriving at Leitrim station the members visited Magheramayo Fort, and the granite quarries and works, afterwards walking into Castlewellan, where the famous gardens and grounds were thrown open to the Club by the kindness of Lord Annesley. Tea was served in the Annesley Arms at six o'clock, and afterwards a short business meeting was held, the President (W. H. Phillips) in the chair, when votes of thanks were passed, and four new members elected. The party afterwards returned by train. The Mountain Fern, *Lastrea Oreopteris*, which is not common, was obtained at Tullynasoo Mountain, near the quarries. The ornithologists agreed that, on the whole, the district traversed was poor in bird life, the Meadow Pipit being the dominant species; a few other common species were observed. The movements of a pair of Pied Wagtails in the vicinity of one of the lunching groups near the quarries pointed to the proximity of their nest. After a short search this was found; it was in a crevice in a heap of granite chips, contained one egg, and was profusely lined with feathers. Apart from captive birds, thirty-five species in all were observed during the day. In the short time spent at the railway station, prior to leaving Castlewellan, many Woodcocks were observed taking their customary evening flight, and, judging by the number seen, it was evident that here, as elsewhere in Ireland of late years, this bird is on the increase, and is breeding in tolerable profusion.

June 2.—Excursion to Tandragee, Co. Armagh.—Ninety members travelled by the 2.15 p.m. train to Tandragee station, which is situated at the Madden Bridge, one-and-a-half miles east of the town. On arrival the party were met by a local club member, the Rev. W. F. Johnson, M.A., of Poyntzpass, and his wife; also by the Rector, the Rev. Wm. M'Endoo, B.D., who escorted the party over the parish church, and also through the Castle demesne. On reaching the River Cushen, on the way to the town, the party separated into two sections—about one-third of those present entering the lower demesne at the River bridge, and working their way through it to the other end, a little south of the town. After leaving it, they rejoined the other section in the upper demesne attached to the Castle. The size, beauty, and variety of the conifers was especially noteworthy. The River Cushen flows through the lower demesne, which is locally spoken of as the Forge Wood. The Kingfisher and the Dipper occur here, a pair indeed of the former being noted. The coleopterists, led by Mr. Johnson, bottled quite a number of specimens for further examination. It is also good for Mollusca, but the

hurried nature of the visit on the occasion did not give time enough to the conchologists. Some twenty species, five of which were slugs, were obtained. The rarest were *Helix lamellata*, *Helix fusca*, and *Vertigo edentula*. The pretty little *Arion minimus* was common; large specimens of the Tree Slug, *Limax marginatus*, were also collected. Quite a number of interesting plants were noted by the botanists. The less common species were :—*Lychnis diurna*, *Sisymbrium Alliaria*, *Galium Mollugo*, *Veronica montana*, *Lathræa squamaria*, *Mercurialis perennis*, *Epipactis latifolia*, *Carex pendula*, and *Ceterach officinarum*. The last plant named does not seem to have been recorded from the locality before; the same remark applies to *Sisymbrium Alliaria*. The Dog's Mercury, *Mercurialis perennis*, is plentiful in both demesnes, but another colony of it was pointed out by the conductor, close to the roadside, near the Madden Bridge, and which does not appear to have been recorded hitherto. Tea was provided, after which a formal meeting of the Club took place.

May 7.—Geological Section.—A meeting was held in the Museum, W. H. Phillips (President of the Club) in the chair. The meeting was convened for the purpose of presenting to G. C. Gough an address and testimonial. After tea, the secretary of the Section was called upon to read the address, which stated that the members desired to take the opportunity of Mr. Gough's approaching departure from Belfast to express their deep regret at the severance of a friendship unhappily as brief as it has been enjoyable. Since Mr. Gough came to Belfast, four years ago, he had given a large share of his valuable time to furthering the objects for which the Club existed, as chairman of the Geological Section, which had progressed in a marked manner under his guidance, and as Honorary Secretary of the Club. In conclusion, hearty congratulations were offered to Mr. Gough on his appointment to the Professorship of Natural History in the Agricultural College, Cirencester, with good wishes for his continued success.

Mrs. J. Wright made the presentation (a bicycle), to which Mr. Gough in reply thanked the members. Professor Gregg Wilson, Joseph Wright, G. Donaldson, Robert Patterson, and W. J. C. Tomlinson also spoke in warm terms of Mr. Gough's services. During the evening the following exhibited objects of interest—Miss M. K. Andrews, R. Bell, N. H. Foster, J. Wright, W. H. Gallway, and J. L. S. Jackson.

May 26.—Geological Section.—Excursion to Longhurst, the residence of J. Brown, F.R.S. The object of the excursion was to inspect the gravel pit in the grounds of Longhurst, which was recently brought to notice by the investigations of Mr. J. Wright, F.G.S. Mr. Brown had a microscope and slides in readiness, so that the party were enabled to inspect the foraminifera which have been obtained. The party then proceeded to the pit and were delighted with the section exposed. J. Wright gave a short sketch of the features represented, and called attention to his theory as to their marine origin. He showed that in early ages the land surface was at a lower level than at present, and was probably swept by sea currents from the direction of

Lough Neagh towards Belfast Lough. Owing to the varying strengths of the currents and levels of the sea bed, the pebbles and other sediment carried by the currents were deposited as shown in the exposed section. His description of the gravel pit, together with the balls of rolled clay, also his report on his microscopic investigation of the clay, appeared in the *Irish Naturalist*, June, 1905. Mr. Wright described the process of treating the clay in order to extract the foraminifera. A spirited discussion on the subject ensued, in which J. Brown, W. Gray, T. Anderson, and R. May took part. The following erratics were noticed :—Eurite (with riebeckite), dolerite, schist, sandstone (Ballycastle), basalts, and Cretaceous rocks (with included fossils).

Afterwards the party, under the guidance of Mr. Brown, were conducted over the grounds and across the Lagan in order to visit the gardens and other interesting objects, great admiration being heard from all present. Coming home by way of Shaw's Bridge the section and friends were kindly entertained to tea by Mrs. W. J. Fennell, at Deramore Drive. Subsequently Mr. Fennell exhibited his collection of geological specimens and other objects of interest.

JUNE 9.—GEOLOGICAL SECTION.—Excursion to Carnmoney.—There was a large attendance of members and friends. On arrival at Glengormley, the road was taken to Carnmoney Church. Afterwards the members proceeded to the quarry, which is situated at the base of Carnmoney Hill, the neck or core of an extinct volcano, through which the basalts which flowed over this part of the County Antrim were poured. The rock itself is a crystalline dolerite, containing a good deal of magnetite, and in some parts is very vesicular.

DUBLIN NATURALISTS' FIELD CLUB.

MAY 19.—EXCURSION TO SEA-SHORE BETWEEN SKERRIES AND BALBRIGGAN.—Members and visitors, to the number of twenty-one, left Amiens-street by the 12.30 train. On arrival at Skerries, Rev. Charles Benson, LL.D., took charge of the party and conducted it to the seashore, where under his skilled guidance the members studied the birds of the district. On reaching Ardgillan, the party turned inland and reached Balbriggan through the demesnes of Ardgillan and Hampden. After having tea at the Hamilton Arms, return to town was made by the 8.27 train. Thirty-four species of land birds were observed during the day.

OMAGH NATURALISTS' FIELD CLUB.

We rejoice to learn that a Field Club has been started in Omagh, making the second society now working in Co. Tyrone. We heartily wish every success to this new Irish natural history association. Mr. J. Henry is the honorary secretary.

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THE BALLYCUMBER BOG-SLIDE.

BY R. LLOYD PRAEGER.

The Dublin press of June 20 contained an account of what was apparently a sudden and extensive bog-slide which had occurred on the previous day near the village of Ballycumber, King's Co. Four acres of bog had been "torn up and scattered as if by an explosion," while a man narrowly escaped being buried. The people in terror had driven their cattle off the adjoining lands, and abandoned the dwellings which lay nearest to the scene, while the bog "kept heaving in all directions." I saw Prof. Cole, Director of the Geological Survey, that afternoon, and as a consequence Mr. H. J. Seymour and I found ourselves next morning at Ballycumber. On the journey we had read in the papers that the bog-slide had "worked great damage to crops and turf," and that the people were in a state of trepidation, being "alarmed by crackling noises;" a list of twelve tenants was given who had had their lands covered by the bog-stuff, and heavy rains had made the situation critical. It was stated that the "swiftly-running Brosna River, considerably flooded by rains," passed within thirty yards of where the moving bog now rested, and that any further movement would choke the river, and flood large areas of crops.

Tramping out of Ballycumber under a scorching sun, laden with cameras and other implements of the chase, we therefore hoped to catch the bog-slide in the very act. As we approached the scene of the disaster, enquiries from a passing girl only elicited a smile and a "never heard of it." Further enquiries were more successful, and we were directed to a spot where several men were peacefully cutting and stacking turf, aided by a donkey and a pony. We then discovered that the disastrous bog-slide was a beautiful newspaper hoax. There was no destroyed fuel or crops, or ground covered by outbursts of peaty matter; nor was there any interruption of the tranquil life in the cottages whose chimneys peacefully smoked some hundreds of yards away. The "swiftly-flowing Brosna,"

to which the term "stagnant ditch" would be equally applicable, was nearly a mile away. Sitting on the dry edge of a turf cutting in the centre of the "explosion," enjoying our lunches, we heard from one of the heroes of the tragedy his account of the affair. What had actually happened was this. The turf was cut along a long face, in benches about twenty feet wide. The top three feet, which was no use as fuel, was thrown into a deep trench cut at the back of the working. No cross drains were dug to drain the bog in front of the advance of the cutters. Therefore very naturally the front gave way. The bog slid quickly forward, filling the trenches excavated below the general level of the cut-away portion, causing a horizontal bulging of the general line of the cuttings to an extent of perhaps thirty feet, and a vertical bulging of the edge of the cut-away part which received the pressure of the slipping portion to the extent of about five feet. All was over in ten minutes, and some of the men engaged in turf-cutting did not even leave their work. The effect of the slide on the bog itself is seen over about two acres, the level being lowered a few feet, and the surface fissured. Similar slight slips are bound to occur on every bog where cutting is carried on—as it often is—with so complete a disregard to drainage.

My reason for dealing with so insignificant an occurrence at such length is this: that in many cases, the only accounts of bog-slides which are published at all are those in the daily press; and the man of science, seeking information, is naturally inclined to use what material he can find in newspapers. This is exemplified in the report[1] by Prof. Sollas and myself on the Kerry bog-slide of Christmas, 1896. But if local reporters in general possess the lively imagination which appears to be the inheritance of those of King's County, the value of these press reports from the scientific point of view appears somewhat dubious.

Dublin.

[1] *Sci. Proc. R. Dublin Soc.*, viii., no. 57, 1897.

NOTES ON THE GENUS ENCHYTRÆUS,

WITH DESCRIPTION OF A NEW SPECIES.

BY ROWLAND SOUTHERN.

THERE are at the present day more than 100 species of the Family Enchytræidæ known, of which the larger number are recorded from Europe. Of these, only twelve have been recorded from Great Britain, whilst the Irish list contains only seven species. This deplorable state of affairs is not due to the poverty of our fauna, but to the lack of interest shown by Irish naturalists in the Oligochæta. Since the time of Robert Templeton, in the early part of last century, no naturalist has worked at the Irish Oligochæta, till a few years ago, when the Rev. Hilderic Friend published several papers in the *Irish Naturalist*, and in the *Proceedings* of the Royal Irish Academy. He confined his attention chiefly to the Lumbricidæ, or Earth-worms proper, but he also recorded seven species belonging to the family Enchytræidæ, one of which, *Fridericia ulmicola*, was new to science[1]. In the genus Enchytræus, with which this paper is chiefly concerned, he recorded a species under the name of *Enchytræus parvulus*[2]. He has since recognised that this species is identical with one described by Michaelsen, viz., *Enchytræus argenteus*[3].

The members of the family Enchytræidæ are characterised by the possession of short setæ, not bifid at the extremity. The testes are in the eleventh segment, the male pores on the twelfth segment. Spermathecæ usually one pair in the fifth segment, opening on the intersegment 4–5. They are terrestrial, aquatic, or littoral worms.

In the genus Enchytræus, the setæ of each bundle are of equal length, straight in the shaft, only hooked at the internal end. There are four bundles of setæ in each segment, two ventral and two lateral. Salivary glands are present, and the œsophagus passes gradually into the intestine.

I have now to record three species of the genus Enchytræus new to the Irish fauna, one of which is also new to science.

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[1] *Ir. Nat.*, 1898, p. 195. [2] *Ir. Nat.*, 1902, p. 110. [3] *Tierreich*, vol x., p. 91.

Enchytræus sabulosus, n. sp.

I found numerous examples of the worm, among other Enchytræids, on Sandymount strand, Dublin Bay. It lives under stones, and amongst the gravel at high-water mark (*sabulum*, gravel; *sabulosus*, gravelly). It was in company with *Enchytræus albidus*, to which worm it is most nearly related, so I was able to compare it closely with the latter, before deciding that it was new.

Enchytræus sabulosus is a delicate, milky worm, with colourless blood. It is 10–15 mm. long, and ·25–·5 mm. thick. The number of segments is about 45–48. The *setæ* are of equal length, slightly thicker in the middle and hooked at the internal end. (Fig. 1). There are usually three setæ in each bundle, but never more, sometimes two only. The number is very constant, and serves to distinguish this species from *Enchytræus albidus*, which always has at least four setæ in some bundles.

The *brain* is about twice as broad as long, and its sides are almost parallel. Its posterior border is straight, or slightly concave. (Fig. 2).

The *epidermis* shows several very faint rows of glands on each segment. The *clitellum* occupies segments 12 and 13. It is not so glandular and conspicuous as that of *Enchytræus albidus*.

There are three pairs of *septal glands* in segments 5, 6, and 7. The first and second pairs are simple, but the third pair are bilobed. (Fig. 3, c, e, f.)

The *salivary glands* (Fig. 3, b) arise from the sides of the œsophagus just behind the pharynx. They are of considerable length, twisted and wrinkled, but unbranched, and of the same diameter throughout.

The *alimentary canal*, behind the pharynx, and, except in the clitellar region, is thickly coated with large peritoneal cells, which are full of oil drops. (Fig. 4, b). This character is somewhat variable. In some cases the peritoneal cells were almost as conspicuous as in *Enchytræus Bucholzii*, whilst in others, they hardly exceeded those of *Enchytræus albidus* in size.

There is a small *dorsal pore* present, between the prostomium and the first body-segment. The *dorsal vessel* rises between the 16th and 17th segments. (Fig. 4, a.).

The *body-cavity* contains numerous pear-shaped corpuscles, very granular in appearance, either floating freely in the cœlome, or attached to the body-wall or septa by their pointed ends. Peritoneal cells, detached from the outer wall of the intestine, are also to be seen, floating freely in the body-cavity.

Fig. 1.

Fig. 2.

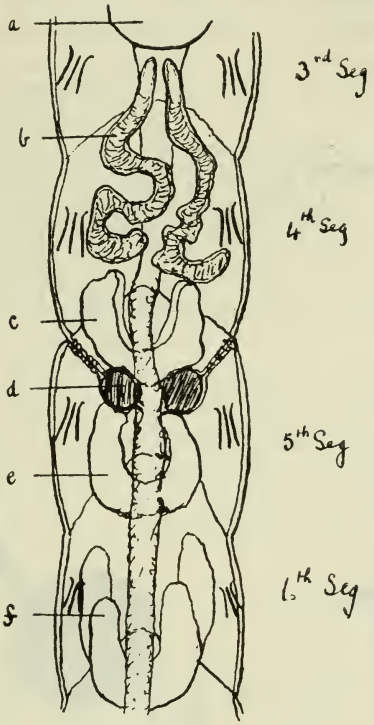

Fig. 3.

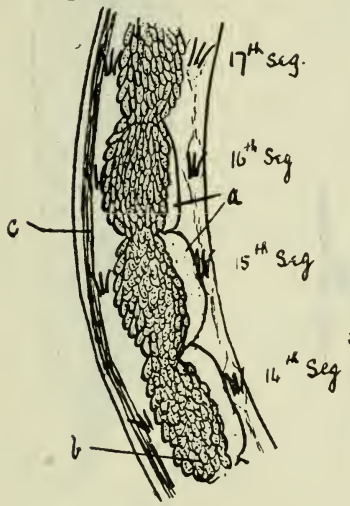

Fig. 4.

All the figures were drawn from living specimens.

Fig. 1. Single seta.

Fig. 2. Brain, seen from above.

Fig. 3. Diagram of 3rd–6th segments :—

a, pharynx ; *b*, salivary gland ; *c*, *e*, *f*, septal glands ; *d*, spermatheca.

Fig. 4. Showing the origin of the dorsal vessel *a*, in the 16th -17th intersegment ; *b*, peritoneal cells of intestine ; *c*, ventral nerve cord

If the body of the worm is squeezed under a cover-glass, these cells may be seen breaking away from the wall of the intestine.

The *nephridia* are oval-shaped bodies flattened from side to side. They consist of three parts—a small anteseptal part constituting the funnel (Fig. 5, a); a flat, oval post-septal part; and a thick duct (*d*), about equal in length to the post-septal part. The duct arises from the hinder end of the post-septal, and opens to the exterior in front of the ventral setæ. The lumen of the nephridium is convoluted, but does not

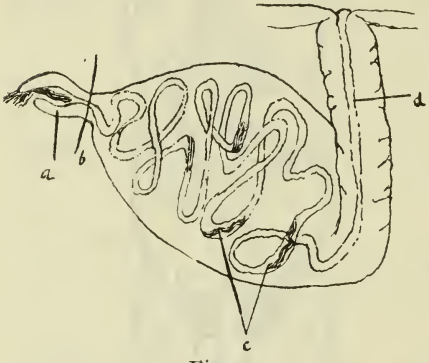

Fig. 5.

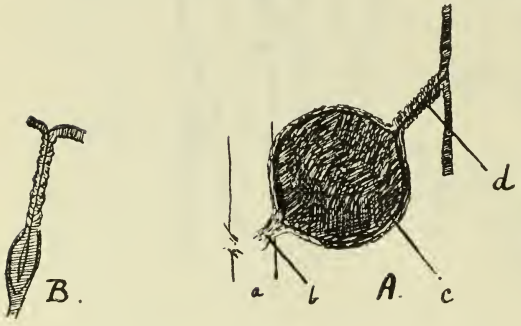

Fig. 6.

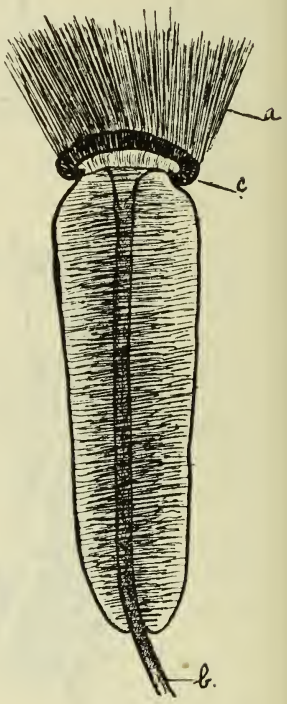

Fig. 7.

Fig. 5. Nephridium.—*a*, funnel; *b*, septum; *c*, ciliated regions; *d*, duct.

Fig. 6. Spermathecæ.—*A*, Fully mature; *a*, œsophagus; *b*, duct communicating with œsophagus; *c*, ampulla full of sperm; *d*, duct covered with glands.

B, Immature spermatheca.

Fig. 7. Sperm funnel—*a*, sperm; *b*, sperm duct; *c*, lip of funnel.

anastomose, as has been stated by M. Bolsius[1], to be the case in other Enchytræids. If the nephridia are studied in the living worm, patches of cilia may be seen in active motion in several parts of the lumen. (Fig. 5, c).

The *spermathecæ* lie, as usual, in the fifth segment. (Fig. 3, d, Fig. 6). They vary very much in form and size, according to their state of maturity. The shape of preserved specimens, also, is very different from that of the living worm. The mature spermatheca consists of three parts (Fig. 6, A). There is a narrow duct (*b*) leading into the œsophagus, an extremely large, spherical, transparent ampulla (*c*), coloured golden-yellow by the contained sperm, and a duct (*e*), leading to the exterior, between the 4th and 5th segments. The latter duct is thickly covered with small glands along its whole length. It is nearly equal in length to the ampulla, and twice as long as the duct leading into the œsophagus. Fig. 6, B represents an immature spermatheca. When mature, the spermathecæ are very conspicuous, and the ampulla is much larger than that of *Enchytræus albidus*.

The *testes*, when ripe, fill segments 9, 10, and 11. The *sperm funnels* (fig. 7) are three to four times as long as broad. The mouth is coloured golden-brown with sperm (*a*). The lip (*c*) is very conspicuous. The *sperm ducts* are very long, extending back sometimes to the 20th segment. They open to the exterior on segment 12. The *ovaries* are in segment 12.

The following characters serve to differentiate this species from all others:—

Length, 10–15 mm. Thickness, 0·25–0·5 mm. Number of segments, 45–48. Setæ usually 3 in each bundle, never more. Brain twice as long as broad, slightly concave or straight behind. Peritoneal cells of gut large, and full of oil drops. Anteseptal part of nephridium consisting only of the funnel. Spermathecæ with large ampullæ, the duct covered with glands. Sperm funnel 3–4 times as long as broad.

Enchytræus sabulosus is most nearly related to *E. albidus*, though it occupies a very central position in the genus. It differs from the last mentioned worm (i.) in the number of

[1] *Mem. d. Acad. Pont. d. Nuovei Lincei*, vol. ix., 1893.

setæ, never being more than three in a bundle; (ii.) in the structure of the spermathecæ and sperm-funnels; (iii.) in size and number of segments; (iv.) and, to a less extent, in the form of the septal glands, and the more or less thick peritoneal lining to the gut.

Locality.—Among gravel, and under stones at high-water mark, Sandymount strand; Dublin Bay.

Enchytræus albidus, Henle.

(For the full synonomy and literature of this worm, see the "Tierreich" volume on "Oligochæta," by Michaelsen, page 89.)

This worm has a very wide distribution. It has been recorded from all parts of Europe, from North and South America, and from Asia. It shows considerable variation in structure, and has been named and described as new more than a dozen times. I am inclined to think that several well-marked varieties are included under this name.

Enchytræus albidus is a milky-white worm; 10–35 mm. long, 0·5–1·0 mm. thick. Total number of segments, 50–75. Setæ 3–5, rarely 6, usually 4, in a bundle. Brain slightly concave behind. Nephridia as in *Enchytræus sabulosus*. There are three pairs of lobed septal glands. Sperm-duct funnels 4–6 times as long as broad. The spermathecæ consist of an irregular ampulla, and a duct of equal length, thickly coated with glands. This species has been recorded in England by Goodrich, under the name *Enchytræus hortensis*.[1] I expect it will be found commonly in all parts of Ireland.

Irish Localities.—In mud at Dundrum, Co. Dublin; among stones, refuse, and manure at high-water mark, round Dublin Bay; and at Baldoyle.

Enchytræus Bucholzii, Vejdovsky.

(For synonomy and literature, see the "Tierreich" volume on "Oligochæta," by Michaelsen, page 90).

This worm has not previously been recorded from the British Isles, though it seems to be very common. It is a delicate, white worm, 5–10 mm. in length. Total number

[1] *Quart. Jour. Micr. Sci.*, vol. xxxix., p. 51.

of segments, 25–28. The setæ are usually 3 in a bundle, often 2, and rarely 4. Brain slightly concave behind.

The salivary glands are long, slender, and coiled. The intestine is thickly coated with a conspicuous layer of large peritoneal cells, full of shining oil drops. The nephridia have a slender anteseptal portion, two or three times as long as broad; the postseptal portion is oval, and has a short duct. The sperm-funnel and duct are comparatively short, with large glands at the external opening. The spermatheca has a sack-like ampulla, and slender duct, with a ring of glands near the external opening.

Enchytræus Bucholzii has been recorded from various parts of Europe, and also from Brazil and Patagonia.

IRISH LOCALITIES.—Dundrum, Co. Dublin, in mud, under a tree-stump; Bray Head, in manure; Limerick, in soil; Mammoth Cave, Doneraile, Co. Cork.

Key to the Irish Species of Enchytræus.

1. { Perivisceral corpuscles deeply pigmented. *E. argenteus.*
   { Perivisceral corpuscles not pigmented. 2.

2. { Salivary glands very long and coiled. Worm less than 10 mm. long. *E. Bucholzii.*
   { Salivary glands not so long, and not coiled. Worm more than 10 mm. long. 3.

3. { Setæ, not more than 3 in a bundle. *E. sabulosus.*
   { Setæ, usually up to 4 or 5 in a bundle. *E. albidus.*

Dublin Museum.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Manchurian Deer from the Duke of Bedford, Green Monkeys from Capt. MacCarthy Morrogh and Mr. C. Bennett, a Sulphur-crested Cockatoo from Mr. Noel Bryers, two Leopard Cubs from Major and Mrs. Beasley, a Gannet from Mr. R. S. Webster, a Blue-fronted Amazon from Mrs. Wrench, a pair of Call Ducks from Capt. Boxer, an Egyptian Goose from Mr. J. Dunn, and three Weasels from Mr. W. E. Peebles.

A Chimpanzee, a Spider Monkey, a Seal, a Great Northern Diver, three Arctic Knots, a pair of Red-crowned Doves, a pair of Crested Doves, and a Nuthatch, have been bought. Three Lion cubs and three Wolf cubs have been born in the Gardens.

BELFAST NATURALISTS' FIELD CLUB.

JUNE 16TH.—EXCURSION ON LOUGH NEAGH TO ARDBOE AND TOOME.—A party of 85 members and friends attended. Leaving Belfast by the 9.15 a.m. train, Antrim was reached at 10. Then the party walked to the little quay on the Six-mile Water, where the latter falls into Lough Neagh, and embarking on the S.S. *Lough Neagh Queen*, a start was made across the lough for the Tyrone shore, where all disembarked at Newport Trench, shortly after noon. The party then walked southward along the shore by a tolerable path to Ardboe Point, a mile distant. Here some time was spent examining the very fine high cross and the ruins of the old monastery and church. Short descriptive addresses were given by three of the members, W. J. Fennell. M.R.I.A., William Gray, M.R.I.A., and Rev. W. S. Smith. Returning to the steamer a start was made for Toome Bridge, which was reached about 3.15. A period of two hours was allowed here. The principal object of interest to the majority of the party was the diatomaceous earth industry carried on by Messrs. Grant. Large tracts of the flat land on each side of the River Bann are covered to a depth of several feet with an extensive deposit of diatomaceous earth; and it was interesting to see it dug out like peat, wheeled away to another part of the field, and there stacked up to dry, when it becomes white and floury. After tea, a short business meeting was held, when seven new members were elected. Toome was left by steamer at 5.20, and Antrim reached again at 7.15, in good time to take the 7.52 train for Belfast, where all arrived at 8.35. Too much time was occupied on the water to enable the naturalists to render a big account regarding the places visited. When at Ardboe some Yellow Wagtails were seen, which was quite an event to the ornithologists, this being one of the few places where this exceedingly local visitor to Ulster occurs. A pair of Oystercatchers on the shore near Newport Trench seemed by their behaviour to indicate that their young were in the neighbourhood, but a hurried examination failed to discover them. This bird has not hitherto been recorded as breeding in County Tyrone. The botanists were fortunate in seeing in full flower at Ardboe that provokingly erratic plant, the Henbane, *Hyoscyamus niger*. Two interesting plants were observed in plenty on a sandy stretch north of Ardboe, the Soapwort, *Saponaria officinalis*, and the Mountain Groundsel, *Senecio sylvaticus*. *Ranunculus heterophyllus* was also obtained at one spot, and among the other less common species noted were *Myrrhis odorata*, *Lychnis diurna*, *Lysimachia Nummularia*, *Conium maculatum*, *Valerianella olitoria*, and *Habenaria chlorantha*. At Toome the best plant was that rare Pepper-wort, *Lepidium campestre*, which was found in a dry sandy ditch bank by the road, on the County Derry side of the bridge, a first county record apparently.

JUNE 30.—EXCURSION TO SHANE'S CASTLE.—A party of over 80 travelled from York-road Terminus, by the 12.25 p.m. train, to Randalstown Station, on arrival at which they were met by a few local members. Prior to entering Shane's Castle demesne, Mr. A. R. Hogg, one of the members, photographed the party. About four hours altogether was the

time spent in the exploration of the demesne. The long two-mile stretch from the entrance to the point where the River Main debouches into Lough Neagh, at Main-water-foot, was much admired; and the groves and river banks proved good collecting grounds. On arrival at the impressive ruins of the old ancestral castle of the O'Neills, destroyed by fire in 1816, and never rebuilt, the Rev. W. S. Smith, of Antrim, a Club member, gave a brief account of the history of the castle and of the O'Neills. The party subsequently walked into Antrim, where they met for tea. A short business meeting was afterwards held. The members returned to town by the 7.52 p.m. train from Antrim. The following plants were noted during the afternoon:—*Thalictrum flavum*, *Ranunculus penicillatus*, *Sisymbrium Alliaria*, *Viola canina*, *Arenaria trinervis*, *Sedum Telephium*, *Galium boreale*, *Lycopus europæus*, *Scutellaria galericulata*, *Lamium album*, *Neottia Nidus-avis*, *Briza media*, and *Sisyrinchium angustifolium*. The last, considered a doubtful native, has not hitherto been recorded from Shane's Castle, although included in the flora of a few other Irish counties. The ornithologists observed forty-eight species of birds during the day. A single Kingfisher was seen on the river. The Dipper was also seen, besides a Grey Wagtail and a pair of Common Sandpipers. A large family of Long-tailed Tits and a Tree-creeper were busily engaged in searching the same tree for insect food. Of course Lough Neagh afforded an opportunity of seeing some interesting birds. Nine adult Great Crested Grebes were seen together not far from the shore, and many Tufted Ducks, evidently breeding, resented the invasion of their ground. Mallards were common, while a male Red-breasted Merganser, accompanied by two females, gave rise to interesting speculations as to where they might be breeding. Black-headed Gulls were very numerous on the lake, and two other species of gulls were seen, while Common Terns were fairly abundant. Sandpipers fluttered about the shingle, and a beautiful nest with four eggs was found. A single Cormorant was seen, and of course innumerable Coots croaked at the intruders and hastened to hide their young.

OMAGH NATURALISTS' FIELD CLUB.

MAY 17.—The first ramble of this Club took place in inclement weather. Mountfield demesne, on the side of Mullacarn Mountain, was visited, and something was learnt of its flora and fauna.

MAY 31.—The Club, under the leadership of P. G. DALLINGER, visited Tattynure Wood, on the right bank of the Strule, midway between Omagh and Newtownstewart. Botany was the chief study: many of the ordinary species were found, but nothing new.

JUNE 21.—A number of the members visited Rossnowlagh (Donegal Bay). The day was rather wet and gloomy, nevertheless some flower photography was accomplished, and the Sea-Devil or Angel Fish (*Rhina squatina*), whose ugliness, like the bull-dog's, is his beauty, had his features under the lens. The Wheatear and Black Guillemot were the only birds noticed out of the ordinary.

JUNE 28.—Close on 30 members and adherents visited the demesne Cecil Manor, near Augher, Co. Tyrone. The beautifully wooded slopes of Knockmany, the gardens containing rare exotic trees, the lakes with waterlilies in bloom, and the glen, were much admired. The party left for Omagh at 8.30 p.m., after spending a delightful evening.

DUBLIN NATURALISTS' FIELD CLUB.

JUNE 16.—EXCURSION TO CARTON.—Members and visitors to the number of fifty left Broadstone by the 3.30 train for Maynooth. On arrival the party visited Carton demesne, and botanical work was undertaken for some hours. Return to Maynooth was made for tea, after which the party worked along the canal until 8.30, when return was made to town.

NOTES.

BOTANY.

Spiranthes Romanzoviana.

At a recent meeting of the Royal Irish Academy I exhibited a series of dried specimens of this plant from its four known Ulster stations, and mentioned that the question of the identity of the Irish plant had been recently under consideration as follows. Mr. Arthur Bennett had written me drawing attention to specimens of *Gyrostachys stricta*, Rydberg, in his herbarium, received from the late Dr. Moring. This plant was described as a new species by Rydberg in his "Flora of Montana," p. 107 (1900), and accepted by Dr. Britton in his "Manual of the Flora of the United States and Canada," p. 299 (1901). On comparison, Mr. Bennett was inclined to refer specimens of *S. Romanozoviana* from Co. Armagh and Co. Derry, which I had sent him some years ago, to *S.* (or *G.*) *stricta*, and suggested that an expert should be consulted. Accordingly, I sent my specimens from all four Ulster stations to Dr. Rendle, who kindly reported on them. At the same time he sent a copy of Ames's "Monograph of the American Species of Spiranthes" (1905), in which, as he pointed out, this orchid authority quotes Rydberg's plant as identical with *S. Romanzoviana*, and not a distinct species. Dr. Rendle's examination leads him to agree in not regarding *G. stricta* as distinct; and he would refer all the Irish specimens (the Berehaven plant included) to *S. Romanozoviana*. In a discussion which followed my remarks, Mr. F. W. Moore remarked that he had not heard of the Berehaven plant being seen for a long time, and feared it had been exterminated by certain ploughing operations. Whereupon Mr. R. M. Barrington conveyed the welcome intelligence that Mr. A. H. Evans, of Cambridge, had visited Berehaven in 1904 to obtain the plant, and had procured some specimens without difficulty.

R. LLOYD PRAEGER.

Dublin.

Plants in the South-East.

Brief trips during the spring were the occasion of the making of the following casual notes. *Viola lutea* was traced from its headquarters around Brittas as far up the King's River valley as Knockalt Bridge (800 feet), where it was joined by *Saxifraga stellaris*. It was particularly abundant in a pasture south of Ballyknockan, not only in the typical yellow form, but with purple petals (var. *amœna*, Watson), and was accompanied by a profusion of *Ophioglossum*, *Botrychium*, *Orchis Morio*, *O. mascula*, and three Habenarias. *Polypodium Phegopteris* grew on cliffs north-east of Mullacor. *Cystopteris fragilis*, whose only two recorded Wicklow stations are on high mountains, was seen grown sparingly on the walls of one of the Seven Churches *Isoetes lacustris* is abundant in the lower lake at Glendalough.

Going further westward, *Potentilla procumbens* and *Populus tremula* (seemingly native), both new to Kilkenny, were seen about Inistioge and Thomastown, and in its old station at Inistioge *Colchicum autumnale* formed numerous tufts of dark foliage in damp meadows. *Poa nemoralis*, also new to Kilkenny, grew in hedges near Brittas, north of Inistioge. In Borris demesne, Co. Carlow, *Lastrea spinulosa* grew on a tree-stump. On the railway bank of the Carlow branch, close to Kildare junction, removed from any cultivation or road, *Euphorbia Cyparassias* has a large colony.

R. Ll. Praeger.

Dublin.

ZOOLOGY.

Anodonta cygnea in Co. Clare.

On June 14th last, the Limerick Field Club paid a visit to Cullane in Co. Clare. While walking round a little sheet of water known as Cragaunowen Lake, one of the members found some broken shells of large size, and they were recognised as broken *Anodonta cygnea*. Considering them sufficiently interesting to invite another visit to the spot, Dr. George Fogerty and I drove out a few days later. The level of the lake, which is situated about five miles inland from the village of Sixmilebridge, was very low, a large piece of foreshore being uncovered, and on this lay quantities of damaged shells, but not a living specimen was to be seen. However, after a search which necessitated wading into the lake, a colony was found in about eighteen inches of water. The shells lay thickly on the muddy bottom, covering an area of about ten square yards. The majority of the specimens were about $4\frac{1}{2}$ inches long and 2 inches wide, though some reached $5\frac{1}{4}$ inches by $2\frac{1}{2}$ inches.

I sent some to the Hon. Recorder of the Conchological Society for registration, and I think this makes the first recorded instance of *Anodonta cygnea* in Co. Clare. I may mention that the full list of shell

found in the Limerick district, since I commenced collecting some months ago, is published in the *Journal of the Limerick Field Club* for June.

HARRY FOGERTY.

Limerick.

New Localities for Geomalacus maculosus.

On June 18 I found a specimen of the slug *Geomalacus maculosus* on the western face of Bolus Head, Co. Kerry, and on same day found another specimen on the eastern slope of Kilkeencragh mountain, near the pass between that mountain and Killemlough Hill. In both cases the slug was found on the site of old ruins.

M. J. DELAP.

Valentia, Co. Kerry.

Helix tormensis in Ireland.

In the *Nachrichtsblatt d. deutschen Malakozoologischen Gesellschaft*, part 2, 1906, Mr. Clessin refers to the fact that *Helix tormensis*, Sandberger, occurs in the Pleistocene tuff deposits, near Regensburg, in Bavaria. This species has been described by Sandberger as being heavier in texture than *Helix nemoralis*, to which it was otherwise closely allied. I therefore sent some specimens of our heavy *Helix nemoralis* from the well known sandy deposit of Roundstone, Co. Galway, to Mr. Clessin for his opinion. He now informs me that the Irish specimens agree with the German ones of *Helix tormensis* in every respect. Whether, therefore, the latter is looked upon as a good species or only as a race or variety of *Helix nemoralis*, it is interesting to note the occurrence of this remarkable form in the south of Germany and the west coast of Ireland.

R. F. SCHARFF.

Dublin Museum.

Succinea oblonga in Antrim.

It may be worth recording that near Antrim town, on the shore of L. Neagh, *S. oblonga* is fairly abundant. The locality is rather unusual for this mollusc, as it occurs there in a wood along with great numbers of *H. nitida*.

J. N. MILNE

Belfast.

Mamestra persicariæ in Antrim.

Last year I got some larvæ near Antrim. Some have now emerged, and among them there were over twenty specimens of *M. persicariæ*. The Rev. W. F. Johnson, Poyntzpass, tells me this moth is widespread in Ireland, but decidedly rare. Antrim town is at present its most northern station, so far as I know, in Ireland.

J. N. MILNE.

Belfast

Striped Hawk Moth at Londonderry.

On 5th June Mr. Eric Donnell brought me a fine specimen of *Deilephila livornica*, which he had found in his garden at Victoria Park, Londonderry. This is the first record of the moth for this district.

D. C. CAMPBELL.

Londonderry.

Centriscus scolopax in Irish Waters.

On 24th May I heard that a curious fish had been taken from the stomach of a Hake, and I at once went to see it. The Hake had been taken the day before off Ardglass, Co. Down, was landed there, and sent to Belfast in the usual way. The fish was the Trumpet Fish (*Centriscus scolopax*), and it could not have been long in the Hake, as it was quite fresh and almost uninjured. The edges of the fins were a little frayed, and the tip of the long snout was broken, but otherwise the fish was in perfect condition, digestion not having begun. I took down the following particulars as soon as I got the fish home:—Length over all, 6 inches; breadth at centre, $1\frac{7}{8}$ inches; greatest thickness, $\frac{5}{8}$ inch; from centre of eye to end of snout, 2 inches; length of dorsal spine, $1\frac{3}{4}$ inches; weight, $\frac{3}{4}$ oz. full. Pale pink, with a few darker streaks of pink, shading into silver at belly. Skin very rough to the touch. I could find no Irish record of this Mediterranean fish in all the books at my disposal, and on communicating with Dr. Scharff he states that no Irish record is known to him. Although it is impossible to say where the Hake swallowed it, I think from its perfectly fresh appearance, that not more than an hour or two can have elapsed till the Hake was caught and killed, and therefore it can be fairly added to the Irish list. Its passage was "assisted," but there are birds on the British list with a more shadowy claim.

ROBERT PATTERSON.

Holywood, Co. Down.

Lacerta vivipara at Baltray.

On Thursday, May 31, when I was playing golf on the links of the Co. Louth club, at the mouth of the Boyne, one of the caddies produced a live lizard, just caught. He had tethered it by a string tied to its *tail*, which was still attached to the poor little reptile's body. It was about six inches long, and an ordinary specimen of its kind. I bought it for a shilling, and let it go into a rabbit hole. I have known for many years that lizards exist in the sandhills along the Louth coast, but they must be very rare, as this is the first one I have seen, and none of the caddies had ever seen one till this year, when they suddenly appeared in a small colony. One of them was brought to the Hon. H. Pery, at Termonfeckin, a few weeks ago, and the caddies reported that there were crocodiles a yard long on the links, of which it was supposed to be the young.

G. H. PENTLAND.

Black Hall, Drogheda.

The Iceland Falcon.—A correction.

In the *Irish Naturalist* for 1905, p. 115, it is stated that at a meeting of the Dublin Naturalists' Field Club, Edward Williams exhibited an Iceland Falcon from Co. Donegal. At p. 202, Edward Williams stated that this Iceland Falcon was obtained at Oughterard, Co. Galway. I presume the latter statement is correct. If so, it may be well to correct the former, so as to avoid its being copied.

R. J. Ussher.

Cappagh, Co. Waterford.

Iceland Gull at Londonderry.

On 23rd April I saw an Iceland Gull (*Larus leucopterus*) flying about the quay at Londonderry. It was in company with other gulls, chiefly Herring Gulls, which are always much in evidence about the steamers and vessels. It flew quite close to me at the quay edge.

D. C. Campbell.

Londonderry.

Sandwich Tern Breeding in Co. Down.

On May 27, 1906, accompanied by Mr. Nevin H. Foster, I visited a certain place in Co. Down, which had better be left nameless at present. Here we were much pleased to find six or eight pairs of Sandwich Terns (*Sterna cantiaca*). Apart from their black bills and feet, they were distinguishable from the other terns by their larger size, hoarser cries, and more powerful flight, their wing-beats being very strong. Presently they soared higher than the rest, and their harsh cries were modulated by distance. I was so fortunate as to find one egg of this species (which I submitted to Mr. R. J. Ussher, who confirms the identification) lying on grass, without any attempt at a nest. This was the only egg obtained. The place was visited again by Mr. Foster on June 9th, and although the Sandwich Terns were clearly identified, no more eggs could be found. Perhaps the visit of an Englishman a day or two before may account for this. On June 23, Mr. Foster and I paid another visit to the place and could find no more eggs. But the birds were still there, and they betrayed all the anxiety of breeding birds, wheeling round and round uttering hoarse cries. It is most interesting to be able to add the Sandwich Tern to the list of birds breeding in Co. Down.

Robert Patterson.

Holywood, Co. Down.

[Since above was written, I received, on July 16th, from Mr. S. M. Stears, four eggs of the Sandwich Tern, taken in another locality in Co. Down, several miles from where I found the first colony. It would therefore seem that these birds visited Co. Down in some numbers this year, and it is to be hoped that they will become a permanent addition to our breeding birds.

R. P.]

Pomatorhine Skua from Loop Head.

I have just received a splendid specimen of *Stercorarius pomatorhinus*, the Pomatorhine Skua, from Loop Head, Co. Clare, shot on June 6th, while chasing some small birds 100 yards inland from the sea. According to Ussher, this is its first occurrence in Clare, and only one other June record exists for Ireland.

This species breeds in the north circumpolar area, and is a great oceanic wanderer. It can hardly be confounded with any other European Skua, the vertical twisting of the two central tail feathers being a remarkable feature, apart from other differences. The specific name was originally written *pomarinus*, but amended in 1862 by Sclater to *pomatorhinus*. from πῶμα, a lid or cover, and ῥίν, the nostril. from the nasal operculum.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

Buffon's Skua on Clare Island.

A beautiful adult specimen of Buffon's Skua (*Stercorarius parasiticus*) was caught on Clare Island, Co. Mayo, on June 14th and sent to me by Mr. Henry Hammond, Light-keeper. This swift and graceful Skua has the two central tail feathers projecting 7 or 8 inches beyond the rest. The shafts of the two outer primaries ONLY are white in Buffon's Skua—whereas in the Arctic Skua (*S. crepidatus*) the shafts of ALL the primaries are white according to Saunders' Manual.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

Birds in the South-east.

At Glendalough on June 7, the Cuckoo sang till 9.30, when it was quite dark. It may be true that Skylarks "never warble o'er" the lake there (I am not aware that they are addicted to warbling over any lakes), but the "gloomy shore" has no terrors for the Woodcocks, which were observed taking their evening flight with its weird vocal accompaniment backwards and forwards across the lake. A pair of Ravens was seen on Mullacor, close by. At Bagenalstown station, a goods train drawing up, Rooks and Jackdaws at once descended and vigorously devoured the grease from the axle-boxes. Rev. W. S. Green tells me he has observed the same habit. We were much struck by the number of Goldfinches seen in this part of Ireland.

R. LL. PRAEGER.

Dublin.

The Melodious Warbler in Ireland.

My old friend, Robert Warren, of Moyview, draws attention to a stupid and obvious error of mine in the notice of the above bird (p. 157 of the current volume). "It is satisfactory" in the last sentence should read, "It would be satisfactory."

RICHARD M. BARRINGTON.

Fassaroe, Bray.

Migration of the Chiffchaff and Willow Wren.

The spell of unusually fine, warm, and bright sunny weather which prevailed at the latter end of March and early in April last, helped to hasten the migration of our spring warblers, and it was remarked in some English papers that migrants had appeared a week earlier than usual. Being in the south-west of Ireland I had a favourable opportunity of looking out for them, and I was agreeably surprised on the 9th of April to find the Chiffchaff (*Phylloscopus rufus*), and the Willow Wren (*P. trochilus*), in full song, and numerously dispersed along the wooded shores of Kenmare River. At Derreen, 18 miles from Kenmare, and situated on the shore of Killmakillioge Harbour, Kenmare River, the woods were vocal all day long with their notes. In some of the outlying glens where there were only low gorse bushes and also thorn and alder, I found the birds as numerous as in the well-wooded districts.

Being in London on the 29th of April, I wished to look up some English district for comparison, and selected Chislehurst, in Kent, an ideal place,—woods of tall stately trees, large heath and gorse-covered commons, with plantations of young trees and plenty of undergrowth. I was greatly surprised to find no gorse in bloom, and during the entire day I spent there I only heard one Willow Wren and no Chiffchaff.

The subject of bird migration is a fascinating one, and it seems rather puzzling to find a district less than 100 miles distant from the Continent, and separated by only 20 miles of sea, so thinly supplied with birds twenty days later than the date when they were so abundant in the Kenmare and Killarney district, distant over 450 miles from London.

ALEXANDER WILLIAMS.

Dublin.

Vesperugo leisleri in Co. Carlow.

I have to record the capture here of a specimen of *Vesperugo leisleri*. This bat, though fairly common in the eastern counties of Ireland, has never before, I believe, been recorded from County Carlow.

DENIS R. PACK-BERESFORD.

Bagenalstown.

REVIEW.

A "READY REFERENCE" SELBORNE.

The Natural History of Selborne. By the Rev. Gilbert White, M.A. Re-arranged and classified under subjects, by Charles Mosley. London: Elliot Stock, 1905. Pp. viii.+and 266. Price 6*s.* net.

The idea of this new edition of a favourite and incomparable classic is to re-arrange all the observations embodied in the Selborne letters as far as possible under the headings of the species referred to, to facilitate ready reference. There may be students to whom it will be useful for that purpose, though all the charm of the old "Natural History of Selborne" is completely lost in Mr. Mosley's series of scrap-book extracts, and though the editor has found it necessary to depart from or vary the principle of his scheme in so many ways that those who turn to his volume as the quickest way of finding out what White had to say on the subject of some particular species, will frequently find only another illustration of the wisdom of the homely warning, "More haste less speed." They will look in vain under "Fieldfare" or under "Redwing" for any extract from the several interesting letters (*e. g.* VIII. and IX. to Daines Barrington) in which White touched on the question whether those birds might sometimes breed in Great Britain; in vain under "Cuckoo" for his remarks (letter X. of same series) on the local variations which a musical neighbour had detected in that bird's note; in vain under "Flycatcher" for the touching story (related in letter XIV.) of parental affection shown by the pair of Spotted Flycatchers which had their nest in White's vine. These extracts, of course, are all given elsewhere in the book, under miscellaneous headings; but what becomes of that convenience for speedy reference which is supposed to be the justifying cause of Mr. Mosley's edition? The book certainly does not enable us to see at a glance all that White had to say on each animal of which he wrote. Even with the help of its index it fails to tell us this, for the "Observations on various parts of Nature," the "Naturalists' Calendar," and the Poems, which figure in most modern editions of the classic, are excluded from Mr. Mosley's. Thus the student who may flatter himself that he has read in this book all that White has left on record concerning the habits of (for instance) the Nightjar or the Hawfinch will be wofully misled.

There are some cases in which letters of real interest have been most unhappily dissected. In letter 26 to Pennant, for instance, White notes what he regards as certain analogous peculiarities in the habits of the Swift and of the Great Bat, or Noctule, and suggests, though diffidently, an inference from this analogy. Mr. Mosley cuts the passage in two, puts the sentences dealing with the Noctule under "Bats," and those dealing with the Swift under "Swallow, Martins, and Swift." The effect of this treatment is, naturally enough, that the argument cannot be followed.

Not only in the above instance, but throughout this book, the total absence of foot-notes, even where they are absolutely necessary to render a detached paragraph intelligible, or to indicate in what part of the book its context will be found, is a grave blemish. One extract (p. 181) abruptly concludes with the sentence: "I have discovered this summer three species of birds with us, which writers mention as only to be seen in the northern counties." One has to turn to one of the ordinary editions of White's "Selborne," and there to look up the letter (20 to Pennant) from which this extract was taken, to discover what the three birds were; though it would have been easy for Mr. Mosley to avert this absurdity by appending a short foot-note—"See under Ring-Ousel, Sandpiper, and Shrike."

A further mischief resulting from the absence of foot-notes is that the headlines placed over some of the paragraphs are unnecessarily dogmatic, and even misleading. For example, under "Lesser Whitethroat" the editor sets two paragraphs which obviously cannot both refer to that species. One is the description in letter 40 to Pennant of the notes and habits of the bird which White himself called the Whitethroat, and which he knew at the time his correspondence with that naturalist opened as a regular summer visitant to Selborne. The other, in a much later letter (LVII. to Barrington), speaks of "a rare, and, I think, a new little bird," frequenting White's garden, which he described as "much resembling the Whitethroat," but having a more silvery breast and different habit. It is true that each of these passages, looked at separately, has been conjecturally referred by good naturalists to the Lesser Whitethroat; but it is almost an insult to White's memory to put them together and to say—without even the suggestion of a doubt—that they *both* relate to that species. One or the other conjecture must be wrong, and both may be. The present reviewer sees no reason at all for doubting that by the "Whitethroat" White meant the Common Whitethroat, and nothing else. Otherwise, that observant naturalist, the first discoverer in England of the Noctule and of the Harvest Mouse, entirely overlooked one of the commonest and most generally known of the British warblers; and it would take a much stronger reason than Mr. Harting has adduced in his edition of Selborne for the conjecture that the Lesser Whitethroat was meant, to convince us that any such error was possible.

By the way, although White in his letters refers at least twice to Ireland, we do not find the name of this country in Mr. Mosley's index. The references will be found under "Lizards" and "Miscellany."

C. B. M

NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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ADVANCES IN IRISH MARINE ZOOLOGY.

BY PROFESSOR GEO. H. CARPENTER.

The work of the naturalists attached to the Fisheries Branch of the Irish Department of Agriculture and Technical Instruction has resulted during the last few years in the accumulation of large and valuable collections of animals from the Irish marine area, especially from the deeper waters off our western coast. The scientific exploration of the Atlantic slope, so well begun twenty years ago by the Royal Irish Academy and the Royal Dublin Society, is now being systematically carried on under the auspices of the Government Department responsible for Irish fisheries. It must be particularly gratifying to Mr. W. S. Green, who was so zealous as a pioneer in this marine zoological research, to see the harvest of results that is now being reaped under his oversight, through the splendid work of Mr. Holt and his assistants.

Several references have already been made in this magazine to the published results of the Fishery Branch's work. Farran's account of Nudibranch Mollusca and of Copepoda, Holt and Tattersall's monograph of Schizopoda from the Atlantic slope, Hoyle's notes on Cephalopoda, and Calman's description of the Euphausid genus Nematobrachion, are among the works that have thus been noticed. On the present occasion we propose to call attention to several important contributions that have been published during the last and the current year.

Dr. W. T. Calman's paper[1] on the Cumacea is of quite exceptional interest and value. Its fifty-two pages and five plates contain notes on forty-eight species, nine of which are described and figured as new to science. These are *Leucon siphonatus*, *Cumella gracillima*, *Nannastacus brevicaudatus*, *Campylaspis rostrata*, *Platyaspis orbicularis*, *Diastylis tubulicauda*, *Cumellopsis Helgæ*, *Platycuma Holti*, and *Ceratocuma horrida*. The three last-named are referred to new genera, of which Platycuma "presents in its specially-coiled alimentary canal an anatomical character which is unique among the Malacostraca," while Cumellopsis "is in some

[1] W. T. Calman. The Marine Fauna of the West Coast of Ireland. Part iv. Cumacea. *Fisheries, Ireland, Sci. Invest.*, 1904, i., [1905].

respects intermediate between the families Nannastacidæ and Campylaspidæ, and suggests that they ought probably to be merged into one"; and Ceratocuma "is so aberrant that it has been considered necessary to establish a new family for its reception."

Besides these hitherto unknown species, Dr. Calman enumerates twelve Cumacea new to the "British area" of Norman. Five of these—*Cyclaspis longicaudata*, G. O. Sars, *Campylaspis verrucosa*, G. O. Sars, *C. sulcata*, G. O. Sars, *Platyospis typica*, G. O. Sars, and *Leptostylis macrura*, G. O. Sars—occur both in Norwegian and in South European waters; two—*Leucon pallidus*, G. O. Sars, and *Hemilamprops uniplicata*, G. O. Sars—are Norwegian; another—*Leptostylis longimana*, G. O. Sars—is North American and Norwegian; another—*Eudorella hispida*, G. O. Sars—has hitherto been recorded only from the New England coast of the Atlantic; while the remaining three—*Cyclaspoides Sarsi*, Bonnier, *Procampylaspis armata*, Bonnier, and *Campylaspis nitens*, Bonnier—are South European or Mediterranean species.

Most of the above-named species were obtained by a townet attached to the beam of the trawl or dredge, a method of collection admirably adapted for securing delicate organisms from the sea-bottom, as Mr. Holt has abundantly shown by his work on the Schizopods. Two localities seem to have been especially fruitful. A station 64 miles N.W. ½ W. of Cleggan Head, Co. Galway, yielded, from a depth of 199 fms., eight of the twelve species new to Britannic waters, and one of those new to science. Another station 77 miles W.N.W. of Achill Head, Co. Mayo, the depth being 382 fms., was the locality for six of the twelve new Britannic species and seven of the nine new to science, including the three referred by Dr. Calman to undescribed genera!

The wonder of this spot in the Atlantic waste is shown also by Prof. G. H. Carpenter's paper[1] on the Pycnogonida. Thence were dredged three species of "Sea-spiders" unknown in our marine area—a northern Nymphon—*N. leptochele*, G. O. Sars; the hitherto undiscovered male (exhibiting remarkable structural features) of a blind northern Anoplodactylus—*A.*

[1] Geo. H. Carpenter. The Marine Fauna of the Coast of Ireland. Part vi. Pycnogonida. *Fisheries, Ireland, Sci. Invest.*, 1904, iv. [1905].

typhlops, G. O. Sars; and a new species of Pallenopsis (described under the name of *P. Holti*), a genus not before recorded from the British and Irish area, most of its species being southern in their distribution.

Another novelty described and figured in this paper is *Anoplodactylus oculatus*, a large and handsome species with a remarkably prominent eye-eminence, obtained by the townet on dredge 50 miles W.N.W. of the Tearaght, Co. Kerry, at a depth of 306 fathoms. The remaining nine species enumerated are all well known and widespread British pycnogons.

The western locality previously mentioned, or stations within a few miles of it where dredgings have been made at a depth of over 300 fathoms, yielded also a large proportion of the new and rare Isopoda described by Mr. W. M. Tattersall at the British Association meeting in 1904, and now fully illustrated in another of the publications of our Fisheries Branch.[1] The townet on trawl in "one remarkable haul" on this ground yielded no fewer than twenty-one species of Isopoda, seven of them new to science, three new to the British and Irish fauna, and the majority of the remainder very rare indeed.

In this paper, Mr. Tattersall separates, as an order distinct from the Isopoda, the Tanaidæ under the name Tanaidacea. A new species, *Typhlotanais proctagon*, is described from 60 miles west of Achill Head in 199 fathoms, while two species of the same genus are recorded for the first time from the Britannic[2] area; these are *T. tenuicornis*, G. O. Sars (50 miles W.N.W. of Tearaght in 320 fathoms), hitherto known only from Norwegian waters, and *T. Richardi*, Dollfuss (77 miles W. of Achill Head, 382 fathoms). A very rare Azorean species, *Leptognathia breviremis* (Lilljeborg), already known in the British area, was dredged from the Tearaght station, and is an addition to the Irish marine fauna.

Turning to the Isopoda in Mr. Tattersall's restricted sense we notice that *Cæcognathia stygia* (G. O. Sars) and *Æga arctica*, Lutken, arctic species (the former blind), have been added to the

[1] W. M. Tattersall. The Marine Fauna of the Coast of Ireland. Part v. Isopoda. *Fisheries, Ireland, Sci. Invest.*, 1904, ii., [1905].

[2] Mr. Tattersall uses "British and Irish" in the sense in which Carpenter has proposed (see *I. Nat.*, p. 13 of current volume) to employ "Britannic."

Britannic fauna through specimens dredged west of Co. Mayo, while two other arctic species of the latter genus (*Æ. ventrosa*, M. Sars, and *Æ. crenulata*, Lutken), already known from North British waters, have been dredged off the Kerry and Mayo coasts. *Cirolana Hanseni*, J. Bonnier, from the Achill station, already known from the Hebrides and the Bay of Biscay, is yet another addition to the Irish marine fauna. *Cymodoce granulatum*, M.-Edw., dredged off Galway and Mayo in 72 to 74 fathoms, is a most interesting addition to the Britannic fauna, having been hitherto found only in the Mediterranean.

Of all the species described in the paper none is of greater interest than *Bathycopea typhlops*, a blind Isopod dredged from two stations 60 and 77 miles W. of Achill Head, and from three stations 50 miles W.N.W. of the Tearaght, which is referred by Mr. Tattersall to a new genus, and grouped with Leach's *Ancinus depressus* in a new family.

Among the Munnidæ, Mr. Tattersall describes as a new genus *Metamunna typica* taken off Cleggan Head and on the Porcupine Bank, adds *Munna limicola*, G. O. Sars (Porcupine Bank) to the Britannic, and *Pleurogonium inerme*, G. O. Sars, and *Paramunna bilobata*, G. O. Sars, to the Irish fauna. In the Desmosomidæ, a new species of Ischnosoma (*I. Greeni*) is described from specimens dredged west of Achill, while *I. bispinosum*, G. O. Sars, a species both Norwegian and Mediterranean, together with the Norwegian *Desmosoma lineare*, G. O. Sars—both dredged off Achill—are recorded for the first time from Britannic waters, and *Eugerda tenuimana*, G. O. Sars—already known from Norwegian, Orcadian, and Mediterranean seas—is added to the Irish fauna.

Among the Munnopsidæ, Mr. Tattersall describes as new *Munnopsis oceanica*, taken off Eagle Island, Co. Mayo, and refers to a new genus (Munnopsoides) a species, *M. Beddardi* dredged from the deep-water stations west of Achill. Munnopsoides includes also a species dredged by the "Challenger" off Kerguelen—so the range of the genus is remarkable; while the genus Ilyarachna is brought for the first time within the Britannic fauna through a new species, *I. Plunketti*, dredged off both the Mayo and Kerry coasts. *Eurycope longipes* is a new species of large size allied to the

arctic *E. gigantea*, and obtained 50 miles W.N.W. of the Tearaght, while three Norwegian species, *E. latirostris*, G. O. Sars, *E. megalura*, G. O. Sars, and *E. producta*, G. O. Sars, are now first recorded for the Britannic, and another, *E. phallangium*, G. O. Sars, for the Irish area. *Lipomera lamellata*, dredged 60 miles W. of Achill in 199 fathoms, is the type of a new genus. Another new genus—Scyracepon—is founded on *S. tuberculosa*, belonging to the Epicarida, dredged 48 miles W.N.W. of the Tearaght in 337 fathoms. To the same tribe—parasitic on other crustaceans—belongs *Pleurocryptella formosa* (Giard and Bonnier), taken in 500 fathoms west of the Porcupine Bank—a Canarian species, and *Asconiscus simplex*, G. O. Sars—a Norwegian species, neither before dredged in Britannic waters. *Aspidophryxus peltatus*, G. O. Sars, another Norwegian species already recorded from the Scottish coasts, is new to the Irish list.

In a special section of the paper dealing with the Isopoda of Ballynakill and Bofin Harbours, Mr. Tattersall records fourteen further additions to the marine fauna of Ireland. These are:—*Leptognathia longiremis* (Lilljeb.), *Paratanais Batei*, Sars, *Anthura gracilis* (Montagu), *Eurydice spinigera*, Hansen, *E. truncata* (Norman), *Limoria lignorum* (Rathke), *Idotea neglecta*, G. O. Sars, *Iaera marina* (Fab.), *I. Nordmanni* (Rathke), *Munna Kroyeri*, Goodsir[1], *M. Fabricii* (Kroyer), *Pleurogonium rubicundum*, G. O. Sars, *Bopyrus squillarum*, Latr., and *Bopyrina virbii* (Walz). Altogether the paper increases the Irish list by twenty-three species, and the Britannic by fourteen, while ten species are recorded as new to science, five of which are referred to new genera. Mr. Tattersall now reckons the British and Irish marine Isopoda as numbering 134 species "made up of roughly, one-half boreal, and one quarter southern types, and one quarter representing forms at present only known from British and Irish waters." The present paper contains a description and figures of one extra-Britannic species—*Heterophryxus appendiculatus*, G. O. Sars, from the Bay of Biscay. Its inclusion in a paper on the "Marine Fauna of the Coast of Ireland" may possibly cause confusion to recorders and students of distribution.

[1] This species is recorded from Belfast Lough by Thompson ('Nat. Hist. of Ireland,' vol. iv., p. 413), in a list of Pycnogonida!

Another order of Crustacea—the Copepoda (littoral species and fish-parasites)—are dealt with by Mr. Joseph Pearson, who during his too short sojourn at the Larne Marine Laboratory gave much study to this group. He points out that previous observers have paid most attention to the pelagic Copepoda, and that discoveries may be expected among the bottom-haunting species. The present list[1] includes 89 free living, shore-haunting copepods and 25 fish-parasites.

We owe to the labours of Messrs. E. W. L. Holt and W. M. Tattersall two important papers[2] on Schizopoda from the "Atlantic slope," the first of which has been already mentioned in this Journal.[3] The net result of these two memoirs is the addition of twenty-six species to the British and Irish marine fauna, of which twelve are new to science, four of these being referable to new genera. Several new oceanic species are described which were obtained beyond the 1,000 fathom line, and are therefore excluded from the "Irish marine area." Among the Euphausiacea the additions are *Euphausia Mulleri*, Claus, a southern species; *E. Lanei*, a new species (obtained off Achill); *Thysanopoda distinguenda*, Hansen, an Azorean species; *T. acutifrons*, a new species dredged off Mayo in 600–1,000 fathoms; *Nematobrachion boopis*, Calman; *Stylocheiron Suhmi*, G. O. Sars; *S. abbreviatum*, G. O. Sars; and *Thysanoessa gregaria*, G. O. Sars, widespread oceanic species. Still more remarkable are the discoveries among the Mysidacea. *Gnathophausia zoea*, Will.-Suhm; *Eucopia sculpticauda*, Faxon; *E. unguiculata*, Will.-Suhm; *Katerythrops Oceanæ*, a new species; and *Chunomysis diadema*, the type of a new genus, are all oceanic in habitat. *Meterythrops picta* is a new species found off Achill, and from the same region come three new generic types—*Dactylerythrops dactylops*, *Hyperythrops serriventer*, and *Paramblyops rostrata*. *Euchaetomera Fowleri*, Holt and Tatt., formerly taken in southern and western North Atlantic waters, is now brought within the Irish

[1] Joseph Pearson. A List of the Marine Copepoda of Ireland. Part i. Littoral Forms and Fish Parasites. *Fisheries, Ireland, Sci. Invest.*, 1904, iii., [1905].

[2] E. W. L. Holt and W. M. Tattersall. Schizopodous Crustacea from the North-east Atlantic slope. *Fisheries, Ireland, Sci. Invest.*, 1902-3. iv., [1905]. Supplement, *ib.*, 1904, v., [1906].

[3] *I. Nat.*, xiv., 1905, p. 116.

area. In the genus *Pseudomna* there are three new species—*P. calloplura*, *P. Kempi*, and *P. nanum*, and a northern species, *P. affine*, G. O. Sars, added to our area. *Amblyops abbreviata*, G. O. Sars, is another boreal addition; while in the genus Boreomysis, *B. arctica* (Kroyer), *B. tridens*, G. O. Sars, *B. megalops*, G. O. Sars, and *B. microps*, G. O. Sars, are new to the Britannic area. *Mysidetes Farrani* is an interesting new species from deep water to the west of Kerry. There are a number of additions and corrections in the supplemental paper, which, like the earlier, is illustrated by plates beautifully drawn and executed.

Echinoderms from the Co. Galway harbours and the deep Atlantic waters are enumerated in a paper by Mr. S. W. Kemp.[1] Twenty-eight species were dredged in the harbours of Ballynakill and Bofin—nearly 60 per cent. of all the British species known from less than 20 fathoms depth. The deep-water list contains 73 species, and includes all the forms that have been found off our western coast outside the 50-fathom line. There are several faunistic additions. Among the Asteroidea *Solaster affinis* (Dan. and Koren), first discovered by the Norwegian North Atlantic expedition, has been dredged 40 miles W.N.W. of Cleggan Head in 70 fathoms, and a specimen from the "Lord Bandon" cruise, included by Prof. Haddon under *S. papossus*, is now referred by Mr. Kemp to *S. affinis*. *Plutonaster Pareli* (Düb. and Koren), dredged in 220 fms. off Mayo, is brought within the Britannic area; a previous record from 1,360 fms. having been made by the "Porcupine" expedition. Turning to the Ophiuroidea, we find an interesting northern addition to our fauna in *Ophiacantha abyssicola* (G. O. Sars), dredged in 380 fathoms off the Mayo coast. There are several species now recorded from various localities that had hitherto been represented only by a single Irish specimen.

The Fisheries Branch has not yet published an account of the Cœlenterata, but a preliminary note,[2] by Prof. S. J.

[1] Stanley W. Kemp. The Marine Fauna of the West Coast of Ireland. Part iii Echinoderms from Ballynakill and Boffin Harbours, Co. Galway, and of the deep water off the West Coast of Ireland. *Ann. Rep. Fish., Ireland.* 1902–3. Pt. ii., App. vi. [1905].

[2] Sydney J. Hickson. Remarkable Cœlenterata from the West Coast of Ireland. *Nature*, lxxiii., 1905, p. 5.

Hickson, on some of the material of this group, which he is working out, must lead all Irish naturalists to look eagerly for the issue of the full paper. A Coraliid—*Pleurocorallium Johnsoni*—has been dredged 60 miles off Achill Island in 382 fathoms, and the family of precious corals to which it belongs has so far been found only in the Mediterranean, the Japanese seas, the Banda seas, and the southern regions of the North Atlantic. Another feature of very great interest is the presence within our marine area of three representatives of the Antipatharia, hitherto regarded as an entirely exotic group; these are *Cirrhipathes spiralis*, *Antipathella gracilis*, and a species of Stichopathes allied to *S. Lutkeni*. There are also examples of Ceratoisis, Stachyodes, and Eunephthya, genera of the Alcyonaria which Prof. Hickson believes to be new to the Britannic fauna.

Some "Miscellaneous Notes" of the Fisheries Branch[1] contains three short papers each, by Mr. G. P. Farran and Mr. W. M. Tattersall. In a supplement to his list of Nudibranchs from Ballynakill Harbour, Mr. Farran adds *Staurodoris verrucosa* (Cuv.) to the Britannic, and *Styliger bellula* (d'Orb.) to the Irish marine fauna. He further records the rediscovery in numbers, at the oyster ponds, Ardfry, Co. Galway, of *Alderia modesta* (Loven), a nudibranch found in 1846 by Allman near Skibbereen, and the occurrence off our west coast of large colonies of the floating barnacle, *Lepas fascicularis* (Ellis and Sol.).

Two of Mr. Tattersall's notes refer to Crustacea. Of these one is on Stomatopod Larvæ, which occur in numbers from the middle of August until the end of October in the pelagic fauna of our western coasts, while no adult member of the order has yet been found in the Irish area. The second note is on the occurrence of an interesting Leptostracan—*Nebalia typhlops*, G. O. Sars—in deep water (120–200 fms.) west of Counties Mayo and Galway. This is an addition to the Britannic fauna, as the species had hitherto been known only from the Norwegian and Mediterranean regions.

Mr. Tattersall's third note is on the adult Enteropneust, which was obtained by digging in sand, at low-water, off Coastguard Point, Ballynakill Harbour. Hitherto no adult

[1] *Ann. Rep. Fish., Ireland*, 1902–03, pt. ii. App. vii. [190 .]

member of this interesting class of the "non-vertebrate Vertebrata" had been found in the Britannic area, though the tornaria larva has been met with not infrequently. The species is a new one—*Dolichoglossus ruber*—and a full account of it, with figures, will be published shortly.

Some very important discoveries among the Fishes are recorded by Messrs. E. W. L. Holt and L. W. Byrne.[1] To their previous article on the British and Irish Gobies[2] they now add description and figures of the Giant Goby (*Gobius capito*, C. and V.) which occurs in the western English Channel, but has not yet been found in Irish waters. A short note, with figures, deals with the discovery of *Dentex vulgaris*, Cuv. in Dingle Bay, a widespread species thus added to the Irish marine fauna. The descriptions, with beautiful drawings by Miss Woodward, of the British and Irish species of Solea, will be of value to the general marine zoologist. Of the six species dealt with in this paper, four occur in Irish waters, and one —*S. profundicola*, Vaillant—should be of especial interest to Irish naturalists, since "of twenty-one specimens known to science all but five have been taken off the south-west of Ireland."

In the "First Report on the Fishes of the Irish Atlantic slope," issued during the present year, no fewer than twenty-seven species new to the British and Irish area are recorded. These are *Centrophorus ringens* (Boc. and Cap.), *Spinax niger*, Bon., *Chimaera mirabilis*, Collett, *Alepocephalus rostratus*, Risso, *A. Giardi*, Koehler, *Conocara macroptera* (Vaillant), *Bathylagus atlanticus*, Gunther, (hitherto known only from the South Atlantic), *Bathytroctes rostratus*, Gunther, *Xenodermichthys socialis*, Vaillant, *Gonostoma microdon*, Gunther, *G. bathyphilum*, Gunther, *Synaphobranchus pinnatus* (Gronow) (= *Nettophichthys retropinnatus*, Holt, 1891), *Scopelus punctatus* (Rafin.), *S. crocodilus* (Risso), *S. elongatus*, Costa, *S. Rafinesqui*, Cocco, *Notacanthus Bonaparti*, Risso, *Bathypterois dubius*, Vaillant,

[1] E. W. L. Holt and L. W. Byrne. i.—Note on a specimen of *Dentex vulgaris* from Dingle Bay. ii.—The British and Irish Gobies: Supplement. iii.—Figures and Descriptions of the British and Irish species of *Solea*. *Ann. Rep. Fish., Ireland*, 1902-03, pt. ii., app. v. [1905].

—— First Report on the Fishes of the Irish Atlantic Slope. *Fisheries, Ireland, Sci. Invest.*, 1905, ii., [1906].

[2] *Ann. Rep, Fish., Ireland*, 1901. See *Irish Nat.*, vol. xii., 1903, p. 319.

Macrurus mediterraneus (Giglioli), *M. labiatus*, Koehler, *M. Guentheri*, Vaillant, *Trachyrhynchus trachyrhynchus*, Risso, *Molva elongata*, Risso, *Antimora viola* (Goode and Bean), *Melanphaes eurylepis* (a new species from the deep water off the Mayo coast), *Scorpœna echinata*, Koehler, and *Diretmus argenteus*, Johnson. Five species—*Argentina silus*, Ascan., *Maurolicus borealis*, Nilss., *Stomias boa*, Risso, and *Scopelus glacialis*, Reinh.—are additions to the Irish marine fauna. And a deep-sea variety, *exilis*, of the common shore pipe-fish, *Nerophis æquoreus* (Linn.), is described.

In conclusion, there are a few general remarks that it seems advisable to make on these most valuable publications. They are worthy of far better paper and printing than has been bestowed upon them, and their appearance might be taken as an example of the light esteem in which science is held in certain official quarters. The titles of the publications—especially the nominal and actual dates, sometimes two or three years apart—will, it is to be feared, cause much inconvenience to bibliographers. We notice that in the case of only one group is it stated that the specimens have been deposited in the Dublin Museum, while in another the type collection has been presented to the British Museum. And when we find that two of the recent reports of the Royal Irish Academy's Flora and Fauna Committee—that by Mr. A. R. Nichols on the Echinodermata[1], and that by Miss J. Stephens on the Cœlenterata[2]—were drawn up in apparent ignorance by their authors of the rich collections in these groups which the Fisheries officers were accumulating, we cannot help regretting the seeming lack of co-operation between two bodies of earnest and enthusiastic naturalists. The recent advance in our knowledge of marine zoology has been gratifying. Still more gratifying might it be if our workers could advance together.

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[1] *Proc. R.I.A.* xxiv., B., 1903. [2] *Ib.* xxv., B., 1905.

ON THE BOTANY OF LOUGH CARRA.

BY R. LLOYD PRAEGER.

Lough Carra is one of the chain of lakes which runs from Galway Bay to Killala Bay, intervening between the great limestone plain, which stretches away to the eastward, and the Connaught highlands, formed largely of metamorphic and igneous rocks, which rise, often abruptly, on the western side of the lake-basins. While not attaining anything like the size of Corrib, Mask, or Conn, Lough Carra is nevertheless a good-sized sheet of water. It has a length of six miles and a breadth of two, but is much broken up by promontories and islands. One large land projection almost cuts the lake in two, and as there are certain differences of character between the two portions, I shall distinguish them as the upper (*i.e.*, northern) lake and lower (*i.e.*, southern) lake respectively. Lough Carra lies just inside the western boundary of the limestone area, which runs north and south within a mile of the lake-shore. The strip of Carboniferous Sandstone, a couple of miles wide, which then intervenes between the limestone of the plain and the slates, gneisses, and porphyries of the mountains, supports the full calcifuge flora which characterises the latter. Around the lake the limestone dips east and south-east at very low angles—generally about 3°—which tends to produce shallow water on the eastern side of the islands and points, while the western side often descends steeply into deeper water. The lower lake is mostly very shallow, the upper lake deeper, and with higher shores. Lough Carra has long been famous for the wonderful colour of its water, which is a pale pellucid green. This results partly from the purity of the water itself, but mainly from the extraordinary limy incrustation which covers the whole bottom. Even on the boulders just below water-level this is an inch or two in thickness—a soft crust, with pinkish and greyish blotches caused by algal growth. Deeper down the deposit is softer and more soapy in feel, and white or cream in colour. The incrustation is most dense in the lower lake, and has there a very deleterious effect on aquatic plant-life. Hydrophytes are nearly absent, and a few starved beds of

Chara, desperately incrusted, and some spindly stems of *Potamogeton perfoliatus* rising from deep water, represent the aquatic vegetation. Even the reed vegetation is affected, and the groves of Phragmites and Scirpus are thin and rather stunted. In the upper lake the incrustation, though everywhere present, is not nearly so dense, and hydrophytes have a better chance. The lake is here seen to be divided into areas of pale green and areas of dark green. The former indicate the white limy bottom; the latter were found by dredging to represent great beds of *Chara hispida*, growing in 10–20 feet of water, mixed with *Potamogeton perfoliatus* and *C. polyacantha*. Along the margin of the upper lake, too, *Littorella* and littoral Pondweeds may be gathered. It may be noted that both in the streams which enter the lake, and in the stream which drains it, the hydrophytes are quite unincrusted, and excellent specimens of Pondweeds and Charas may be gathered.

Lough Carra lies 69 feet above Ordnance datum. The surrounding country is low. Around the lake in some places drift is absent, and limestone pavements are developed, though to no great extent. The shores are wooded in many places, sometimes with pines and other exotic trees, sometimes with a native vegetation. Peat bogs are rare in the vicinity of the lake, and cultivated land and woods predominate.

The flora of Lough Carra is by no means unexplored. John Ball, F.R.S., visited the lake in 1837, and notes[1] the occurrence of *Thalictrum minus*, *Rhamnus catharticus*, *R. Frangula*, *Euonymus europæus*, *Rubia peregrina*, *Galium boreale*, *Antennaria dioica*, *Gentiana verna*, *G. Amarella*, *Spiranthes autumnalis*, *Lastrea Thelypteris*, and *Equisetum variegatum*.

A. G. More visited Lough Carra in 1854, but notes[2] only eight plants—namely, *Viola canina*, *Rhamnus catharticus*, *Myriophyllum verticillatum*, *Antennaria dioica*, *Gentiana verna*,

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[1] Botanical Notes of a Tour in Ireland, with Notices of some new British Plants. *Ann. of Nat. Hist.*, ii., 35. 1839.

[2] Localities for some plants observed in Ireland, with remarks on the geographical distribution of others. *Proc.* Dublin Univ. Zool. and Bot. Assoc., ii , 54-65, 1860, and *Nat. Hist. Review*, vii. (*Proc.*), 434-443. 1860.

Plantago maritima, *Sesleria cærulea*, *Selaginella selaginoides*. To these he added, in the first edition of "Cybele," *Rubus saxatilis*, *Rosa Sabini*, and *Epipactis palustris*; and in the same work *Ophrys apifera* is recorded, on the authority of Miss Lindsay. Lastly, Mrs. D. D. Persse collected a good deal in the Ballinrobe district in 1892–4, and kindly allowed me to take notes from her herbarium when I was gathering material for "Irish Topographical Botany." The rarer Lough Carra plants included in her collection were *Thalictrum collinum*, *Gentiana verna*, *Salix pentandra*, *Juniperus communis*, *Spiranthes autumnalis*, *Ophrys apifera*. This appears to exhaust our previous knowledge of Lough Carra botany, save for *Rubus cæsius*, published by Focke,[1] as collected there by John Ball in 1837, and *Ophrys muscifera* and *Lastrea Thelypteris*, given in "Cybele Hibernica" (ed. II.), as found at Lake View by Miss Jackson in 1894–6.

Towards the end of last July my wife and I spent four days at Lough Carra. By the kindness of Mr. Stanhope Kenny, of Ballinrobe, we not only found comfortable quarters close to the lake in the house of Mr. P. J. Loughlin, but had a boat at our disposal, which was an invaluable aid to botanical work. Three days were spent on the water, visiting the islands, points, and bays, while on the fourth we cycled round the lake, to gain some idea of the flora of the adjoining country. The following notes convey our impressions of the vegetation, and give particulars concerning the rarer plants observed.

ZONES OF VEGETATION.—On the shores of the lake, and particularly upon the islands, the zoning of the vegetation is very marked. Four zones are present, each with a characteristic flora. They may be distinguished as follows:—

1. Woodland zone.
2. Sesleria zone.
3. Schænus zone.
4. Scirpus zone.

Scirpus zone.—To take the lowest first. This extends from water-level to some feet below it, and is characterized by patches of *Scirpus lacustris* and *Phragmites communis*. As already mentioned, water-plants are quite rare, especially in the

[1] List of the British and Irish *Rubi* in the herbarium of the late Mr. John Ball, F.R.S. *Journ. Bot.*, xxix., 162-163. 1891.

lower lake (which is the more characteristic as well as the larger portion), and some stunted Chara is usually the only other inhabitant of this zone.

Schænus zone.—This extends from summer water-level to about two feet above it. Ground wet and marly. *Schænus nigricans* is absolutely dominant, and very abundant. Here also *Epipactis palustris* has its headquarters. This lovely Orchid is remarkably common around Lough Carra, and hardly a yard of shore, on island or mainland, is without it; I never saw it in such profusion before. Other abundant and characteristic plants of the Schænus zone are *Galium boreale*, *Cnicus pratensis*, *Parnassia palustris*, *Pinguicula vulgaris*, *Habenaria conopsea*, *Selaginella selaginoides*. Two interesting Orchids, *Ophrys apifera* and *O. muscifera*, seen at Derrinrush and below Moore Hall, grew in this zone, as also *Equisetum variegatum* (var. *majus*, Syme), found on Bush Island.

Sesleria zone.—When the ground reaches about two feet above summer water-level (the lake does not appear to be subject to much winter flooding), *Sesleria cærulea* becomes abundant, and as one ascends, quite replaces *Schænus*, growing luxuriant and tall (up to 2½ feet), and easily dominant, save on one or two islands, where the zone is controlled by a tall growth of *Festuca elatior*. The ground here is dry, and masses of disintegrating shells thrown or blown up by storms help to make a light limy soil. Abundant and characteristic concomitants of the Sesleria are *Thalictrum collinum*, *Viola canina*, *Rhamnus Frangula* (growing almost prostrate), *Rubus saxatilis*, *Galium verum*, *Antennaria dioica*, *Carlina vulgaris*, *Leontodon hispidus*, *Campanula rotundifolia*, *Chlora perfoliata*, *Plantago maritima*, *Orchis pyramidalis*, *Agrostis nigra*—a very calcicole group, it will be noticed. Odd young trees from the next zone—mostly Birches—are sometimes present.

Woodland zone.—At about four feet above summer water-level the grass formation gives way abruptly to arboreal vegetation. On shores facing west this presents a very dense thicket, sloping upwards from the ground; on the other side the bushes are larger, and their front not so dense. The leading species are *Betula pubescens*, *Rhamnus catharticus*, *Fraxinus excelsior*, *Salix aurita*, *S. cinerea*, *Juniperus communis*. There are also present *Cratægus Oxyacantha*, *Ilex Aquifolium*,

Euonymus europæus, *Rubi*, *Rosa canina*, *R. tomentosa*, *Pyrus Aucuparia*, *P. Aria*. *Viburnum Opulus*, *Ulmus montana*, *Corylus Avellana*, *Populus tremula*, and more rarely *Prunus Avium*, *Sambucus nigra*, *Alnus glutinosa*, *Salix caprea*, *Quercus Robur*. All these are, I believe, native. On some of the islands conifers and other trees have been planted, and on others, which are close to mainland plantations, seedling Pines and Sycamores may be seen; but the flora of most of the outlying islands appears to be quite undisturbed, and I have no doubt that *Ulmus*, *Populus*, and *Prunus Avium*, which are sometimes questionable natives, are indigenous here. Of the trees and bushes mentioned, *Juniperus communis* and *Rhamnus catharticus* especially haunt the woodland edge, along with tall herbaceous plants, such as *Spiræa Ulmaria* and *Eupatorium cannabinum*. The largest trees are *Fraxinus* and *Ulmus*, attaining a height of about 20 feet. Below the trees, the ground is carpeted with Ivy, often infested with *Orobanche Hederæ*, and *Primula vulgaris* is abundant.

So much for the zones of vegetation of the lake-shore. It remains to refer further to the flora of different types of habitat which occur about the lake.

Lake Plants.—The great poverty of the aquatic flora has been already mentioned, but, as stated, in the upper lake, and especially at its northern end, hydrophytes flourish. The most interesting of these is *Potamogeton filiformis*, found in no less than four stations, all of them being shallow sheltered sandy bays. It is accompanied by *Ranunculus trichophyllus*, *Myriophyllum spicatum*, and *M. alterniflorum*.

Streams, Marshes, and Bogs.—In the stream which enters the lake south-east of Moore Hall, *Ranunculus Lingua* and *Myriophyllum verticillatum* are abundant, also a Pondweed of puzzling appearance, on which Mr. Arthur Bennett makes the following report:—

"Interesting specimens. I have the counterpart of your sheet in my herbarium from the canal between Woking and Frimley in Surrey, and I have not put a name to it, though I have it in the *heterophyllus* cover. I have nothing exactly like it from Asia, America, or Europe, among some hundreds of specimens. In Europe the nearest is Irish, *i.e.*, from 'Lough Derg, 28/7/1882, B. King'; but it is a poor specimen. The formation of fruit is against its being a hybrid, though at one time I thought

it might be *heterophyllus* × *nitens*, though *nitens* has rarely (if ever?) been found with fruit. The lower parts are very like specimens named *P. intermedius* Tiselius, from Sweden, but the upper part is not! There is a plant that is somewhat like yours, only on a very small scale, from Canada, lat. 56°, gathered by Prof. Macoun. You will say—well, what is it? My answer will be *P. heterophyllus*, Schreb. *f. confertus*."

In the stream which drains the lake *P. lucens* and *P. nitens* grow, and the latter was also seen in a starved condition in the lake. In marshy ground and shallow bays, especially on the upper lake, *Cladium Mariscus* and *Juncus obtusiflorus* are abundant, with some *Carex Hudsonii*, and *C. filiformis*. Cladium also climbs out of the water, and colonizes the chinks of limestone pavements, up to six feet above lake-level. The few wet peaty places yield *Drosera anglica*, *D. intermedia*, and *Scirpus pauciflorus*, and peaty pools are full of *Potamogeton plantagineus*, *Myriophyllum verticillatum*, and *Lemna trisulca*.

Woods.—The shade or dependent flora of the dense thickets on the islands is limited, and has been referred to already. At Derrinrush an extensive natural wood occurs. In addition to the trees mentioned above, *Prunus Padus* grows here. The shade plants which carpet the ground include *Viola Reichenbachiana*, *Geum rivale*, *Crepis paludosa*, *Veronica montana*, *Neottia Nidus-avis*, and *Epipactis latifolia*.

Limestone pavements.—Along the western side of the lake there are several areas of bare limestone, forming irregular pavements and terraces. These were examined with some care, to see what members of the Burren flora extend to this, the extreme northern limit of the Galway-Clare area of limestone pavements. The best find was *Neotinea intacta*, of which two stations were discovered by my wife and one by myself, namely, half mile south of Deradda, half mile west of Bonniamillish Island, and half mile north-west of Church Island. As these stations range from the south to the north end of the lake, and as the plant was of course in fruit, and therefore difficult to find, there can be little doubt but that it is fairly abundant in this district. Its previous most northern station in Ireland was by Lough Corrib, near Cong (D. Moore, 1872). On these limestones *Rubia peregrina* and *Aquilegia vulgaris* are abundant, as well as all the plants mentioned as characterizing the Sesleria zone around the lake. *Taxus*

baccata occurs occasionally, and *Hieracium iricum* had at least one station. Another Hawkweed, now out of flower, I brought home to grow. *Erica cinerea* grew and flourished on the bare limestones. The absence of *Euphrasia Salisburgensis* was noticeable. On our journey to Lough Carra we had found it abundant near Clonbur, and traced it northward nearly to Ballinrobe ; but about Lough Carra we did not meet with it.

The Calcifuge Flora.—Though not actually touching the lake shore, we turned westward for half a mile out of Partry to note the change of flora caused by the substitution for limestone of Carboniferous Sandstone. This is very marked. On one side of a narrow shallow valley rise green limestone bluffs, clothed with Sesleria, Chlora, and Carlina. On the other are dark-brown heathy knolls, covered with Erica, Calluna, and Dabeocia in profusion. The river which divides East from West Mayo is here still half a mile distant, so this furnishes a very satisfactory third East Mayo station for the last-named. With it, among the heather, grew *Listera cordata* at an unusually low elevation—about 100 feet above Ordnance datum.

Cultivated Area.—At Ballintober *Lychnis Githago* grew among crops, and *Tanacetum vulgare* in a rough field. *Anthemis Cotula* and *Euphorbia exigua* occupied roadsides near Partry, where also *Lolium temulentum* was gathered, and *Inula Helenium* in a rough field at Carrownacon. *Matricaria, discoidea* lines every road and lane right round the lake.

Influence of Birds.—On several islands, such as Bush Island and Illanatran, Black-headed Gulls and Terns breed, but without effect on the flora. On a small rocky wooded islet south-east of Castle Carra, however, there is a large colony of Black-headed Gulls, which largely control the flora there. The birds breed not only on open rocks, but on flat rocks among dense bushes. The trees and certain other plants, such as Phragmites, seem benefited by the guano, and flourish exceedingly. Other usual plants of the islands are missing, and have presumably been exterminated. A third set of plants have been introduced by the gulls. These include *Stellaria media*, *Sonchus asper*, Polygonums and Atriplices, *Urtica dioica*, the cultivated Oat, *Matricaria inodora*, and even *M. discoidea*.

Additions to E. Mayo flora.—The following plants, which have been referred to above, are additions to the flora of Division 26, East Mayo :—

Viola Reichenbachiana,
Prunus Avium,
P. Padus,
Myriophyllum spicatum,
‡Anthemis Cotula,
Hieracium iricum,
Euphorbia exigua,
Ulmus montana,
Juniperus nana,
Taxus baccata,
Listera cordata,
Neottia Nidus-avis,
†Lolium temulentum.

Taxus baccata has, in fact, been previously found in East Mayo (see "Irish Top. Bot.") but only in a "probably introduced" station.

Of the plants previously recorded from Lough Carra, those which we did not meet with were *Rosa Sabini*, *Gentiana verna*, and *Lastrea Thelypteris*. These were found about Moore Hall or Lake View, places to which we devoted only a few minutes.

One of the most interesting features of the Lough Carra flora is its richness in Orchids. Out of the Irish list of 24 species, 19 were found around the lake—namely, *Neottia Nidus-avis*, *Listera cordata* and *ovata*, *Spiranthes autumnalis*, *Epipactis latifolia* and *palustris*, *Orchis pyramidalis*, *Morio*, *mascula*, *incarnata*, *latifolia*, and *maculata*, *Ophrys apifera* and *muscifera*, *Habenaria conopsea*, *intacta*, *viridis*, *bifolia*, and *chloroleuca*.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a short-eared Owl from Mrs. J. E. Ellis, a Sulphur-crested Cockatoo and a Mealy Amazon from Mrs. St. George, a Kingfisher from Mr. H. G. Cooke, a Herring Gull from Dr. J. Lentaigné, an Amazon from Capt. J. R. Simpson, four Black-headed Gulls, two Call-ducks, four Redpolls, and a Bullfinch from Mr. W. W. Despard, a Ring-snake from Mr. J. Marshall, and Badgers from Mr. J. C. Carter.

DUBLIN NATURALISTS' FIELD CLUB.

JULY 5-7—EXCURSION TO ROSSLARE AND DISTRICT.—Members and visitors travelled from Harcourt Street terminus by the 10.10 a.m. train on Thursday morning. On arrival at Wexford the party was met by J. J. Perceval, who (with the Hon. Sec.) acted as conductor during the excursion. At Rosslare the whole party, which numbered 17, was well accommodated at Kelly's Hotel. After lunch the members drove to Ballytrent, and (after a visit to the very fine rath) proceeded to walk northwards along the seashore towards Ballyhire. The sand-loving plants of the neighbourhood presented great attractions, and members made a large number of finds. A very fine specimen of *Ophrys apifera* was secured near Ballytrent. From Ballyhire the excursion returned to Rosslare, *via* Tagoat, at 7.30. On Friday a start was made in brakes at 9 o'clock for Carnsore, the most south-easterly point of Ireland. At about half a mile from Carnsore the members left the brakes and proceeded on foot to the seashore. Here the geologists had an opportunity of studying the occurrence of the Carnsore granite in the field and collecting specimens. The botanists collected here the rare *Salvia Verbenaca* and *Atriplex laciniata.* From Carnsore the party drove to the northern end of Lady's Island Lake for lunch. Here the botanists obtained *Trifolium filiforme.* At two o'clock a start was made on the most important work of the excursion, which was to see *Diotis maritima* in, perhaps, its only remaining station in the British Isles. It was found by Mr. N. Colgan growing in great abundance on the shingle barrier between Lady's Island Lake and the sea. A few specimens of this very rare plant were obtained in flower. Its present range on the shingle bank, according to Mr. Colgan, is about 400 paces, and every care was taken to prevent needless injury. *Trifolium striatum* was also obtained here. At 3.30 the party drove to "Lake" Tacumshin, where the fauna and flora of this brackish lagoon was studied This lake, which was open to the sea in 1683, has become enclosed since by the formation of sand and shingle banks across its inlet, and a severely dwarfed fauna and flora has resulted. Rosslare was reached at 8.30.

On Saturday, July 7th, an early start was made from Rosslare for Wexford, and at 10.30 the party left Wexford in steam and motor launches (kindly lent by Mrs. Deane-Morgan, of Ardcandrisk, and Mr. Pearse, of Wexford) for a botanical trip up the Slaney. At various points on this beautiful river the party landed and studied the local flora. These halts included Ferrycarrig, Carrigmannon, where the party lunched, and Bellevue, where a section of the party left the launches and botanized along the railway line to Macmine Junction. At Macmine the members were very hospitably entertained by Capt. A. G. Richards, of Macmine Castle. The excursion finally came to an end by the departure of the members from Macmine Junction by the 6.10 train for Dublin, after one of the most successful excursions of the D.N.F.C. Among further interesting plants collected were—*Trifolium glomeratum*, *Brassica nigra*, and *Sisyrynchium californicum*, the last being obtained by W. F. Gunn north of Rosslare Station.

BELFAST NATURALISTS' FIELD CLUB.

JULY 12-14.—EXCURSION TO SOUTH-WEST DONEGAL.—Forty-eight members joined in this excursion. Leaving Belfast by the 7.30 a.m. train on the morning of July 12, Donegal was reached shortly after mid-day. The first afternoon was devoted to driving round Lough Eske, with visits to Ashdoon Waterfall and Ardnamona demesne, at which latter place the members were received by Sir Arthur R. Wallace, C.B., D.L., and entertained to tea by Lady Wallace. The combination of wood and water at this place, situated as it is on the edge of the Carboniferous limestone area, and lying between the Barnesmore and Blue Stack groups of mountains, was much admired, and the geological and botanical features noted. The ferns and orchids for which the district is noted were mostly all seen, including *Hymenophyllum tunbridgense*, *H. unilaterale*, *Cystopteris fragilis*, *Lastrea spinulosa*, *L. æmula*, *L. Oreopteris*, *Polypodium Phegopteris*, and *Osmunda regalis*. *Lobelia Dortmanna* grew abundantly in the lake. In the evening a visit was paid to Donegal Abbey. Friday was devoted to a drive to Brownhall, where, under the guidance of Major Hamilton and his son, the members explored the wonderful ravines, caves, &c., made by the Ballintra river as it works its way alternately above and below ground through the limestone strata of Brownhall Demesne. The drive was continued to Coolmore Strand, on the shores of Donegal Bay. Antiquarian members busied themselves in the sand-hills between Coolmore and Rossnowlagh, where neolithic remains and shell-mounds occur frequently. Others made their way along the cliffs as far as Kilbarron Castle. On the return journey to Donegal *Ceterach officinarum* and *Cystopteris fragilis* were noted on walls between Coxtown and Laghy. The most noteworthy botanical feature of the district was the frequent abundance of *Carduus pratensis* and *Habenaria conopsea*, just as the prevalence of *Melampyrum pratense* was a feature in the woods at Ardnamona. The geologists obtained a number of Carboniferous Limestone fossils from rocks south of Coolmore Strand. Here also were noted *Trochus lineatus* and the Purple Sea Urchin, *Strongylocentrotus lividus*. A short business meeting of the Club was held after dinner, the Vice-President, N. H. Foster, M.B.O.U., in the chair. Three new members were elected, and a vote of thanks accorded to the secretaries. The forenoon of Saturday was devoted to a drive to Mountcharles, where the sandstone quarries and works were inspected. Afterwards the drive was continued to The Hall, where the party were entertained by Mr. and Mrs. J. A. Hanna. Two members reported collecting, during the excursion, 43 species of land and fresh water Mollusca. Very few beetles were observed. Four species of butterflies and nine of moths were obtained. Five species of Hymenoptera were collected, including the Giant Sawfly, *Sirex gigas*. The bird-men noted a total of 64 species. They were informed that Black-headed Gulls, Terns, Red-breasted Mergansers, and Herons, breed regularly on Lough Eske. The most remarkable fact learnt, however, was that the common House Sparrow is unknown at Ardnamona and Brownhall.

JULY 28.—EXCURSION TO KILLOUGH AND ST. JOHN'S POINT.—The morning was so excessively wet that not a few were deterred from joining in the excursion to St. John's Point. A party of nineteen travelled to Killough station. Before reaching Killough the rain which had prevailed during the morning had cleared away, and the afternoon was very fine. The excursion was mainly a botanical one. In the programme a list of fifty species was given of the rarest plants recorded from the area around Killough, and fully three-fifths of these were obtained in addition to other rare species which had not been so listed The area examined lay between Rossglass, round the shore by St. John's Point to the railway station at Killough. Among the rarer plants noted were:—*Papaver Rhœas, Glaucium flavum, Raphanus maritimus. Trifolium striatum, T. filiforme, Crithmum maritimum, Artemisia maritima, Mertensia maritima, Atriplex portulacoides, A. farinosa, Ononis repens, Beta maritima, Juncus obtusiflorus, Cochlearia danica, Senebiera didyma, Torilis nodosa*, and *Polygonum Raii*. At Rossglass *Euphorbia Paralias* occurred sparingly, a small extension of range. The white flowered variety of *Erythræa Centaurium* grew profusely between St. John's Point and Killough. On waste ground near the lighthouse *Borago officinalis* and *Saponaria officinalis* grew. *Crithmum maritimum* and *Artemisia maritima* seem to be increasing at their old stations Thirty-five species of birds were noted by the ornithologists of the party. The geological members studied the igneous dykes, glaciated slates, old sea cliffs, raised beach, and consolidated sands and gravels that stretch round the coast here. The party met in the Castle Hotel, Ardglass, for tea, after which a business meeting was held.

REVIEW.

NATURE STUDY FOR SCHOOLS.

Our School out of Doors.—A Nature-book for young people. By the HON. M. CORDELIA LEIGH. 2nd edition. London: T. Fisher Unwin, 1906. Pp. xii.+142. Price, 2*s*.

This is a handy little book intended for the use of teachers to guide them to appropriate natural objects when taking their classes for country rambles. There are twenty-four lessons, two for each month, and the calendar-arrangement leads naturally to a miscellaneous grouping of subjects. In spite of a few unhappy expressions, such as "barnacle-mussels," the "tongues" of butterflies, and the "pupa" of dragon-flies, the zoological and botanical facts are trustworthy, and there is a genuine out-of-door air about the lessons that must appeal to the field naturalist. There are numerous illustrations, many of which are good but some of the half-tone blocks have been badly spoilt in the printing.

NOTES.

BOTANY.

Orchis pyramidalis and Ophrys apifera in Co. Fermanagh.

In the middle of last July, when spending a few days in the vicinity of Enniskillen, I had the pleasure of finding the above two Orchids on the south side of Lower Lough Erne, between the entrance to Ely Lodge and Blaney Post Office. *Ophrys apifera* was very sparingly distributed, single plants being only found at long distances apart, except in one spot where a small colony of about six were found growing close together. *Orchis pyramidalis* was even more limited in quantity, only a few single plants growing at long intervals apart.

N. CARROTHERS.

Belfast.

Orchis pyramidalis in Down and Antrim.

The occurrence of *Orchis pyramidalis* as a native in Co. Down was admitted by Mr. R. Ll. Praeger, in *Irish Topographical Botany*, when he inserted it on the strength of Mr. S. A. Stewart's finding of two specimens at Ballyholme, in 1873. Mr. Praeger himself, in 1902, found it in fair abundance at Killard Point, and one plant on a slope by the roadside east of Murphystown. On Saturday, July 21, I got a solitary plant on the sand-hills, a short distance west of Rathmullan Point. In the immediate vicinity no more plants could be seen, but no special search over the district was made. I did not see it at Murphystown, nor could I turn it up at Killard Point, on the occasion of a visit a fortnight earlier, although at the latter station *Habenaria viridis* grew plentifully. *Orchis pyramidalis* I again turned up on the evening of July 23, this time on the old chalk quarry spoil-bank at Cave Hill, overlooking the city of Belfast. As before, I only met with one plant, and stumbled across it when searching for *Orobanche rubra*, which I found in fair abundance at the same place. This appears to be the second record of the Pyramidal Orchis from County Antrim: the first being that of Mr. Praeger, in 1888, his locality being also a quarry spoil-bank, at Magheragall, near Lisburn. It may be incidentally remarked that *Geranium pratense* occurs by the margins of the disused tramway leading from the Cave Hill quarries, and even over the old spoil-heaps, where it seems to be firmly established. This year many of the plants have flowered; and it is an interesting question how it obtained its foothold at this station, as it does not exist in any of the gardens in the neighbourhood. Its discovery at Cave Hill quarries was made last year by Mr. H. L. Orr.

W. J. C. TOMLINSON.

Belfast.

Names and Uses of Molinia cœrulea.

When at Sneem, Co. Kerry, I was struck by the frequent reference of the tenants on the Warden Estate to "Finnaun," and on Friday, July 20th, I found some of them engaged drying "Finnaun" to make ropes for thatch.

The plant is *Molinia cærulea*. They told us no other grass would make as strong and as lasting ropes for binding down the newly thatched roof. I also found that *Euphorbia hiberna* is used as a black dye for wool, in addition to its well-known use as a poison for fish when pounded up and placed in a salmon pool by poachers.

My friend, Mr. N. Colgan, writes:—"I find the name 'Finnawn' entered in my notes for Sneem, in 1901. For Southern Mayo (in 1899) I have entered the name 'Finntonac' for the dried *Molinia*, gathered in autumn, and I believe the grass is there used for thatching. The name in Mayo for the younger growing stage of the grass is 'Fay-ur Shliev' (phonetically rendered), which means the Mountain Moorgrass.

"I am inclined to believe that 'Finnawn,' as well as 'Finntonac,' may both be names for the dried grass, the hay, in fact, of *Molinia cærulea*, rather than for the growing green state."

It is, however, applied to both states of the grass in Sneem.

RICHD. M. BARRINGTON.

Fassaroe, Bray.

[Mr. Barrington kindly sends us with this note a specimen of the grass.—EDS.]

Orobanche minor in Co. Dublin.

This parasite of clover fields, first detected in Co. Dublin in 1893, is spreading rapidly. In July last I had an opportunity of studying its present distribution in the north-eastern part of the county, District 2 of the *Flora of Co. Dublin*, where I found it growing in no less than 14 stations additional to those already recorded for that district. It appeared in 7 distinct stations near Skerries, in 1 between Skerries and Balbriggan, in 2 near Lough Shinny, and in 4 near Rush, while in its original station of Shennick's Island, off Skerries, it remained as abundant as it had been thirteen years earlier, when discovered there in its first Dublin station. In almost all cases the plant was found where mixed clover and Italian Rye-grass had been sown, the parasite shooting up with the clover after the cutting of the grass. In one of the Rush stations it appeared in a sandy fallow. Whether this species is spread by repeated fresh sowings of alien clover-seed, or is naturally disseminated by its light and minute seeds which may be so easily carried by the wind, it is hardly possible to decide. Further observation in other parts of Ireland will, no doubt, show that the species is becoming quite common.

N. COLGAN.

Sandycove.

ZOOLOGY.

Pugnacity of the Common Tern.

While shore-collecting on rocks to the north of Balbriggan, Co. Dublin, on the 20th July last, I was annoyed by the clamour of a pair of Common Terns (*Sterna fluviatilis*), which kept circling in the air a few feet above me. Their behaviour suggested the neighbourhood of a nest, and five minutes careful search was rewarded by the discovery of a young bird sitting motionless, yet keenly observant, at the upper angle of a large rock pool, near high-water mark. The still callow nestling sat partly in the water, and its coat of whitish, tawny down, mottled with gray, was extremely hard to separate from the surrounding lichen-clad rocks. The position of this nest, if nest it was, was peculiar, yet the bird was apparently too helpless to have scaled the deeply jagged and splintered rocks which hemmed in the pool, so that it was not improbably hatched in the terraqueous cradle where I found it. While I stood inspecting the nestling at a distance of a couple of yards, from the opposite side of the pool, the conduct of the parent birds became most aggressive. They swooped down again and again to within a few inches of my head, and to save my eyes from the threatened attack I was obliged to clear a circle round me with a stick. After a short time I withdrew from the rocks, escorted, or rather chased, by the old birds, and sat down on the shore to watch their further movements.

The rocks lay in the path of a procession of sea birds—Black-headed Gulls, Herring Gulls, and Lesser Black-backed Gulls—which kept passing northward in straggling lines to feeding grounds near the mouth of the Delvin river. Some of these gulls took a high-level route, thirty or forty feet above the rocks, others skimmed close over their jagged crests, but none of them appeared to pay the least attention to the rocks as they flew steadily northward. Nevertheless, the parent terns, who now kept hawking above the pool where their nestling lay, were full of distrust. They chased every gull that crossed the rocks by the low-level route, forcing the large birds to mend their pace, and, in some instances, striking the tail feathers of a laggard. The most amusing part of the performance was the perfect docility of the gulls. Not one of them made the least resistance to the apparently unprovoked attacks of the terns, who, no doubt, were secure in their superior agility against any onslaught of the more powerful birds. The gulls who took the high-level route were allowed to pass unmolested.

N. COLGAN.

Sandycove.

Blackbird laying twice in same nest.

In the *Zoologist* for June, Mr. W. H. Workman records an instance of a Blackbird rearing a brood of young, and then laying a second clutch of eggs in the same nest, near Belfast.

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THE ANNALS OF SCOTTISH NATURAL HISTORY.

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ON THE NESTING OF THE TREE-SPARROW IN CO. DERRY.

BY NEVIN H. FOSTER, M.B.O.U.

PLATE 4.

ON 16th August last I was sitting on the cliffs of the coast of Co. Derry, when a bird alighted on the rock a short distance off. At a first glance I considered it to be a House-Sparrow, but noting the peculiarly light colour of its plumage and the generally slimmer appearance of the bird, I examined it with my binoculars and was surprised and pleased to find that it exhibited all the characteristic markings of the Tree-Sparrow, *Passer montanus* (L.) The bird carried in its beak a moth, but in a short time flew out of sight round a projection of the rock, so I altered my position in order to command a view of the part of the cliff towards which it had gone, and soon saw it emerge from a Sand-Martin's nesting hole. Shortly afterwards its mate appeared, and for some time I watched the pair as they went and returned, each time conveying a supply of insect food with which they entered the hole. As this was the first observation recorded of this species actually breeding in Ireland outside Co. Dublin, I wired to Mr. Robert Patterson, who came, and accompanied me to the place, where we sat for two hours watching these birds, and he confirms the discovery. At this time the young were fully fledged, and we saw them come out to the entrance of the hole to receive a supply of food each time one of the parent birds approached.

Whilst watching we were amused to observe a Rock-Pipit pursuing one of the Tree-Sparrows from point to point on the rocks, with the evident intention of depriving it of the food supply which it carried, but in the end the Sparrow managed to elude its pursuer and convey to its brood the prey it had secured.

By the 20th, the young had left the nest, and though I searched the vicinity I failed to see the birds afterwards.

Mr. R. Welch kindly came and photographed the place, thus enabling the production of a plate showing the position of the nest (see Plate 4). The nesting hole (marked by an arrow)

was situated near the top of an almost perpendicular cliff composed for about 60 to 70 feet from sea-level of rudely columnar basalt; overlying this a band of about 5 feet of clay iron-ore, on which rested about 4 feet of the upper series of the basaltic lava flow, and above this a sand-bank averaging about 3 feet thick at the face of the cliff, the nesting hole being about 2 feet below the summit. Alongside were about a dozen nests of Sand-Martins which must, at the time of our visit, have contained young, as the Martins were continually flying backwards and forwards and conveying food to the nests.

The Tree-Sparrow is fairly common in many districts of England, Scotland, and the Isle of Man, but so rare in Ireland that it may be well to summarise what has been recorded as to its distribution in this island. Thompson (*Natural History of Ireland*, 1849) says—"The Tree-Sparrow appears in Templeton's *Catalogue of Irish Vertebrate Animals* 'as a doubtful native,' but to my ornithological friends and myself it is quite unknown." Watters (*Birds of Ireland*, 1853) does not mention the species at all. The British Association *Guide to Co. Dublin* (1878) says of this species—"Very rare Winter visitor. One shot near Sandymount in March, 1865, is in Museum of Science and Art." A. G. More's *List of Irish Birds* (1st Edition, 1885) says—"Very rare, and hitherto found chiefly near Dublin, but apparently increasing of late years. Has occurred about Baldoyle, Sandymount, and Dalkey. Some nestlings, obtained by Mr. E. Williams from near Howth, are in the Museum [June, 1882]. The first Irish specimen was exhibited in May, 1852, to the Dublin Nat. Hist. Society by Mr. R. J. Montgomery."

The above contains the first recorded notice of the Tree-Sparrow breeding in Ireland. In the 2nd Edition of More's *List* (1889) the following is added—"A pair were found, as if breeding, on Aranmore Island, Co. Donegal, by Mr. H. M. Wallis, in May, 1886 (*Zoologist*, 1886)." Ussher (*Birds of Ireland*, 1900) states that since 1852 "the species has evidently increased and spread over that part of the county between Dublin Bay and the Malahide Estuary. . . . In December, 1900, a specimen was obtained near Bray, on the borders of Dublin and Wicklow. On the 22nd October, 1896, a Tree-Sparrow, now in Mr. Barrington's collection, was caught exhausted on

the Tuskar rock, off Wexford, in the route of migrating birds. I have notices of this bird from the Counties of Wexford and Fermanagh, which I have no wish to discredit, but the corroboration of specimens is wanting, and until such are obtained those localities cannot be admitted." Referring to Mr. H. M. Wallis' note in the *Zoologist* for 1886, he adds—"The species cannot have established itself there, for in 1896, when I visited Aranmore with Rev. A. Ellison, we passed an hour inspecting the Sparrows about the cabins on the island, without meeting with a Tree-Sparrow." In the *Irish Naturalist* (1905) Mr. Robert Warren records the finding of a colony of Tree-Sparrows at Belmullet, Co. Mayo; and Mr. Ussher writes me that it has been reported from another coast village in the same county.

It is probable that the Tree-Sparrow has established itself in many other localities, but owing to its resemblance to the male House-Sparrow, has not been recognised. Doubtless a careful scrutiny, more particularly around our coast, would reveal the existence of the species in many other localities.

Hillsborough, Co. Down.

WHY USE NUMBERS FOR THE NAMES OF COUNTIES?

BY CANON H. W. LETT, M.A., M.R.I.A.

AN article in the May number of the *Irish Naturalist* (*supra*, p. 118) on "Some Irish Brambles" has induced me to give my views on the use of numbers in the place of the names of the counties in Topographical Botany. In the paper referred to, the writer gives the localities under the double designation of the county name and a number according to the plan used by Mr. R. Ll. Praeger in his *Irish Topographical Botany* and other more recent writings, while some authors go the whole length of giving the number only. The system of recording the localities by this double method was first used by Mr. H. C. Watson in his *Cybele Britannica* published in 1847–1852, and was subsequently fully developed as it now stands for 112 "vice-counties" in his *Topographical Botany* published in 1873–74.

Whenever I turn over any of the 584 pages of this last work, I am fairly astounded at the marvellous waste of printing. There is on every page column after column of the numbers assigned to the counties, and alongside each number the full name of the county for which it stands—as an explanation of what the figures are meant to point out. And in Mr. R. Ll. Praeger's *Irish Topographical Botany* there are 400 pages printed after precisely the same method. Each plant has its column of the names of the counties in which it has been found, and to each county-name is prefixed the number by which Mr. Praeger would have botanists designate the county. If the columns of numbers were absent there would be less printing on each page, and surely the county names would at once locate the parts of Ireland and of Great Britain which the respective plants inhabit. I do not think the numbering of the counties affords any assistance to re-calling to one's mind their respective positions on the map.

In the instance, for example, of, say, *Primula elatior*, the numbers are "19, 26, 29, 30," which convey no idea of locality to my mind, while at once I grasp the meaning of "Essex N., Suffolk W., Cambridge, Bedford," which are the localities for this plant.

In Watson's *Topographical Botany* there are 1,428 of these columns of explanation, be they shorter or longer, according to the circumstances of the distribution of each plant. And in Mr. Praeger's *Irish Topographical Botany* there are 400 pages of similar columns of explanation of what the numbers stand for as concerns Ireland!

Every time I open Watson I am more impressed with the difficulty created by his numbers. I can never forget the impression made on me the first time I opened his book, by his numbers for what he calls his "provinces," "sub-provinces" and "vice-counties." The county name without the prefixed number answers every purpose that a botanist can need. But Mr. Watson was not satisfied with his revolution of the appellations by which the counties are known, and he actually abolished the use of the word "county," for which he substituted "vice-county," having much the same meaning as the older word "viscounty"; and Mr. Praeger in his work abolishes "county" for the slightly longer word "division." And all

the while in both Topographical Botanies, the county boundaries, as the public know them, are strictly adhered to. Nothing has been gained by this substitution of numbers for the names of counties. The authors of the plans could not do without giving each county's name after the number, each time they used one of the numbers. And we must always bear in mind that the assignation of the numbers is a purely arbitrary experiment. And if the numbers are so all-important and necessary, and so free from any chance of confusion or mistake arising, there would be no occasion to repeat on every page, again and again, the names of the counties signified by the numbers.

In the communications on the Irish portion of this subject that have appeared in the *Journ. of Botany* and *Irish Naturalist*, the only reason given for the use of the numbers resolves itself into this—"H. C. Watson did it for Great Britain and I have done it for Ireland," But the proceeding is like many another experiment that has been tried on Ireland. Now, if somebody had the courage to put his pen through every one of those iterated columns of numbers in Watson, he would be a benefactor to every student who is interested in the botany of these islands. I might suggest that the presence of such an overwhelming array of numbers should be recognised in the titles of the works, and that they should be called "*Numerical Botany*."

It is more than a pity to risk the grand old names of the counties around which are clustered so many histories and memories, and to label them off with numbers as if they were porters, or policemen, or convicts who are known only by a number.

It takes away the interest that is more or less attached to all and each of the county names, and the next step in this drying-up system may very well be the substitution of the numbers set down to the plant names as found in the London Catalogue of plants, in place of the Latin names of genera and species—such might be the perfection of mathematical or arithmetical exactness in botany. But would it assist students, or attract recruits to any department of botany?

I have been told that "a great practical difficulty" exists in botanical works for want of these numbers instead of the

familiar names of the localities, but if so, it is a "difficulty" known only in the British Islands, for in no other country has such a plan been adopted.

Somebody, who is an advocate for the numbers, refers me to the numbering of the avenues and streets in New York and other great cities of the United States of America; but that is quite different, and is moreover carried out after a system which is impossible with the wildly irregular contours of Great Britain and Ireland. I grant that in an enormous and regularly built city, the numbering instead of naming the streets and cross-avenues is an aid for quickly finding the spot one desires to arrive at, but in that case the numbers are not arbitrarily assigned, they follow in regular succession. The dismal prospect of the complete disuse of the names of counties reminds me of the mathematical master of a pack of hounds of whom I have heard, who would have none of your "Jowlers," or "Keepers," or "Fireflies," or "Dairymaids," but severely with scientific accuracy called to his poor dogs instead as "1," "2," "3," "4," &c.

I do not enter a plea for the retention of the county names instead of the numbers without having had a practical trial of Watson's numbers. In a little handbook of the British Hepatics that I printed a few years ago, I took the distribution of the Hepatics in Great Britain from Mr. W. H. Pearson's magnificent work, and inserted the numbers without the county-names as he had done. And I regret having done so. I constantly use my own book, and I have always to turn up the explanation of the numbers when I want to see in what county a certain plant has been found.

The sample of beautiful and ingenious maps recently published by Mr. Praeger convinces me that it is well it is too late to map out all the British Islands into rectangles, each designated by a number. The mere idea of trying to study the botany of our own country with such guides fairly takes one's breath away. Would it not be better worth while to work out something more attractive and less costly. One cannot be too thankful for the names of the county-divisions, they are quite sufficient, and whether poetical or historical, there is no danger of their being lost sight of, at least, so long as Messrs. Watson's and Praeger's Topographical Botanies exist in their present forms.

In a certain way the counties and their names have a necessary connection—namely, through long usage or custom, and our familiarity with them acquired by the use of maps in our school-days. I might even say we inherit a certain part of this association from our forefathers, and it does not need a prophet to predict that there will be many generations passed away before our descendants find the numbers as convenient as the names—if they ever do so.

Not one reason has been brought forward against the use of the existing county names: one writer did allude to the contractions of the names of the Irish counties that have been already used by the Rev. W. Moyle Rogers in his handbook of *British Rubi*, and in my *Hepatics*, as if it was an invention on our parts. But there was nothing new or original in these contractions, no more than in the use of "Jan., Feb., Mar.,' &c., and "Mon., Tues., Wed.", &c., which I am aware some persons prefer to speak of as the 1st, 2nd, and 3rd months and days.

If the contractions of the Irish county names just referred to are too short for perfect distinctness, it is easy for writers to lengthen them according to their fancy by adding a few letters to each. Thus—Ant., Arm., Carl., Cvn., Clare, Cork, Down, Dngl., Dub., Ferm., Gal., Kery., Kngs., Kldr., Klky., L.dry., Leit., Lgfd., Lim., Lou., Mayo, Meth., Mon., Qns., Rosc., Slg., Tyrn., Tip., Wick., Wat., Wex., W.meth.—none of these are likely to be confounded one with another. And if at any time it might be considered advisable to split a county, nothing is easier than adding as a suffix a letter from the compass, such as "N." for "North," and so on, which would not dislocate the existing designations. The same could be effected for all the "vice-counties" of Watson. I have made the experiment for my own amusement, but it would take up too much space to give them in the present article.

Loughbrickland, Co. Down.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include two Talpacoti Doves, two Californian Quails, and a Weka Rail from Mr. W. Cross, a Roseate Cockatoo from Mr. A. Coe, twelve Green Lizards from Mrs. Blacker, a Squirrel from Mr. W. S. Tighe, a Crossbill from Dr. J. Trumbull, three Snow-geese from Lord Lilford, a Wolf from Mrs. Cockburn, Sparrowhawks from Mr. J. C. Carter and Mrs. Gumbleton, Hedgehogs from Mr. M'Grogan and Mr. H. C. Poulter, a Seal from Mr. J. H. Kincaid, nine Guinea-pigs from Mr. T. Beatty, a pair of European Storks from the Royal Gardens, Kew, a Song Thrush from Dr. Tweedy, a Fox from Mr. J. C. W. M'Clintock, a Cuckoo from Mr. W. W. Despard, and a Mongoose from the Countess of Kilmorey.

Two Lion cubs, a Pigmy Calf, and a Golden Agouti have been born in the Gardens. Among recent acquisitions by purchase are a Chimpanzee, a White-nosed Monkey, twelve Rhesus Monkeys, a Capuchin Monkey, three Marmosets, a Brown Lemur, four Hedgehogs, four Canadian Tree-porcupines, three Hamsters, two Pumas, a Red Kangaroo, two Tasmanian Devils, a pair of Red-throated Francolins, two Black Tanagers, a South American Starling, three Indian Starlings, two Pileated Jays, an Amster Pigeon, four Talpacoti Doves, two Greek Partridges, two Grant Quails, two Pelicans, five Storks, two Ibis, a Curassow, and six Egrets.

BELFAST NATURALISTS' FIELD CLUB.

AUGUST 11.—EXCURSION TO GREENCASTLE AND CRANFIELD POINT.—Fifty-three members attended this excursion. The main body travelled by the 9.20 a.m. train from Belfast to Warrenpoint, where several other members joined. At noon a steamer took the party down Carlingford Lough to Greencastle, where the tumulus, old church, and old castle were examined. The party then walked round the sandy shore from Greencastle Point to Cranfield Point. This district is rich in maritime and sand-loving plants, and the trip afforded many members an opportunity of seeing in their native habitats *Glaucium flavum*, *Cakile maritima*, *Raphanus maritimus*, *Eryngium maritimum* (this in immense quantities), *Lavatera arborea*, *Salsola Kali*, *Beta maritima*, *Polygonum Raii*, *Euphorbia Paralias*, and *E. portlandica*. The Wild Teasel, *Dipsacus sylvestris*, was observed at its old station at Cranfield Point. The small outcrop of Carboniferous Limestone on the shore was examined, and in the vicinity of Soldier's Point a few fossils were collected. The raised beach at this place is very conspicuous, and near Cranfield it affords clear evidence of the existence of early man in the district. The party returned to Warrenpoint from Cranfield by coach. A halt was made at Rostrevor for tea, after which a business meeting was held. Afterwards a visit was paid to the quarry

adjacent to the hotel. The party returned to Belfast by the 7.10 p.m. train from Warrenpoint.

AUGUST 25.—HALF-DAY EXCURSION TO BALLYCARRY.—Fifty-two members and friends attended, took the 2.15 p.m. to Ballycarry, and walked to the village. After visiting the early seventeenth century church, the party walked to Redhall demesne, permission to visit which had been granted by W. J. Porritt, Esq. As Redhall has for many years been strictly private, it has been saved from the vandalism of excursionists. Among other plants noted were crested forms of *Scolopendrium vulgare*, *Polypodium vulgare*, var. *semilacerum*, *Circæa alpina*, and *Epipactis latifolia*; also *Epipactis media*, whose only Ulster station hitherto was Glenarm Park, where it was noted long ago by S. A. Stewart. After tea at the Gobbins Hotel a business meeting was held, the President, W. H. Phillips, in the chair. One new member was elected, after which the members returned to town by the 7.30 train.

We have received the Annual Report and Proceedings of the Belfast Naturalists' Field Club for the year 1905-6, which furnishes, as usual, good evidence of the activity of this Society. In addition to the usual record of summer excursions and abstracts of papers read at winter meetings, the series of "Appendices" is revived (after an interval of ten years) in two useful papers—one by Madame Christen, giving a summary, with tables and a map, of the work on glacial erratics carried out by the Club, and the other by Mr. James Strachan, discussing the origin of the chalcedony of Carnmoney. The only change in the usual get-up of the publication is one we cannot commend—namely, the printing of scientific names of species in roman type, instead of italic as heretofore. This makes it very difficult to pick out zoological or botanical records from the discursive—sometimes more than discursive—matter in which it is embedded.

DUBLIN NATURALISTS' FIELD CLUB.

JULY 28.—EXCURSION TO LOUGH BRAY AND KIPPURE.—Members to the number of twelve took part in this excursion. The party met at Terenure at 9.15 a.m., and started on cars and bicycles for Lough Bray, *via* Rockbrook and Killakee. At Glassamucky Dr. G. H. Pethybridge, who acted as conductor, explained the methods of plant surveying, and pointed out the different associations in view. After lunch at Lough Bray the party ascended Kippure mountain. From the top of the slope overlooking the loughs a very fine view of the glacial moraines of the upper and lower loughs was obtained. After tea at Lough Bray cottage the members returned to Dublin by Enniskerry and the Scalp.

REVIEWS.

THE NEW "THOMSON."

Outlines of Zoology. By J. Arthur Thomson, M.A. 4th edition, revised and enlarged. Pp. xx.+856. Edinburgh and London: Young J. Pentland, 1906. Price, 15*s*.

The issue of another edition of Prof. Thomson's well-known text-book is sufficient evidence of its continuous popularity, and shows at the same time that the author will spare no pains to make his work merit the warm approval of students and teachers of zoology. In this edition 36 pages of letterpress and 55 new illustrations have been added. The accounts of the Tunicates and of Balanoglossus and other worm-like animals, now regarded as low type vertebrata, are fuller than in previous editions. In the chapter on the Protozoa there is now a summary of Schaudinn's researches into the life-history of coccidian parasites, but fuller references to the Hæmosporidia that cause blood-diseases in man and domestic animals would have been welcome. The Fishes are classified according to the views of most recent authorities on the class, but the chapter on Mammalia—excellent and full of information as it is—needs further revision. For the Okapi, and the recently discovered fossil Hyracoidea and ancestral Proboscidea are all treated as non-existent. We notice, too, that Prof. Thomson retains the old division of the Streptoneurous Gastropoda into Zygobranchs and Azygobranchs, which has been abandoned by modern malacologists. The section on the Arthropoda is exceptionally good. In the next edition we hope that the author will see his way to abolish the class "myriapoda," and treat centipedes and millipedes as separate classes. The figures of these these two types, by the way, are among the few bad things in the book; another figure that we hope may soon be replaced is that of the arterial system of the pigeon on p. 644.

In the domain of biological theory there are not a few improvements. A short summary of Mendel's observations has been added, but the deductions drawn thence as to the nature of the germ-cells is curiously omitted. We wonder what the Mendelians will think of the "Diagram showing hypothetically the action of natural selection in the evolution of a white race of mice from a dark-coloured stock" on p. 811! But whatever our opinion on matters of detail, the book as a whole is one to be confidently recommended to students. For the subject is made so "living," the facts mentioned are so used to point out problems that remain for solution, the need for fresh observation and experiment is so constantly urged, that no student who uses the book intelligently can fall into that most dangerous mistake of believing in the infallibility of any printed page!

G. H. C.

ANOTHER BIRD BOOK.

Pocket-Book of British Birds. By E. F. M. Elms. London: West, Newman & Company. 1906. Price 2*s.* 6*d.*

The idea and plan of this little book of 150 pages is excellent, and if well carried out, it would be most useful to the naturalist in the field. But much as we should like to recommend it, there are several blemishes which impair its usefulness. The price is too high; it should have been sold at 1*s.*, so as to make it uniform with Miller Christy's "Bird Nesting and Bird Skinning." Then, again, the Irish information is not at all satisfactory. For instance, the Redstart is given as "rather rare," the Chiffchaff as "rare," the Willow Wren "rarer," and the Wood Wren "rare." Those who know of the status of these four birds in Ireland will at once see how misleading these definitions are; they are practically put on the same basis, which, as we all know, is absurd. Again the Marsh Tit is noted as "rarer in Scotland and Ireland"! We could pick out numerous instances of similarly misleading information regarding birds in Ireland, but the above will be enough to indicate that reference to Mr. Ussher's well-known book may be recommended to the author if a second edition should be called for. Some of the remarks about common birds are not very happy. For instance, the song of the Thrush can hardly be described as "monotonous." We were under the impression that its variety was one of its chief charms. It would have been a great improvement if Mr. Elms had given the average sizes of the eggs. We consider this a great want, that much detracts from the value of the book. As we said before, the idea is an excellent one, and it is a pity it had not been more carefully carried out. The book is well printed on thin paper, takes up very little room in the pocket, and there are blank pages for notes at the end. If the letterpress were revised, and the price reduced, there should be a large sale for this little book.

R. P.

NEWS GLEANINGS.

English Naturalists in Ireland.

During September Mr. G. C. Druce, of Oxford, visited Kerry, Galway, and Wexford, and carried out some botanical field-work. The results of his tour will appear in our pages before long. During the same month a party of well-known English zoologists—Dr. G. W. Chaster, Edward Collier, R. Standen, and C. E. Wright—spent ten days in conchological work in the Galway district; their observations will be recorded in due course in the *Irish Naturalist*. Mr. F. J. Hanbury spent the month near Lough Caragh in Kerry.

NOTES.

BOTANY.

Truffles in Co. Limerick.

I send a specimen of Truffle (I believe *Tuber æstivum*), of which I found a considerable quantity a few days ago in a grove in this place (Newborough, Patrickswell). They were in groups, and of various sizes, slightly protruding over the earth, chiefly under beech trees. One or two were found some years ago in the same grove, but never in such numbers as at this time. I should much like to know whether they are uncommon in this country, and if they can be cultivated? The "find" might perhaps be of interest to the readers of the *Irish Naturalist.*

E. L. MAUNSELL.

Patrickswell, Limerick.

The Truffle is *Tuber æstivum*, Vitt.; it is edible, but is much inferior in flavour and aroma to some other species, as *Tuber melanosporum*, Vitt., etc. A French book, entitled "La Truffe," by A. Chatin, Paris, 1892, deals with the cultivation of the various species of edible truffles. Numerous attempts have been made to cultivate truffles in this country, but the result has never proved satisfactory.

GEORGE MASSEE.

Kew.

The Calcareous Deposit in Lough Carra.

With reference to the calcareous incrustation that covers the bottom of Lough Carra, to which I drew attention on a previous page (p. 207 *supra*), I sent several specimens of the crust to Mr. William West, F.L.S., asking him how far algæ could be held accountable for its formation, and pointing out the curious fact that while deposition of lime was going on in L. Carra, the limestone was being dissolved, apparently with some rapidity, in the adjoining and, on the whole, similarly situated loughs of Corrib, Mask, and Conn, as is witnessed by the curious and well-known perforations and pock-markings so characteristic of the shores of these lakes. In the course of an interesting reply, Mr. West writes:—

"I should say that the peculiar conditions in L. Carra are due probably to the much smaller supply of water to it, and from *low ground.* The water will probably be stiller, and may get warmer than the other three loughs you mention (dissolved CO_2 will then be more readily given off). The three other loughs have high hills west of them, from which much water will flow into them not saturated with $Ca\,CO_3$ in

solution, and if this water contains much CO_2 in solution it will necessarily act as a solvent. I find algæ similar to those contained in your specimens on shady limestone rocks in Yorkshire in the ghylls (ravines) with precipitous banks, where there is a constant but small trickle of water, which is so highly charged with lime that a tufaceous deposit gradually results. The alga which forms much of the matrix of your specimens is *Dasyglœa amorpha*, Berk., a blue-green alga; this occurs in all the patches. The pulvinate patch has also radiating and branched filaments of *Stigonema mamillosum*, Agh. The soft specimen from the bottom appears to be mostly *Dasyglœa amorpha*. There is also present, scattered among the other algæ, a very slender Phormidium, probably *P. tenue*. The above are all (blue-green [cyanophyceous)] Myxophyceæ. As mixtures among (or resting on) the above were *Glœothece linearis*, another blue-green alga; also *Cosmarium granatum* var. *subgranatum*, *Euastrum pectinatum*, *Epithemia Argus*, *Cocconema lanceolatum*, and other diatoms. I have not had time to make a list of all the species; the diatoms would require some days' preparation."

R. Ll. Praeger.

Dublin.

Parsley Fern in Co. Wicklow.

In the *Irish Naturalist* for October, 1905, the occurrence of the Parsley Fern (*Allosorus crispus*) near Lough Nahanagan, in Co. Wicklow, is recorded. Up till that date it was not known south of a line drawn from Dundalk to Sligo. On one of the excursions in connection with the Summer Course in Botany for Teachers, held last July at the College of Science, I obtained several fronds of the Parsley Fern growing in crevices between stones at Ballyknockan, near the granite quarries. Several tufts were observed, and they were bearing sporangia at the time. Probably other stations will be found for it in Co. Wicklow, where it seems to be undoubtedly native.

J. Adams.

Royal College of Science, Dublin.

Glyceria aquatica in Co. Donegal.

Travelling on August 7th on the recently opened branch line between Donegal and Ballyshannon, at a place where the line runs on the level through old marshy meadow land, I noticed an unfamiliar grass growing in drains near the railway. On August 9th we went and gathered a quantity. I diagnosed it to be *G. aquatica*, and sent a specimen to Mr. S. A. Stewart, who confirmed my identification. The grass was growing most luxuriantly, and extended into the meadows for some distance. It has all the appearance of having been there for generations. I may say that the railway was only completed a few months ago, so there could be no possibility of introduction in that way.

M. J. Lebody.

Londonderry.

ZOOLOGY.

Entomological Notes from S.W. Ireland.

I spent a pleasant month's holiday in the vicinity of Killarney from the middle of July to the middle of August. Short visits were made early in August to Kenmare and Glengariff. Most of my time was spent in 'doing the sights' and making sketches of the lovely scenery which surrounded me on all sides, but much of my leisure also was devoted to collecting the various insects—chiefly butterflies, moths, and beetles—which I met with on my rambles. The weather unfortunately was very unsettled during the greater part of my stay in this enchanting country and many a carefully planned excursion was spoilt by the rain. Nevertheless I took close on a hundred species of coleoptera and about sixty of lepidoptera. Many of these were, of course, common species, but the following are perhaps worthy of mention. The species marked with an asterisk have not, I believe, been recorded previously from Co. Kerry—they were all taken in the Killarney district unless otherwise stated.

COLEOPTERA.—*Cicindela campestris; Carabus glabratus*, a crushed specimen near Upper Lake on the Kenmare Road; *C. granulatus*, a jet-black variety in the same locality as the last; *Leistus rufescens*; Bembidium monticola**, quite common under stones near the Colleen Bawn Rock, Middle Lake; *B. pallidipenne; Amara spinipes (aulica); Taphria nivalis; Aleochara bipunctata*; Philonthus splendens*, one specimen at Glengariff; *P. puella*; P. intermedius; P. fumarius*; Xantholinus tricolor; Stilicus similis*; Hister carbonarius; Adalia obliterata*; Geotrupes spiniger*; Melolontha hippocastani*—I took a single specimen on the road near the entrance to Torc Waterfall on August 5th. *Aromia moschata*—I was very pleased to meet with the beautiful Musk-Beetle which is, I believe, of rare occurrence in Ireland. I took six specimens: four at Muckross on umbelliferous flowers growing by the side of a stream, and two at Kenmare on Sallows. *Strangalia armata* occurred rather commonly on bramble blossom near the Upper Lake in the Derrycunnihy district.

LEPIDOPTERA.—*Pyrameis cardui; Vanessa io*—the larvæ of these two beautiful butterflies were very abundant in the Killarney district. *Thecla quercus*—I took a very fresh example of the Purple Hairstreak on the wall adjacent to the entrance to Torc Waterfall on August 2nd. *Saturnia pavonia (carpini)*—I found a full-fed larva of this handsome moth crawling on the Kenmare Road near the Upper Lake on August 5th. *Thyatira derasa, T. batis*—both these moths occurred at dusk in July. *Urapteryx sambucata*, not uncommon. *Selenia bilunaria* var. *juliaria*—one specimen in Torc demesne. *Boarmia gemmaria*, not uncommon at dusk, one specimen at Glengariff on August 10th. *Melanthia bicolorata; M. ocellata; M. albicillata*, all three occurred at dusk—the last-mentioned rather commonly. *Hemithea strigata; Scopula lutealis*; Botys ruralis*; Tortrix forsterana**.

Most of the above have been examined and determined by Messrs. W. F. Johnson and J. N. Halbert, to whom I tender my best thanks.

London. L. H. BONAPARTE-WYSE.

Marine Mollusca of South-east Wexford.

As the marine fauna of the south-eastern extremity of Ireland appears to have received little attention either from the dredger or the shore collector, the following notes on the Mollusca of the Wexford coast in the neighbourhood of Rosslare, Greenore Point, and Carnsore Point may be of interest. They were made during the visit of the Dublin Field Club to Rosslare on the 5th and 6th July last. A half hour on the strand north of Rosslare hotel yielded only thirty-seven species. Most of these were ubiquitous for Ireland, but the following may be mentioned as being apparently unrecorded for Wexford :—*Rissoa costata*, *Actæon tornatilis*, *Pleurotoma rufa*, *Montacuta bidentata*, and *Lacuna pallidula*. In shell sand from this station, too, a couple of specimens of the minute sea-urchin, *Echinocyamus pusillus* were found. A small gathering of sand made at Ballyhire, immediately south of Greenore Point, gave better results, yielding twelve specimens of *Cæcum glabrum*, five of *Aclis unica*, two each of *Lamellina perspicua*, *Cyclostrema serpuloides*, and *Eulima distorta*, and one each of *Rissoa proxima* and *R. fulgida*. A handful of *Laurencia pinnatifida* taken from the rocks at Carnsore Point on the 6th July gave numerous specimens of *Skenea planorbis* and three of *Odostomia pallida*. All of the species mentioned in this note appear to be previously unrecorded for Wexford, and *Rissoa fulgida* is new for Marine Province II. of Mr. Nichols' *List of the Marine Mollusca of Ireland*.

N. Colgan.

Sandycove, Co. Dublin.

Anodonta cygnea in Co. Clare.

Since writing my notice of *Anodonta cygnea* in Co. Clare, published in the August number of the *Irish Naturalist* (supra p. 189), my attention has been called to the fact that this shell has previously been recorded (*Irish Naturalist*, 1902, p. 140), by Mr. Grierson, for Loughannillon, making an earlier record than mine.

Harry Fogerty.

Limerick.

Gannets on the Little Skellig.

On June 5th this year I sailed around the Little Skellig Rock, Co. Kerry. The gannets were in full swing—gathering surface seaweed for their nests—and thousands were sitting on nests already made. I am glad to say they have increased enormously since my last visit nearly twenty years ago, and the entire rock is inhabited. I estimate fifteen to twenty thousand gannets. If the colony continues to increase at the same rate for the next ten years, it will be the largest in Europe.

Richard M. Barrington.

Fassaroe, Bray.

Tree Sparrows in Co. Dublin.

On the road from Skerries to Balbriggan on the 19th August I found a colony of this species feeding in the corn fields close to the sea road. In one flock I counted twenty birds, and there were several small parties feeding further in the field. I think this species is often overlooked, as, owing to its wildness, it is almost impossible to identify. It usually flies straight in the air, not allowing a nearer approach than eighty yards; but the note is different from the House Sparrow, and once you are familiar with it you can always detect the Tree Sparrow even in the company of his more confiding brother (*Passer domesticus*); it is smaller in size, but any person wishing to become acquainted with this species, had better arm themselves with a powerful field glass; in my opinion it is the wildest small bird in this country.

W. J. Williams.

2 Dame-street, Dublin.

Glossy Ibis in Co. Down.

On Monday, 10th September, I had the pleasure of examining, in the flesh, a beautiful specimen of the Glossy Ibis (*Plegadis falcinellus,* Linn.), which had been shot on the sloblands of the old "People's Park," now Victoria Park, on the Co. Down side of the river, and at the extreme end of Belfast Lough. It was first seen on Thursday, 6th, and its large size and dark plumage having attracted attention, it was pursued by a gunner the following day—7th inst.—and shot. It was only winged, and came into the possession of Mr. S. M. Stears, who kept it alive until the Sunday evening, when it died. Mr. Stears very kindly brought it to me early the next morning, and it is now in the hands of Messrs. Sheals, the taxidermists. Like most of the twenty-five specimens which are on record as having occurred in Ireland, this bird is a young one. It is a male, 24 inches long, and weighed 1 lb 2 ozs. Its stomach contained nothing but a few bits of seaweed. Mr. Stears tried to feed it, but he noticed the great difficulty it had in picking up any object from a hard, flat surface, showing that it was accustomed to delve for its food in soft oose. The Glossy Ibis has only occurred twice in Ulster previously—viz., in 1819 and 1853—Co. Antrim claiming both records.

Robert Patterson.

Holywood, Co. Down.

NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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AND
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THE HYÆNA-DENS OF THE MAMMOTH CAVE NEAR DONERAILE, CO. CORK.

BY R. J. USSHER, D.L., M.R.I.A.

In my communication to the Royal Irish Academy (*Proceedings*, Nov., 1904), the discovery of extinct animals in this system of caves is described. Since then I have devoted 31 weeks to the excavation of the rich contents, and have altogether sent to the Dublin Museum 76 baskets-full of fossil bones and teeth from the Mammoth Cave.

The summer and autumn of 1905 were occupied in clearing out the contents of the Hyæna-Hall and the cavities connected with it, which yielded enormous quantities of bones of Reindeer, a great many of Bear and Mammoth; while Wolf and Hyæna were also represented, the latter by a very perfect ramus of the lower jaw.

The bones and teeth of Lemming were found to occur in the sand of the Hyæna-Hall in the utmost profusion, and with the above animals a few bones of birds were associated.

In June, 1906, we broke up the stalagmite floor of the passage to the Elephant-Hall, which extended into and covered much of the latter, and in it found several bones of Mammoth completely enclosed in stalagmite, while others were deeper in the sand. The latter deposit was removed from a great part of the Elephant-Hall to daylight, but the results were less satisfactory than in the Hyæna-Hall.

At the end of July we went to work in a very remote series of eleven galleries, more than 100 yards from the cave's mouth, and approached through the Fairy Hall and the Hall of the Agonies by much creeping through low passages. I know this remote part as "Hyæna-land" from the abundance of remains of that animal which were found there, with its coprolites, and the bones of its prey deeply scored by its remarkable teeth.

Extracts from Daily Notes.

July 30.—There are four small, narrow galleries, which had the upper stalagmite floor overhead. This, as well as the dividing walls, are broken down in places. The gallery which we dug to-day had a bed of dark sand, in which were fragments

of limestone, stalagmite and brecciated sand. In it we found, not far below the surface, the densest assemblage of various bones I have met with. There were many of small Mammoth, also bones of Bear, Reindeer, a metatarsal and back tooth of Wolf (?) a maxilla, an ulna and metatarsals of some small carnivore.

JULY 31.—Continued to dig in the Third Gallery of the Quadruple Set, which, as we worked southward, was found to have a 6-inch stalagmite floor formed in the sand in the trench of rock, 3 feet below the shelf, partly under the portion of the upper stalagmite floor overhead, and partly where it was absent.

We found in the sand under this lower stalagmite (as well as where the sand had no stalagmite cover) bones of small Mammoth, Bear, Reindeer, Fox, Hare, and Lemming.

Where the lower stalagmite ceased the sand soon failed, and the trench had rubble in it, among which a bone of the small Mammoth occurred.

AUGUST 1.—Dug deeper along the same Third Gallery, and found an *os innominatum* of a little Mammoth. We then explored the gallery further on, where the right wall had fallen down and leaned in. It was undermined or imperfect beneath, and, in the hollow among rubble, huge stones, and breccia, found a Mammoth's radius 19 inches long, lying loose, which weighed 9 lbs. It was coated with mud on one side. We also found in the same mass of stones a segment of the head of humerus (?) of Mammoth, deeply scored by the teeth of carnivores, and the shaft of a long bone of a small Mammoth. In afternoon worked in the next or Fourth Gallery, which at its northern end has the upper stalagmite floor *in situ*. A little further south this has fallen in huge masses on the sand. Further again is a subsequent uneven stalagmite floor on sand, blocks, and rubble; and further on again, opposite to site of the Mammoth radius of yesterday, was only rubble and blocks of stalagmite. In the latter we found a radius and calcaneum of Hyæna disengaged, but slightly coated with sandy mud.

AUGUST 2.—Dug and searched the sand in this Fourth Gallery, and found in it more bones of Hyæna, a perfect tibia and fibula, patella, astragalus, calcaneum, a number of metatarsal and metacarpal bones and phalanges. We also found

many bones of Bear, Reindeer, and Mammoth, the latter fragmentary, except two phalanges.

AUGUST 3.—Continued to dig the rubbly sand where the Fourth Gallery widens and its course is continued on another parallel. Here we found pale sand uppermost, with darker sand beneath. Besides limestone blocks and rubble, we found buried in the sand several worn sandstones, the absence of which from the sand of the outer halls was so remarkable. Found in the sands here many bones of Bear, Reindeer, Mammoth, a femur of Hare, and the ends of a shin of Irish Elk.

In the afternoon I had the great pleasure of taking Dr. and Mrs. Scharff and their sons through the cave. Dr. Scharff showed me that we have got both the Norwegian and Arctic Lemmings, of which we have recently obtained jaws.

AUGUST 4.—Worked beyond (west of) the Fourth Gallery, where the dividing walls are gone and there is a low continuous hall over benches of rock that represent the foundations of the dividing walls. On these rock-benches sand and bones had accumulated, and a lower stalagmite floor had formed like that in the Elephant-Hall, but at a much shorter distance below the upper stalagmite. Besides the bones found in the lower stalagmite (which we had to take out with cold chisel and hammer) we found others of Bear, Reindeer, and small Mammoth either in sand below the stalagmite or in rubble where the sand had been drained away. A humerus of Hyæna was in the sand. A tibia and horns of Reindeer had been extensively gnawed by rodents, apparently while they were fresh, and the marks had been coated with sandy mud.

AUGUST 6.—Continued working the low hall, and got into a wide gallery which flanks it on the west, called from its contents the Gallery of the Aged Carnivores. In this some of the upper stalagmite remains like a ceiling 2 to 4 inches from the rocky roof; between it and the sand below there is room to creep. In part of this gallery, opposite where we entered, were found in or near the surface many bones of Reindeer, Bear, and Mammoth. Of the latter we got most of a large mandible, containing a fine molar tooth.

AUGUST 7.—Dug in the deep bed of sand under the stalagmite bridge and found many bones of Reindeer and Bear.

AUGUST 8.—Continued to dig the sand in the Gallery of the Aged Carnivores, working north, and found so many bones that we had to carry them home in a bucket twice. The sand was not dark, but fairly sharp and clean; besides limestone fragments, it contained rounded sandstones, one nearly of 5 lbs. There is a deep, narrow, minor gallery to the right, divided by a thin partition of limestone. In this we got portions of a Bear's skull, and in the main gallery a half mandible and other bones of an aged Bear, also a pile of bones of Reindeer, including a boss of antler, with 3 branches deeply gnawed. Our principal find was portions of a maxilla of a huge, aged Hyæna, and part of the mandible, with most of the teeth. The former was near the centre of the gallery, a foot or more beneath the surface of the sand, on which lay the wrecks of the upper stalagmite that had fallen here. We also got other bones of Hyænas.

AUGUST 9.—Continued to dig, about 3 feet deep, the sand in the Gallery of the Aged Carnivores, from 10 feet to 17 feet, after which there is a swallow-hole, and beyond 19 feet our progress was stopped by the roof having partly fallen in. At 10 feet there is a low arch communicating with the Gallery of the Elephants' Teeth (the next parallel to the west); in this archway we got, in the sand, the jaw of a very young Bear, with all the teeth perfect and of an ivory colour, while the bone was grey-green, with buff blotches, a beautiful specimen. A humerus and radius of young Bear may have belonged to this. About the same part of the principal gallery we got an imperfect humerus and radius of Hyæna, two large pieces of Mammoth's ribs, and many bones of Bear, Reindeer, and bits of Mammoth. John Power explored beyond the Gallery of the Elephants' Teeth, and reported six new galleries that communicated and were workable.

AUGUST 24.—After a fortnight's absence, resumed work in the Gallery of the Aged Carnivores, working south, partly beyond (north of) the stalagmite bridge, and partly under it, digging deeper than before.

Along the west side, under a pale barren sand, was a darker sand that contained many bones, especially in a recess under the stalagmite bridge, and under an opening into the next gallery. We found several worn sandstones, some of which

at least were in the dark or bone-bearing sand. The animals represented by to-day's find were Reindeer, Bear, Mammoth, Hyæna, and Irish Elk, of the latter only a penultimate phalanx.

AUGUST 27.—Continued our deeper excavations, working south until we were past the stalagmite bridge ; pale, barren sand again on top of a darker sand, which contained many bones. Power worked deep under the orifice that leads west into the Gallery of the Elephants' Teeth, under the stalagmite bridge, and found more Hyæna bones, including a jaw, with all the teeth much worn, corresponding with those found on the 8th inst. We also got several coprolites of Hyæna (?), an astragalus, and piece of shin-bone of Irish Elk, and three plates of the molar of a young Mammoth, with other bones of same. On the east side is a swallow-hole, near which we got, at the bottom of our excavation, the humerus of a young Mammoth and the spine of the vertebra of an old one, with other bones of these.

We met with rolled or worn sandstones at all depths, also buried pieces of stalagmite floor nearly under the south edge of the bridge of this material which remains overhead. These once doubtless formed a continuation of it; but to the west side of the gallery were large pieces of a floor of brecciated sand, buried very deep, and evidently *in situ*. On a lower level was a dark moist or muddy, barren stratum.

AUGUST 28.—Continued to dig in the Gallery of the Aged Carnivores under the south edge of the stalagmite bridge, and found the cranium of a large Reindeer, 7 feet 6 inches below the limestone roof.

We opened up the swallow-hole on the east side, and down in this, about 8 feet from the roof, Power found the cranium of a Hyæna lying loose, and the right ramus of the mandible perfect, except one incisor. A black wing-bone of a bird was also found down this swallow-hole. Slabs of limestone, the dividing walls of galleries that existed before the stalagmite bridge was formed, were found buried in the sand, and several worn sandstones were in and about the swallow-hole.

AUGUST 29.—Continued to work south. There were about 12 to 18 inches of sand, and beneath this were buried the wrecks of the upper stalagmite floor which had fallen. The

sand overlying these wrecks contained the bones, chiefly of Bear and Reindeer, so that these must have been deposited there after the fall of the stalagmite, and not before it, as in the "Fairy-land."

August 30.—Dug on south in the Gallery of the Aged Carnivores. Pale sand above, darker beneath, but very irregularly stratified. Found many bones of Bear and Reindeer, the latter of a very large individual, a slender jaw of Fox, and a portion of a jaw and other bones of Wolf (?). This jaw, which contained a fine sharp back tooth, was 2 feet down, near a humerus of Reindeer, by the west wall.

August 31.—Dug on, 3 feet deep, the gallery being 8 feet wide. Much fallen limestone was on and in the sand, and we got a few worn sandstones. Stalagmite was not met until we dug to 3 feet, below which fragments of the fallen sheet were found. Some of the stalagmite remains *in situ* near the roof on the east side of this gallery, and it still bridges over the passage by which we enter. Found many bones of Bear and Reindeer from 8 inches to 3 feet below the surface. Several bones of Hare occurred, and the remains of the skull of a Fox was found 3 feet deep under sand in which stones were packed. It was close to the ulna of a Bear on the same level. A foot-bone of Mammoth was found 18 inches below the surface.

September 1.—Continued to excavate, 3 feet deep; the darker layer of sand having paler sand above and below it, with many limestone fragments and pieces worn by solution; also a few rounded sandstones, no stalagmite. The horizon of the great majority of bones found to-day was within a foot of the surface. This applies to a skull of Wolf (?), partly incorporated with a mass of breccia. It was recovered in slender bits, as also the remains of a ramus of mandible. We seem to have got some metatarsals of Wolf and a couple of bones of Lemming, a good many bones of Bear and Reindeer, and a tibia of Hare.

We have now worked out the Gallery of the Aged Carnivores for 34 feet; beyond this point southward it is piled with masses of rock fallen from the roof, and beyond these masses is a great earth-fall. It might be suggested that the cobbles or rolled sandstones found in the sand-beds of this gallery were intruded with this earth-fall in later times; but the sand-

stones occurred at all the levels we dug in the sand, and the presence of so many bones of extinct animals, from Lemming to Mammoth (and especially the fragile skulls of Wolf and Fox, which broke up when stirred) seems irreconcilable with the idea that the bone-sand was rémanié, as it must have been if more recent stones were mixed with older material. The examination of these worn sandstones may throw light on the glacial relations of the cave-fauna.

SEPTEMBER 3.—Resumed the excavation of the Fourth Gallery, Quadruple Set, where we left off on 3rd August. I call this the Threatening Gallery, as dislocated blocks impend over its entrance from the low hall. Among the bones found in it was an axis of a small Mammoth, and further on a skull of Hyæna, which retains the back teeth on both sides, and one side of the maxilla connected with the cranium and forehead. The worn teeth denote great age. It was about eight inches below the surface, and was full of sand.

The repeated finding of remains of Hyæna, associated in narrow galleries with those of Mammoth and Reindeer, makes it evident to my mind that these animals must have been contemporaneous in Ireland, as also the Bear, Wolf, Hare, and Lemming.

SEPTEMBER 4.—Continued to work the Threatening Gallery southward. A thin stalagmite floor lay on the surface of the sand, which was packed with limestones and a few worn sandstones, and the older broken-up stalagmite occurred at various depths in the sand. The latter contained many bones of the following:—

Mammoth:—adult, vertebra and patella, and fragments; young, two milk teeth in portion of maxilla, larger unground molar, larger ground molar.

Hyæna:—canine of aged animal (probably belonging to skull found yesterday); ramus of mandible of young Hyæna, humerus, femur (?), vertebra, and metatarsus.

Bear:—tibia and other bones, part of skull, with molar teeth, being 2 ft. 6 in. deep.

Reindeer:—several bones, one two feet below the surface, while several of Hyæna were less. The gallery being narrow. I take this as proof that Hyænas lived in the age of the

Reindeer. The Threatening Gallery was, in short, a den of the Hyæna, whose favourite prey seems to have been Mammoth, especially in the very young state. We found a junk of bone or antler remarkably dug into by Hyænas' (?) teeth.

SEPTEMBER 5.—The Threatening Gallery, before it has quite reached nineteen feet from the corner where it was diverted, ends in a *cul-de-sac*, but before we reach this there are openings on the right into the Aged Carnivores Gallery, and on the left (east) into a continuation of the Third Gallery (Quadruple Set), which had become impassable. The part opening into the Threatening Gallery has a deep bed of sand, on the surface of which Ned Dalton found the head of a Mammoth's femur, a globe of bone, coated with mud. I call this Dalton's Gallery. Beyond this another opening leads into a further gallery, 24½ feet long, which is encumbered with fallen blocks and rubble; its walls are insecure, and it ends in an earth-fall. So leaving it, we continued to work out the Threatening Gallery, in the sand of which we found chiefly Reindeer's bones, with some pieces of Hyæna and Mammoth. These were coated with mud rather than with sand. A few rolled sandstones were found.

SEPTEMBER 6.—Among the bones found in the extremity of the Threatening Gallery is an astragal of Hyæna, and the ends and middle part of a metacarpal of a very large Reindeer, the intermediate piece being plainly crushed, probably by Hyænas.

We then worked the Dalton Gallery, and found in it quite a lot of Hyæna remains, teeth of great size, and pieces of jaws, scapula, ulna, astragalus, ribs, vertebræ; also the spine of a Mammoth's vertebra, and ends of bones of Reindeer. The above were all found less than two feet deep, while under them was buried stalagmite, probably part of that overhead, which is here broken off, and ceases on the high level.

SEPTEMBER 7.—Worked in Dalton's Gallery down to three feet below surface, finding bones, the largest canine of Bear I ever found, over 4½ inches long; two canines of Hyæna, one on the surface. Here I may note a remark of John Power, who did the digging, that in both these galleries the remains of Hyæna were usually near the surface, while bones of Bear were found among the deepest. In Dalton's Gallery

there was a bed of pale sand, 15 inches deep in the centre, deepening to the left, and dark sand under it. Bones were found in both sands, but most numerously in the pale. Several bones of Bear occurred between the two layers at 2 feet 4 inches, and deepening to the left is a paler sand than either of those above it.

SEPTEMBER 8–10.—Among the bones found in Dalton's Gallery was the broken-up skull of an old Bear; it was one foot below the surface, and a piece of the broken-down stalagmite floor was resting on it. The excavation of the Threatening Gallery was then deepened, and among the few bones found were the vertebra of a small Mammoth and a canine of an old Hyæna probably belonging to the skull found on 3rd September.

We then commenced to dig in the Gallery of the Elephants' Teeth, beyond (west of) that of the Aged Carnivores. About 6 inches below the surface, near the ope by which we entered, Dalton found the molar of an adult Mammoth, with bones of Reindeer, &c.

SEPTEMBER 11.—Dug 3 feet deep in same gallery and found many bones, all of Reindeer, some of which were stuck into the walls, and we left a metatarsal there *in situ*. A scapula was embedded in a piece of stalagmite which was embedded in the sand.

SEPTEMBER 12.—Gallery of the Elephants' Teeth. Dug four feet deep. We met with 18 inches of pale barren sand on top; beneath that was darker sand containing many bones of Reindeer, which increased in number as we dug down, and not a few were got at four feet deep. They were more numerous by the walls, especially near the junction of the Gallery of the Irish Elk. There were some very large Reindeers' bones, and what appears to be part of the mandible of an adult Mammoth. We also got a bone or two of Hare and Fox (?), black like those of Reindeer.

SEPTEMBER 13.—Dug on north in same gallery, 4 feet 6 inches deep, the sand being pale and barren on top, blackish at bottom, and containing limestone fragments and a few rolled stones. A huge tibia and metatarsus, and other bones of Reindeer found near the junction of the gallery of the Irish Elk in a hollow under the wall, where the water must first have undermined it. Here again, the Reindeer was

found at depths down to four feet, in a gallery which contained remains of Hyæna. Of the latter we found a canine and a molar tooth; also an ulna and metatarsal. There is a canine of an aged Wolf (?), and a fine *os innominatum* of Hare (?). We got several lumpy pieces of Mammoth bone, and a worn molar of this Elephant occurred two feet below the surface with rubble. There is a very small humerus, which may have belonged to a fœtal Mammoth, and some ivory-like surfaces of plates of bone or ivory; also a coracoid of a bird.

SEPTEMBER 14.—Same gallery. Most of the sand worked to-day was pale and barren; but at 8 feet 6 inches from the ope got, 2 feet deep, a small Mammoth's tooth, and at 9 feet 6 inches, and 3 feet deep, got a companion tooth to that found on the 10th inst. in this gallery. These teeth were near a connecting ope from Gallery of Aged Carnivores in which we got so many bones on 9th August. Several broken bones of adult Mammoth were also found to-day. Beyond this ope the sand fills up the gallery to the stalagmite floor, which had been separated from it in the parts previously dug, and here are two well-defined burrows in the sand made by foxes or rabbits. Our work was discontinued at 12 feet 6 inches, from the dangerous nature of the roof.

SEPTEMBER 15.—Irish Elk's Gallery. This branches off north-westwards from the Gallery of the Elephants' Teeth, nearly opposite the ope that leads from the Aged Carnivores. Its stalagmite remains like a roof, as in the last gallery dug, but separated from the limestone roof by a space of 6 inches, and from the sand beneath by another short space. Then there were 9 inches of pale barren sand, below which was bone-sand, darker and containing blocks, to a depth of 2 feet 6 inches, and then blackish sand. The limestone blocks must have fallen from above before the stalagmite was formed over the sand, and the associated bones would therefore be older than the stalagmite in this gallery; while in that of the Aged Carnivores bones and sand overlay the fallen stalagmite (see 29th August). We got to-day a small molar of Mammoth, a jaw of old Hyæna two feet deep, under overhanging wall to the right, and other bones of Hyæna, Reindeer, and Hare. What gave its name to this gallery were the following remains of Irish Elk:—A blackened ulna, with pallid

blotches, found three feet deep under a block; a phalanx similarly marked, and the beam of a large antler, which, at its proximal end, had all the appearance of being shed, but at its broken end had evidently been gnawed, so that it probably had been in possession of a Hyæna. It was found two feet deep in the sand. Two large sandstone cobbles were found in this gallery, between the bone-sand and the upper sand.

In this pale upper sand we got a Reindeer jaw, and below that, 1 foot 6 inches from the surface, several portions of the broken skull of a Mammoth.

SEPTEMBER 17.—Found a long bone of Mammoth, whose ends had been gnawed away, about 15 inches below the surface, above a limestone block; and also at 15 inches deep, near the same spot, was an ulna of Hyæna. Here, we may say, we found the Hyæna in the midst of its prey, Irish Elk and Mammoth. Among other things found to-day were vertebræ and other small bones of Hyæna, plates of a young Mammoth's tooth, Bear's canine, and bits of Reindeer.

SEPTEMBER 18.—Found a Bear's femur 3 feet 8 inches below the stalagmite.

SEPTEMBER 19.—Up to 13 feet the Gallery of the Irish Elk has an unbroken stalagmite sheet overhead (once a floor); then a vacant space of about a foot, then 9 inches of pale sand, and below that coarse, dark sand, with limestone rubble; in this was an angular block of limestone, 1 foot 3 inches to 3 feet below the stalagmite. Beyond 13 feet the stalagmite is broken down, and its fragments lie on the sand. Between 12 feet and 13 feet the humerus of a large bird was found. A Reindeer's dorsal vertebra came out of the pale sand, and other pieces of Reindeer were below the limestone block.

SEPTEMBER 20.—Dug in a diagonal gallery that branches off from the last to the left at 6 feet. In the mouth of this, 2 feet 6 inches below the stalagmite, an ulna of Hyæna in dark sand and rubble, with a sandstone cobble near it on the same horizon; from the diagonal gallery and its offshoots we obtained Mammoth, Bear, and Reindeer, some bones of the latter loose on the surface.

SEPTEMBER 21.—The remainder of the Gallery of the Irish Elk, up to 18 feet, proved to be full of pale soft barren sand, and beyond that point there was an earthfall; but at 18 feet

a narrow gallery led off to the left in which we found in deeper, darker sand a Mammoth's cervical vertebra almost entire.

SEPTEMBER 22.—We found the rest of the Gallery of the Vertebra unsuitable for excavation, owing to the insecure nature of its east wall; but at 21 feet 6 inches, where it terminates, there is a side opening into another gallery, the Bear's Den, which runs a further course south of 16 feet 6 inches. This, again, before it terminates, opens east and west into other galleries. Passing through the eastern ope, we reached a narrow gallery that slopes down into a deep swallow-hole. Johnny Nicholls, who went down into it, brought up the finest tooth of adult Mammoth we have yet got, in perfect preservation, and of a rich mahogany-colour, which he said was loose under a stone, also two imperfect Reindeer antlers; and Power pulled out of the side of this swallow-hole from sandy earth a Reindeer's cranium, wanting the maxilla and nasal part.

SEPTEMBER 24.—Excavated the Bear's Den down to 4 feet below the surface. It was barely wide enough for a man to work in, and the sand, which was muddy or earthy, contained blocks and rubble which increased as we dug down. The first foot or so in depth contained hardly any bones, but the bed below that was the richest I have seen, so that we filled two large riddles with remains of Mammoth, Bear, and Reindeer. There is a tibia found near the surface which I take to belong to Wolf, and some other bones may also be of Wolf. Of Mammoth we got two teeth, not full-sized, the head of a large femur, a long piece of rib, a phalanx, and many other pieces. Of Reindeer we found the longest piece of antler I have seen in the cave.

From the swallow-hole and its gallery we got a large lot of broken bones of Reindeer, some of Bear, and some bits of Mammoth. The richness of these galleries seems to be due to their narrowness, which retained the bones within close limits in times of disturbance.

SEPTEMBER 25.—The Swallow-hole Gallery, worked by Power, yielded a large Mammoth's tooth under the superficial rubble in a vacancy, under a block, and over the sand. A sandstone cobble was embedded under bones of Reindeer. We also got here a piece of mandible of Hyæna and bones of Hare and Rabbit (?). A portion of Lemming's skull was taken out of a

Reindeer's vertebra. Ned Dalton worked a gallery on the other side of the Bear's Den. In it a bed of harder limestone dipped northwards, and at the foot of this slope the gallery expanded into low cavities right and left, which yielded bones of Bear and Mammoth, chiefly of the latter. In the cavity on the west side Dalton found in dark sand, under a cake of brecciated sand (which protected it) a huge Mammoth's humerus in two pieces. The head was gone, but the shaft and distal end when put together were 2 feet 2 inches long, and the latter was 1 foot 10 inches in girth. The latter part had the deep indentations of teeth, probably of a Hyæna. This is the largest bone we have yet found, and it taxed the efforts of both my men to get it out safely ; as it was packed into a cavity with limestone blocks, where it had doubtless rested through many floodings of the cave.

The foregoing notes are offered to give some idea of how we found the haunts of the Hyænas and what was in them, and to indicate broadly the nature of the record which is being deciphered, a chapter in the far past history of Ireland which, to a great extent, is still an unwritten one.

It is not intended to forestall the systematic report which will be presented hereafter to the Royal Irish Academy when the collections from this cave shall have been examined by Dr. Scharff's critical eye, and when the learning of the geologist shall have been exercised upon the complex problems this great cave offers.

I look to that report to correct any errors I may have made in naming animal remains upon the spot, or in offering my ideas about the sequence of remote events, as well as to inform us of new things that I have not attempted to specify.

Cappagh, Co. Waterford.

OBITUARY.

RICHARD GLASCOTT SYMES, M.A.

The death of R. G. Symes removes one who took an active share in the elucidation of various problems in the geology of our country, and whose careful working out of many complicated areas, more especially in the west of Ireland, it appears impossible to improve upon.

Son of the leading physician of Kingstown, Co Dublin, he entered Trinity College, where he graduated M.A. and Licentiate of Engineering,

qualifying for the latter by a course of practical mechanics at the Inchicore works of the Great Southern and Western Railway. Appointed to the Geological Survey of Ireland in 1863, he entirely surveyed six of the one-inch maps, and, in conjunction with other members of the Survey, seventeen others; and though his earliest work was carried on over forty years ago, it has borne the test of time, none of his lines having since been altered. Some of the districts he completed, such as Lough Conn, Sheet 64, and the Pettigo area, Sheet 32, were of a very complicated character. His latest Irish work was in north-east Antrim, which was specially allotted to him on account of his practical knowledge of the coal and iron deposits. It is especially satisfactory to note that recent exploration of the Ballycastle coalfield has entirely justified his mapping of the district, and the sections he plotted. In 1874 Symes was one of the Secretaries of the Section of Geological Science at the meeting of the British Association in Belfast, and in 1878 filled a similar position to the Section of Mechanical Science at the meeting in Dublin. Upon the completion of the Geological One-inch Map of Ireland he was transferred to the Geological Survey of Scotland, where he surveyed several sheets of the one-inch maps of the Argyll districts; his descriptive memoirs of the areas he surveyed were interesting and clear, and his mapping and draftsmanship of more than ordinary merit. He was an ardent sportsman, and as a shot or at casting a fly, had few equals. He took a keen interest in the fauna of the districts in which he was successively engaged, and there was no better practical authority on the birds and fishes of Ireland.

Injuries sustained from a car accident whilst engaged surveying the country near Campbeltown, Argyleshire, shattered a previously robust frame, and he was ultimately carried off after only a few days illness.

R. C.

REVIEWS.

LATEST ADDITIONS TO THE BRITISH FLORA.

British Flowering Plants. By W. F. Kirby, F.L.S., F.E.S. Pp. 8 + 216. 120 coloured plates. London: Sidney Appleton. 1906.

"Is things what they seem, or is visions about?" One must be excused, in noticing this book, for taking refuge with Truthful James. On opening the pages of Mr. Kirby's "British Flowering Plants" casually, we are confronted with portraits of *Rhamnus alpina* and *Cytisus capitatus*, plants which are unknown in Britain even as garden escapes. And on trying again, we find ourselves face to face with *Epilobium Dodonæi* and *Trapa natans*. Turning in some bewilderment to the preface for an explanation of these startling introductions into the British flora, we find a guileless

sentence:—"A few of the illustrations [25 at the lowest estimate] represent plants not found in the British Islands; but, with a single exception (*Globulariaceæ*), every Order figured is represented in our British Flora." A further examination of the book convinces us that, instead of the plates and text being made to fit the subject, the text has been written to fit a stray series of rather bad plates, taken presumably from some cheap German work. It is a pity that Mr. Kirby, whose fine work as an entomologist is known to everyone, should have been induced to a piece of book-making resting on so insecure a foundation. The letterpress itself is interesting, and Mr. Kirby's bent is abundantly evident in the full information given concerning the insects which feed on the various plants treated of—indeed, there is often more information about the insects than about the plants.

R. Ll. P.

BRITISH AND IRISH ONISCIDÆ.

The British Woodlice, being a monograph of the Terrestrial Isopod Crustacea occurring in the British Islands. By Wilfred Mark Webb, F.L.S., and Charles Sillem. Pp. x. + 54, with 25 Plates and 59 Figures in the text. London: Duckworth & Co., 1906. Price, 6*s.* net.

This well got up little work is a reprint from the "Essex Naturalist" (vol. xiv.), and will be welcomed by all interested in the study of British Woodlice. It commences with an illustrated account of the structure, development, and habits of the whole tribe, followed by a detailed description of the different species. Figures of the flagellum of the antennæ, by which the various species are to a great extent classified, are given in every case, and are a great help to their identification. It might have been well however to point out the fact, that this characteristic is only to be relied on when the animal is adult, as in immature specimens the proportional lengths of the terminal joints varies considerably. As the authors in the preface invite corrections, it must be noted thatalth ough "compound eyes" is given as one of the generic distinctions of Trichoniscus, both *T. ro eus* and *T. vividus* have simple eyes; in the latter species the large single-lens eye being one of its most striking features. In *T. pusillus*, too, although the eye is compound, consisting as it does of usually three, though often only two, very indefinitely defined lenses, it differs very much from the compound eye in the other families.

These facts affect considerably all that is said on the genus Trichoniscus, and would make it seem doubtful whether the characteristics of *Trichoniscoides albidus* (Sars) are sufficiently distinct to warrant its being placed in a seperate genus.

The book concludes with a bibliography and twenty-five plates which are for the most part excellent.

Denis R. Pack-Beresford.

NOTES.

BOTANY.

"The Scientific Tourist through Ireland."

There is a book called "The Scientific Tourist through Ireland, by an Irish Gentleman"; plates, 1818. It has various topographical plant lists, and it is not mentioned in last edition of *Cybele Hibernica.*

RICHD. M. BARRINGTON

Fassaroe, Bray.

A copy of this little book—a small octavo of some 200 pages, with seven pretty full-page engravings—has been lent me by my friend, Mr. R. M. Barrington, who appears to be the first amongst latter-day Irish botanists to draw attention to its county plant lists. The book has certainly escaped my notice, and so far as I can discover it has been overlooked by the authors of the first edition of *Cybele Hibernica,* as well as by Mr. Praeger in his *Irish Topographical Botany.* Mr. Barrington has only dipped into the book himself, and believing that many readers of this Journal will be curious to learn what this early-eighteenth century Irish gentleman may have to say about Irish natural history, has given me *carte blanche* in the matter of criticism.

The full title of the book runs thus:—"The Scientific Tourist through Ireland: by which the Traveller is directed to the Principal objects of Antiquity, Art, Science, and the Picturesque; arranged by counties, to which is added an Introduction to the study of the Antiquities of Ireland, &c.—By an Irish Gentleman, aided by the Communications of several Friends. London: printed for T. Booth, Duke Street, 1818." From the date of publication one would expect to find embodied in the book the fruit of the researches of Wade and Mackay, whose *Plantae Rariores* and *Catalogue of Rare Plants* appeared many years earlier in the *Transactions* of the Dublin Society. But the Irish Gentleman, who modestly withholds his name, knows nothing of these moderns, and draws all his botanical lore from such seasoned authorities as Keogh, Threlkeld, and Smith. The Statistical Surveys of the Dublin Society are laid under contribution for the plant lists of some of the counties, and nothing in the shape of an original record is to be found anywhere in the book, unless the following deserve to be so classed:—"Co. Antrim. *Rhinanthus*, Yellow Rattle; on dry soils: *Dactylus glomerata*, Cock's-foot Grass; meadows near Lisburn—Co. Londonderry. *Leontodon Taraxacum*, Dandelion; in pastures: *Achillea Millefolium*, Yarrow; in pastures on the banks of the Fahan." Our northern botanists have no doubt verified all of these records; but I cannot say that I have been able to do as much for the following Co. Dublin record:—"*Euphorbia hyberna*, knotty-rooted Spurge; on mountainous districts." The botany of Mayo is dismissed with the perfectly true statement that it "requires a scientific explorer."

Westmeath is declared to be a "virgin field, but promising great variety of aquatics"; Wexford botany is "yet uninvestigated," and Queen's County is little better off as being "yet unexplored."

So much for the botany of the Scientific Tourist. What about the various other branches of natural history to which the "inquisitive traveller" so often referred to in the Introduction may be supposed to give a share of his attention? There is a little mineralogy and a little geology; there is a reference to the Gillaroo trout of Lough Corrib, "with a gizzard like a fowl," and another to the pearls that may be picked up "from a muscle peculiar to the lake." But it is to the student of insect life that the strongest incentives are offered to a scientific tour in Ireland. Here is the prospect held out to him in the Introduction:—"The entomologist will be certain of finding numerous sources of amusement. Mr. Hall in his tour, Vol. 2, p. 168, asserts that with a tolerable glass one sees animals grazing like cattle in a meadow on the leaves of every vegetable, and these also much larger than in Great Britain." What have our Irish entomologists been doing for the last century that we are still in the dark about these grazing animals?

As a guide book in the ordinary sense of that term, the Scientific Tourist through Ireland is a most interesting and meritorious little work, and was, no doubt, highly esteemed by the "picturesque tourist" of its day. As a contribution to the history of Irish natural science it is of no account. And I must confess that I pen this latter severe judgment with a certain sense of relief; for I should have found it hard to forgive myself for overlooking the work had it been of any scientific value. Can any bookish reader of the *Irish Naturalist* tell us who the Irish gentleman was?

N. Colgan.

Sandycove.

The author of this book was Thomas Walford, militia officer and antiquary, born 1752, died 1833. He also wrote "The Scientific Tourist through England, Wales, and Scotland . . . ," 2 vols., 1818. He had no claim to his *nom de plume* of "An Irish Gentleman," as he was born at Whitley in Essex, and lived and died there, being a Deputy Lieutenant of the county, and a major of the local militia. Walford was a member of the Society of Antiquaries, and of the Linnean and Geological Societies, and contributed to *Archæologia*, *Vetusta Monumenta*, and the Linnean Society's *Transactions*. Having dealt with England, Wales, and Scotland in his larger work mentioned above, he evidently undertook the description of Ireland, for which he was not specially qualified, in order to make his survey of the British Isles complete. As the author himself says in his *Introduction*:—"This interesting country becoming every day more and more the subject of inquiry and personal observation, an Hibernian Tourists' Guide consequently forms a necessary adjunct to our original plan."

R. Lloyd Praeger.

Numbers for Names of Counties—Supplementary Note.

I wish to be allowed to modify a statement in my article (*supra*, p. 223) on the use of numbers for the names of counties in recording localities of plants. I find that three years previous to the publication of his *Cybele Britannica*, Mr. H. C. Watson had introduced the method of double recording by a number and a name, in what he called the third edition of his *Geography of Plants*, the first part of which, down to Papaveraceæ, was issued in 1843. In this he divided Great Britain into his 18 districts, and the description of each plant was accompanied by a map, measuring 2 in. by 1¼ in. of the districts, and an enumeration of them thus:—"Districts—Peninsular, 1; Channel, 2; Thames, 3; Ouse, 4," and so on. But the project was abandoned, it evidently fell flat, and no other part was issued. The existence of this attempt of Watson's seems to be almost unknown, and it was too late to add it to my paper when I first heard of it. It is interesting, as it is much the same idea that Mr. Praeger so recently worked out on Watson's 112 "vice-counties" and his own 40 "divisions."

H. W. Lett.

Loughbrickland, Co. Down.

A Fungus which grows at 57·5° C.

While it is known that certain Algae grow in hot springs in Iceland and other countries at a temperature of 50°-60° C., it is rather startling to find that Fungi can thrive at the same temperature, and in Ireland too. During last August at Antrim I noticed that several ricks of hay were "heating." This is a phenomenon well known to farmers as the result of the hay being somewhat damp when ricked. On inserting my hand into the rick I was surprised to find that the heat was too great for the fingers to bear. The temperature of the air outside the rick was 13½° C. at the time, while inside the rick the first reading was 50° C., and the second reading in another part was 57½° C. (equal to 135½° on the Fahrenheit scale). The hottest parts were completely infested with a Fungus bearing sporangia in all stages of development, and consequently the high temperature must have been admirably suited to its growth. It was a species of Mucor, and in company with it there was another brown septate fungus which, however, did not exhibit any reproductive organs. It is a matter of common observation that, when forking the hay of a heated rick on to the cart, clouds of white dust arise from it. These are doubtless the spores of the Mucor which caused the heating.

As hay when put up damp will invariably heat, the spores of the fungus must be present on the leaves and stalks before they are cut, or in the decaying vegetation of the soil. As these, on the most liberal estimate, are not likely ever to exceed a temperature of 27½° C., it thus appears that the fungus can endure a range of temperature of at least 30° C.—a very remarkable case of adaptation to environment.

J. Adams.

Royal College of Science, Dublin.

Galium tricorne in Co. Down.

This season I noticed in several places near the railway line between Belfast and Kinnegar the above plant (*Galium tricorne*). When in flower it might readily be passed for *G. Aparine*, but when in fruit it is very easily recognised, the fruit being deflexed, destitute of hooks, and having a granular surface. As this English alien seems to flourish and like our Irish soil, it may in time be admitted as a naturalised member of our flora.

N. CARROTHERS.

Belfast.

Orabanche minor in Co. Wexford.

Referring to Mr. Colgan's note in the September issue of the *Irish Naturalist* (p. 219 *supra*) regarding *Orabanche minor*, it may be worth putting on record that the plant was noticed frequently by myself in July last near Enniscorthy. I first found it in three places on the roadside, in every instance parasitic on White Clover. Later on a number of specimens, at least half a dozen, were observed in a closely cropped pasture containing a good deal of *Medicago lupulina*. It would therefore seem to be fairly plentiful in the vicinity of Enniscorthy.

W. F. GUNN.

Dublin.

ZOOLOGY.

Iceland Gull at Belfast.

I am informed by Mr. S. M. Stears that on April 1st, 1906, an Iceland Gull (*Larus leucopterus*) appeared on the river Lagan, opposite the gas works, and settled on a governor house at the river side amongst other gulls, and stayed about twenty minutes, when it rose and flew away steadily to the south. Mr. Stears got within twenty yards of the bird, and saw that it was in mature plumage, and that it agreed with the description in books.

ROBERT PATTERSON.

Holywood, Co. Down.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a White-nosed Monkey from Miss J. Halpin a Rabbit and a Guinea-pig from Mr. A. W. Sweeney, two Shetland Sheep from Mr. J. Sinclair, a pair of Barbary Doves from Mr. W. Moscardi, a Kingfisher from Capt. A. F. Boxer, and two Pied Wagtails from Mr. H. B. Rathborne.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

SEPTEMBER 15.—ANNUAL MEETING.—In the absence of the President (Professor SYMINGTON) the chair was occupied by the President of the Queen's College (Rev. Dr. HAMILTON). The Hon. Secretary submitted the annual report of the Council, which stated that the winter session was opened in the Museum on the 7th November, 1905, and five other meetings were held, at which lectures were delivered and papers read. Amongst these were: "Prehistoric Man in Southern France," by W. F. de V. Kane, M.A., D.L., and "Report on the work of the Marine Laboratory, Larne Harbour," by Professor Gregg Wilson, D.Sc., M.R.I.A. The most important donation received during the year was that of the Battersby collection of British Lepidoptera, which contains many rare specimens. Sympathetic reference was made to the loss the Society has sustained by the deaths of Sir Robert Lloyd Patterson, D.L., F.L.S.—who was President of the Society for two distinct terms,—and Mr. John Anderson, F.G.S., who had filled the office of Treasurer. Sir Otto Jaffe had been co-opted to fill the place of the late Sir Robert Lloyd Patterson on the Council, and as Vice-President. The five retiring members of Council were then re-elected, and the Treasurer's statement showed a deficit of £26 8*s.* 5*d.* At the conclusion of the business the Council met and elected the following office-bearers—President—Sir Otto Jaffe. Vice-Presidents—Sir James Henderson, D.L.; Rev. President Hamilton; Robert Patterson, M.R.I.A.; and W. Swanston, F.G.S. Hon. Treasurer—John Horner; Hon Librarian—John H. Davies; Hon. Secretary—R. M. Young, J.P.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 8.—EXCURSION TO IRELAND'S EYE.—A large number of members and visitors took part in this excursion, which started from Howth at 1.30. On reaching the island the party broke up to study the geology and botany. One section under the conductor (N. Colgan, M.R.I.A.) went on a dredging trip in the ground between Lambay and Ireland's Eye, and obtained specimens of the usual ground forms which live at from nine to twelve fathoms. The party returned to Howth for tea, and returned to town late in the evening.

LIMERICK FIELD CLUB.

We have received Vol. III., No. 10, of the *Journal* of this Club, being the issue for 1906. As usual, the contents are mainly archæological, but the number also contains "Some Stray Notes on Birds," by Rev. T. F. Abbott, B.D., and a preliminary paper entitled "Some Land and Fresh-water Shells of the Limerick District," by Harry Fogerty.

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BELFAST NATURAL HISTORY & PHILOSOPHICAL SOCIETY,
BELFAST NATURALISTS' FIELD CLUB,
DUBLIN NATURALISTS' FIELD CLUB,
CORK NATURALISTS' FIELD CLUB,
LIMERICK FIELD CLUB,
ULSTER FISHERIES AND BIOLOGY ASSOCIATION.
TYRONE NATURALISTS' FIELD CLUB.

EDITED BY

PROF. GEORGE H. CARPENTER, B.Sc., M.R.I.A.

R. LLOYD PRAEGER, B.A., B.E., M.R.I.A.,
AND
ROBERT PATTERSON, F.Z.S., M.R.I.A.

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DEPARTMENT OF AGRICULTURE AND TECHNICAL INSTRUCTION FOR IRELAND.

LIST OF THE DEPARTMENT'S LEAFLETS.

No.	Name.
1	The Warble Fly.
2	*Out of Print.*
3	*Out of Print.*
4	Workmen's Compensation Act, 1900.
5	Separated Milk as Food for Calves.
6	Charlock Spraying.
7	Fluke in Sheep.
8	Timothy Meadows.
9	The Turnip Fly.
10	Wireworms.
11	Prevention of White Scour in Calves.
12	*Out of Print.*
13	Contagious Abortion in Cattle.
14	Prevention of Potato Blight.
15	Fertilizers and Feeding Stuffs Act, 1893, and (Amendment) Regulations, 1904.
16	Sheep Scab.
17	The Use and Purchase of Manures.
18	Swine Fever.
19	Early Potato Growing.
20	Calf Rearing.
21	Diseases of Poultry:—Gapes.
22	Basic Slag.
23	Dishorning Calves.
24	Care and Treatment of Premium Bulls.
25	Fowl Cholera.
26	Winter Fattening of Cattle.
27	Breeding and Feeding of Pigs.
28	Blackleg, Black Quarter, or Blue Quarter.
29	Flax Seed.
30	Poultry Parasites—Fleas, Mites, and Lice.
31	Winter Egg Production.
32	Rearing and Fattening of Turkeys.
33	Profitable Breeds of Poultry
34	The Revival of Tillage.
35	The Liming of Land.
36	Field Experiments—Barley
37	,, ,, Meadow Hay.
38	,, ,, Potatoes.
39	,, ,, Mangolds.
40	,, ,, Oats.
41	,, ,, Turnips.
42	Permanent Pasture Grasses.
43	The Rearing and Management of Chickens.
44	"Husk" or "Hoose" in Calves.
45	Ringworm on Cattle.
46	Haymaking.
47	The Black Currant Mite.
48	Foul Brood or Bee Pest.
49	Poultry Fattening.
50	Portable Poultry Houses.
51	The Leather-Jacket Grub.
52	Flax Experiments.
53	The Construction of a Cowhouse.
54	Calf Meal.
55	The Apple.
56	Cultivation of the Root Crop.
57	Fruit Packing.
58	Sprouting Seed Potatoes.
59	Seed Testing Station for Ireland.
60	The Packing of Butter.
61	The Care of Milk for Creameries.
62	Plans for Creamery Buildings.
63	"Redwater" or "Blood Murrain" in Cattle.
64	Varieties of Fruit suitable for cultivation in Ireland.
65	Forestry: The Planting of Waste Lands.
66	Forestry: The Proper Method of Planting Forest Trees.
67	Forestry: Trees for Poles and Timber.
68	Forestry: Trees for Shelter and Ornament.
69	The Prevention of Tuberculosis in Cattle.
70	Forestry: Planting, Management, and Preservation of Shelter-Belt and Hedge ow Timber.
71	Forestry: The Management of Plantations.
72	Forestry: Felling and Selling Timber.
73	The Planting and Management of Hedges.
74	Some Common Parasites of the Sheep
75	Barley Sowing.
76	American Gooseberry Mildew.
77	Scour and Wasting in Young Cattle.

Copies of the above leaflets can be obtained free of charge and post free, on application to the Secretary, Department of Agriculture and Technical Instruction for Ireland, Upper Merrion-street, Dublin. Letters of application so addressed need not be stamped.

NOTICE.

It is proposed to devote the January and February numbers to an account, fully illustrated, of the zoology, botany, and geology of Lambay, the result of researches which have been in progress for the last two years. For convenience, these two numbers will be issued as one, about 1st February.

THE EDITORS.

NOTES OF A WESTERN RAMBLE.

BY R. LLOYD PRAEGER.

DURING July last some time was devoted to working round the edges of what we may call the Galway-Clare limestone area, which is characterized by the peculiar flora which has its head-quarters in the Burren district. The object of this field-work was to endeavour to define or to extend the range of some of the more interesting members of that remarkable flora.

On July 2 my wife and I took train to Athenry, and cycled northward to examine the areas of bare limestone of that portion of N.E. Galway. I was curious about these, owing to reports received from time to time from Mrs. Frank Joyce of various rare plants growing there amid an abundance of the usually calcifuge *Erica cinerea*. About Cahermore no great area of limestone is exposed, but *Sesleria cærulea*, *Gentiana verna*, *Asperula cynanchica*, *Galium sylvestre*, *Erica cinerea*, and *Calluna vulgaris* grow amicably together. As one descends the hill northward or westward, the limestone is covered with a well-developed heath formation. Pools here yielded *Peplis Portula*, a strongly calcifuge plant hitherto unrecorded for N.E. Galway. From Cahermore a very wide prospect extended of the characteristic scenery of this western part of the Limestone Plain—a great expanse of rather bare country, broken up by wide low ridges here and there, and chiefly remarkable for its distances and its loneliness. Along the western horizon a beautiful mountain panorama extended, contrasting strongly with the nearer distance—the Ox mountains, Nephin and Nephinbeg, Croaghpatrick, Maamtrasna, Maam Turk, the Twelve Bens and lower hills of Connemara, and the Burren uplands—a view full of botanical suggestions. Next day we ranged far on our machines. On the south edge of the Coolaran woods there is a nice piece of limestone, with plenty of *Vicia Orobus* (as reported by Mrs. Joyce), and *Ophrys muscifera*. We returned late in the afternoon to the western slope of the Coolaran ridge, where there is a fine area of bare limestone, with abundance of *Arctostaphylos Uva-ursi*, *Geranium sanguineum*, *Rubia peregrina*, *Euphrasia Salisburgensis*, and

other plants indicating a well-developed outlier of the Burren flora. The neighbourhood of Lackagh yielded *Inula Helenium* run wild, and about the old castle *Cerastium tetrandrum*, *Calamintha officinalis*, *Lamium intermedium*. The esker lying north of Athenry furnishes interesting ground. Here grows plenty of *Juniperus nana* (new to N.E. Galway), and *Ophrys muscifera ;* and in less quantity *O. apifera*, *Ophioglossum vulgatum*, and *Botrychium Lunaria*. Near Cregmore Bridge *Crepis biennis*, another addition to the local flora, fills several fields.

After a day and a half at Athenry, we cycled north-westward across the low limestone country, crossed Lough Corrib at Kilbeg ferry, and halted at Oughterard, on the edge of the Connaught highlands. The neighbourhood of Claregalway yielded some additions to the flora of N.E. Galway, which are listed later on ; and *Geranium sanguineum* was abundant with *Ononis arvensis* in heathy fields near the same place. At Kilbeg the Bee Orchis grew in profusion on the lake shore east of the ferry. On the Connemara side, the limestones were thickly colonized by *Euphrasia Salisburgensis*, new to W. Galway.

At Oughterard a search for *Potentilla fruticosa* in Wade's old station (1804) below Lemonfield was not successful. On the Lough Corrib shore further north *Centunculus minimus* was plentiful, and about the interesting ruins of Aughnanure castle, built on limestone tunnelled by water channels, there grew *Petroselinum sativum*, *Lithospermum officinale*, *Verbascum Thapsus*, *Calamintha officinalis*, and *Taxus baccata*. Our second day at Oughterard was spent on the limestones about Moycullen. Ballycuirke Lough proved interesting. The western shore, formed of metamorphic rocks, had a regular Connemara flora—*Dabeocia polifolia*, *Lobelia Dortmanna*, *Eriocaulon septangulare*, and so on. The eastern side is on the limestone, and low bluffs overlook the margin. Here there are many good plants. *Dryas octopetala* is plentiful on the bluffs : its previous W. Galway stations are Gentian Hill near Galway, and Lisoughter near Recess. In three places *Neotinea intacta* was obtained, being abundant in one of the three. Its previous W. Galway record rests on a few fruiting specimens from Ross Lake (1899). On the lake shore grew *Ophrys muscifera* and

O. apifera, and in the water *Potamogeton Zizii*, *P. nitens*, and *Myriophyllum verticillatum*. Bushes of Yew grew here and there with *Juniperus nana*, and plenty of *Euphrasia Salisburgensis* grew among the *Gentiana verna* and other characteristic plants of the limestone pavements.

Two miles N.N.E. of Moycullen there is an extensive area of bare limestone occupying a conspicuous low ridge. Here *Neotinea intacta*, *Euphrasia Salisburgensis*, *Ophrys muscifera*, &c., were seen again. Gortachalla Lough is very shallow and reedy, but yielded *Potamogeton heterophyllus* in nice condition, with *Chara polyacantha* and *Nitella opaca*. Thence our road followed an esker across miles of bog to near Ross Lake, where *Pimpinella magna* and *Verbena officinalis* were conspicuously abundant, and *Cystopteris fragilis* grew by the roadside. The last plant of the day was *Petasites fragrans*, growing close to Oughterard—West Galway being one of the three divisions from which this south Italian species had not hitherto been recorded.

Roundstone was our next stopping-place, and a few days were devoted to exploring the south-west corner of Connemara, with interesting results. The occurrence here of *Asperula cynanchica* and *Sesleria cærulea* at Roundstone, twenty-five miles from the nearest point of the limestone country, seemed to point to an outlier of the calcicole flora on the Dog's Bay sand-dunes (which, be it remarked, are highly calcareous in character). We hoped to add further members to this interesting little colony, and were not disappointed.

On the peninsula beyond Dog's Bay, in a sward dotted with *Arabis ciliata*, *Chlora perfoliata*, *Orchis pyramidalis*, and the plants already named (a highly calcicole group), we were delighted to get *Euphrasia Salisburgensis*, far from its home on the limestone pavements. And here a surprise awaited us, for it proved to be by no means confined to the limy sands of Dog's Bay. We traced it inland to the road, and on up the side of Urrisbeg to a height of 300 feet, where the character of the ground changes, and wet peat with a bog flora replaces light loam and humus with a grassy heath flora. When it leaves the coast line here, the plant, though widespread, is particular as to the situation in which it grows. It chooses

especially well-drained positions, delighting in the little nearly vertical fringe of Wild Thyme and grass that edges boulders and rocks, and also the Thyme-covered bosses which mark the nests of a small yellow ant. In the latter situation the ants, by "earthing up" the plants in the course of their operations, stimulate their growth, and here I gathered the finest *E. Salisburgensis* I ever saw—regular little bushes up to 12 inches in circumference and 2½ inches in height. We eventually traced the plant from Cregduff Lough near Roundstone along the coast, over the top of Bunowen Hill, to near Slyne Head, and thence north to Mannin Bay. On the whole peninsula on the neck of which Ballyconneely stands, the plant can only be described as very abundant. Over the greater part of this range there is no sand present in the soil, or other possible source of lime, and the plant grows in light peaty loam. Later on, it may be mentioned, we sampled the north-west Connemara coast about Letterfrack, Renvyle, and Killery mouth without seeing this Eyebright anywhere. But a still more interesting plant of the limestone pavements grows at Roundstone. As we returned on our last day from Dog's Bay, my wife found, on the stony bank by the roadside, a fine fruiting specimen of *Neotinea intacta*. A search failed to reveal more; but as the fields around were all closely grazed, and the plant had run the gauntlet already for three months, this was not a matter of surprise. We hope next spring to examine into the question of its range in this neighbourhood.

While at Roundstone, one day was devoted to a long tramp from Urrisbeg to Mannin Bay, through the network of lakes that spreads over that great tract of bog and heath. While characteristic Connemara plants, such as *Lobelia Dortmanna*, *Eriscaulon septangulare*, *Deschampsia discolor*, *Rhynchospora fusca*, *Dabeocia polifolia*, were present in great abundance, I searched without success for any extension of range of *Erica mediterranea*, *E. Mackaii*, or *Naias flexilis*, all of which were seen in their known stations close at hand. An extreme sameness characterizes the flora of this wide tract of curious country.

An interesting day was spent on the peninsula west of Ballyconneely. There are a number of lakes here, with a

flora quite different from that of the lakes in the area last mentioned. Though in most cases now quite cut off from the sea, some of these waters have a brackish flora, including *Œnanthe Lachenalii* and *Ranunculus Baudotii*. They differ also in yielding Charas and Pondweeds in profusion and luxuriance, which have, moreover, a calcicole flavour—*Chara polyacantha*, *C. hispida*, *C. fragilis*, *Potamogeton plantagineus* (growing many feet in length), *P. nitens*, and *P. Zizii*. *Sium angustifolium* and *Rumex Hydrolapathum*, unknown hitherto in West Galway, were unexpected finds in this extreme corner of Connemara. There are wide stretches of sandy wastes here, and also of shorn rocky heath where sand is absent. On both, a calcicole flora grows in great abundance, embracing *Asperula cynanchica*, *Carlina vulgaris*, *Chlora perfoliata*, *Euphrasia Salisburgensis*, *Orchis pyramidalis*, *Sesleria cærulea*, and more locally *Arabis ciliata*. The interesting little Tertiary volcanic neck of Doon Hill, for instance, which, rising abruptly from the low ground into a 200-foot knob, yielded all of these except Chlora, Orchis, and Arabis. Other plants of this remote area were *Apium graveolens*, *Caucalis nodosa*, *Lamium intermedium*, *Utricularia vulgaris*, *Carex teretiuscula*, *Senebiera didyma*, *Agrimonia odorata*, *Peucedanum sativum*, *Matricaria discoidea*, *Centaurea Scabiosa*, *Convolvulus arvensis*, *Stachys arvensis*, *Epipactis palustris*, *Habenaria conopsea*—the first five being additions to the flora of West Galway. The vegetation of this extreme corner of Connemara, in fact, which one might have expected to be very poor and limited, was found to include twelve plants not previously known from West Galway, and another dozen hitherto known only from the limestones on the eastern margin, forty miles away.

Leaving behind us our pleasant experiences of Roundstone ("the nicest place in Ireland," according to A. G. More), we cycled *via* Glen Inagh to Renvyle, seeing *Poa nemoralis* (new to West Galway) at Ballynahinch and *Rubus plicatus* at Tully, and got in late in pours of rain. It was a wild night, but by 10 o'clock next morning the wind had moderated sufficiently to allow of a start for Inishturk, which was reached after a 3½ hours' beat in a lively sea. We spent a delightful week on Inishturk, and botanized the island pretty thoroughly. An

account of its flora (which has not been systematically examined hitherto) will, I trust, follow close on the heels of the present discursive narrative. We left again early one glorious morning, with the amazing panorama of Connaught mountains spread out in every tint of blue—(and I would remark parenthetically that the view from Inishturk furnishes perhaps the finest mountain panorama to be found in Ireland)—and drifted back to Renvyle. Thence we cycled *via* Salruck, Leenane, Lough Nafooey, Clonbur, and Ballinrobe, to Lough Carra—a ride through glorious mountain scenery unsurpassed in Ireland for variety and beauty. But few observations were made by the way. The fine waterfall above Lough Nafooey is remarkable chiefly for the beautiful pebbles of jasper of many shades that fill the conglomerate at the top of the fall. The flora of the lake itself appeared extremely poor. The change at Clonbur from the calcifuge to the calcicole flora was full of interest. A halt on some limestone pavements, two miles north-east of Clonbur, revealed *Euphrasia Salisburgensis* once again in profusion, and we traced it at intervals to near Ballinrobe. At the same place *Matricaria discoidea* put in an appearance, and till we left the district it was our constant companion on every road and lane. Lough Carra was reached on the evening of July 21st. I have already, in these pages, given some account of the result of our botanical observations on and about that pretty lake. On our last day we visited the spot, close to Liskilleen House north of Ballinrobe, whence Mr. Stanhope Kenny sent me *Geranium pusillum* in 1900. We found the plant still there, though sparingly, as the spot is now closely grazed. The habitat is the edges of a haggard close to a cottage set in the middle of large grazing fields, and the plant has the appearance of a colonist there.

I have to record the following additions to the flora of Galway West and Galway North-east, as given in "Irish Topographical Botany," and its "Supplement, 1901–1905."

ADDITIONS TO 16, GALWAY W.

*Chelidonium majus.
Sagina maritima.
*Trifolium hybridum.
Prunus Avium.
Apium graveolens.
†Petroselinum sativum.
Sium angustifolium.
Œnanthe Phellandrium.

Caucalis nodosa.
Galium sylvestre.
*Petasites fragrans.
Euphrasia Salisburgensis.
Utricularia vulgaris.
Mentha sativa.
Lamium intermedium.
*Chenopodium Bonus-Henricus.
Atriplex hastata.
Rumex Hydrolapathum.
Lemna trisulca.
Carex teretiuscula.
C. vulpina.
Poa nemoralis.
Glyceria maritima.
Festuca elatior.

ADDITIONS TO 17, GALWAY N.E.

*Chelidonium majus.
Sisymbrium Alliaria.
‡Lychnis Githago.
Lotus uliginosus.
Vicia hirsuta.
V. angustifolia.
‡Prunus Cerasus.
Callitriche stagnalis.
Peplis Portula.
‡Smyrnium Olusatrum.
Pimpinella magna.
Scandix Pecten-Veneris.
Œnanthe crocata.
Valerianella olitoria.
*Inula Helenium.
*Tanacetum vulgare.
*Crepis biennis.
Mentha sativa.
Stachys arvensis.
*Chenopodium Bonus-Henricus.
Empetrum nigrum.
Juniperus nana.
Potamogeton perfoliatus.
Carex vulpina.
Glyceria plicata.

The following notes give in systematic form particulars of the stations of the above plants; also of others which, taking into consideration our present knowledge of their distribution, seem worthy of note, including those which have been referred to in the preceding narrative:—

Ranunculus heterophyllus, Fr.—**17.** Claregalway.
R. Baudotii, Godr.—**16.** Several lakes about Bunowen.
R. sceleratus, L.—**16.** Near Oughterard.
***Chelidonium majus,** L.—**16.** Moycullen. **17.** Claregalway.
Arabis ciliata, Fr.—**16.** Sands by Aillebrack Lough near Bunowen, and still abundant on sands at both ends of Dog's Bay.
Sisymbrium Alliaria, Scop.—**17.** Near Claregalway.
Brassica alba, Boiss.—**16.** Frequent, Roundstone to Slyne Head.
Raphanus maritimus, Sm.—**16.** Bunowen, Ballyconneely, and very abundant 2 miles west of Dog's Bay.
Viola Curtisii, Forst.—**16.** Abundant 2 miles west of Dog's Bay.
‡Lychnis Githago, Scop.—**17.** Near Claregalway.
Cerastium tetrandrum, Curt.—**16.** Common in S.W. Connemara. **17.** Old Castle at Lackagh.
Sagina maritima, Don.—**16.** Roundstone, and frequent in S.W. Connemara.

Spergularia rupestris, Lebel.—**16.** Roundstone and Ballyconneely.

Malva rotundifolia, L.—**17.** Drumgriffin.

Geranium sanguineum, L.—**17.** Coolaran, and 3 miles S.E. of Claregalway.

Ononis repens, L.—**17.** 3 miles S.E. of Claregalway.

***Trifolium hybridum,** L.—**16.** Moycullen.

Lotus uliginosus, Schkur.—**17.** Claregalway.

Vicia hirsuta, Koch.—**17.** Athenry.

V. angustifolia, Roth.—**16.** Roundstone. **17.** Castle Lambert.

Prunus Avium, L.—**16.** Near Moycullen among native shrubs, not planted.

‡P. Cerasus, L.—**17.** Lackagh.

Rubus plicatus, Wh. & N.—**16.** Tully.

R. corylifolius, Sm.—**26.** Lough Carra.

R. saxatilis, L.—**17.** Coolaran.

Dryas octopetala, L.—**16.** Abundant on bluffs on E. edge of Ballycuirke Lough.

Agrimonia odorata, Mill.—**16.** Roundstone, Killery mouth, and frequent in S.W. Connemara.

Myriophyllum verticillatum, L.—**16.** Ballycuirke Lough.

Callitriche stagnalis, Scop.—**17.** North of Athenry.

Pepis Portula, L.—**17.** Near Coolaran.

Eryngium maritimum, L.—**16.** Doonloughan, and abundant 2 miles west of Dog's Bay.

‡Smyrnium Olusatrum, L.—**17.** Lackagh.

Apium graveolens, L.—**16.** Bunowen and west of Roundstone.

***Petroselinum sativum,** Hoffm.—**16.** Aughnanure Castle near Oughterard.

Sium angustifolium, L.—**16.** Dog's Bay, and frequent on Bunowen peninsula, very dwarf.

Pimpinella magna, L.—**17.** Near Kilbeg Ferry.

Scandix Pecten-Veneris, L.—**17.** Castle Lambert.

Œnanthe crocata, L.—Claregalway.

Œ. Phellandrium, Lamk.—**16.** Aughnanure Castle near Oughterard.

***Peucedanum sativum,** Benth.—**16.** Pebble-beach at Ballyconneely, and sands at Bunowen.

Caucalis nodosa. Scop.—**16.** Roundstone and frequent westward.

Galium sylvestre, Poll.—**16.** Near Gortachalla Lough. **17.** Frequent north of Athenry.

Asperula cynanchica, L.—**17.** Common north of Athenry.

Valerianella olitoria, Poll.—**17.** Near Claregalway.

***Inula Helenium,** L.—**17.** Copse at Lackagh.

‡Anthemis Cotula, L.—**16.** Roundstone.

A. nobilis, L.—**16.** Sands at Loughnafooey.

‡**Matricaria discoidea,** DC.—**16.** Bunowen and Tully. **17.** Claregalway. Common Clonbur to Ballinrobe.

***Tanacetum vulgare,** L.—**17.** Castle Lambert and Claregalway.

***Petasites fragrans,** Presl.—**16.** Oughterard.

Carlina vulgaris, L.—**16.** About Bunowen.

***Crepis biennis,** L.—**17.** Fields near Cregmore bridge.

Statice rariflora, Drej.—**16.** Ballyconneely Bay and Mannin Bay.

Centunculus minimus, L.—**16.** L. Corrib shore near Oughterard.

Lithospermum officinale, L.—**16.** Aughnanure Castle near Oughterard.

Convolvulus arvensis, L.—**16.** West of Ballyconneely.

Verbascum Thapsus, L.—Aughnanure Castle near Oughterard.

Euphrasia Salisburgensis, Funk.—**16.** From Roundstone along the coast to Slyne Head and Mannin Bay, being abundant about Dog's Bay and the Bunowen peninsula, and ascending Urrisbeg to 300 feet. Abundant on the limestones between Killybeg, Moycullen and Oughterard. **17.** Abundant on limestones in Athenry district. **26.** Abundant on limestones two miles N.E. of Clonbur, and thence to near Ballinrobe.

Utricularia vulgaris, L.—**16.** Ballycuirke L. and Doonloughan L.

‡**Verbena officinalis,** L.—**16.** Abundant east of Ross Lake.

Mentha sativa, L.—**16.** Roundstone. **17.** Kilbeg Ferry.

Calamintha officinalis, Mœnch.—**17.** Old castle at Lackagh.

Scutellaria galericulata, L.—**16.** Ballycuirke Lough, and Lough Corrib below Oughterard.

Stachys arvensis, L.—**16.** Bunowen. **17.** Claregalway.

Lamium intermedium, Fr.—**16.** Roundstone and Doonloughan.

***Chenopodium Bonus-Henricus,** L.—**16.** Moycullen. **17.** Lackagh.

Atriplex hastata, L.—**16.** Roundstone and Bunowen.

Rumex Hydrolapathum, L.—**16.** Doonloughan Lough and marshes two miles west of Ballyconeely.

Salix pentandra, L.—‡**16.** Ballyconneely and Renvyle.

Empetrum nigrum, L.—**17.** Coolaran.

Juniperus nana, Willd.—**17.** Abundant on Athenry esker.

Taxus baccata, L.—**16.** On limestone at Ballycuirke L., near Gortachalla L., and Aughnanure Castle.

Epipactis palustris, Crantz.—**16.** Two miles west of Ballyconneely

Orchis pyramidalis, L.—**16.** Bunowen, Ballyconneely, and abundant at Dog's Bay.

Ophrys apifera, Huds.—**16.** Ballycuirke Lough. **17.** Athenry esker and by L. Corrib at Kilbeg.

O. muscifera, Huds.—**16.** Limestones near Gortachalla Lough. **17.** Athenry esker, abundant.

Habenaria conopsea, Benth.—**16.** Bunowen.

H. intacta, Benth.—**16.** Three stations on east shore of Ballycuirke Lough; limestones near Gortachalla Lough; roadside near Dog's Bay

Habenaria chloroleuca, Ridley.—**16.** Roundstone.

Lemna trisulca, L.—**16.** Moycullen.

Potamogeton plantagineus, Ducr.—**16.** Cregduff Lough near Roundstone; Doon L., Aillebrack L., and Doonloughan L. near Bunowen.

P. heterophyllus, Schreb.—**16.** Gortachalla Lough.

P. nitens, Weber.—**16.** Ballycuirke L., Maumeen L., and Doon L. (Bunowen).

P. Zizii, Roth.—**16.** Aillebrack L. near Bunowen, and Ballycuirke L.

P. perfoliatus, L.—**17.** Lough Corrib at Kilbeg.

P. perfoliatus, L., var. **macrophyllus,** Blytt.—**16.** Maumeen Lough.

Ruppia rostellata, Koch.—**16.** Ballyconneely Bay.

Scirpus pauciflorus, Lightf.—**16.** Ballyconneely.

Rhynchospora fusca, R. & S.—**16.** Frequent in district west of Roundstone.

Carex teretiuscula, Good.—**16.** Marsh 2 miles west of Ballyconneely.

C. vulpina, L.—**16.** Frequent from Roundstone to Bunowen. **17.** Claregalway.

C. fulva × **flava,**—**16.** Dog's Bay peninsula.

Sesleria cærulea, Arduin.—**16.** Abundant on the Bunowen peninsula.

Kœleria cristata, Pers.—**16.** Common in S.W. Connemara.

Catabrosa aquatica, L., var. **litttoralis,** Parnell.—**16.** Sea sands at Doonloughan Bay, and 2 miles west of Dog's Bay.

Poa nemoralis, L.—**16.** Woods near Ballynahinch Castle.

Glyceria plicata, Fr.—**17.** Castle Lambert.

G. maritima, M. & K.—**16.** Roundstone and near Ballyconneely.

Festuca rottbœlliioides, Kunth.—**16.** Roundstone, Ballyconneely, Bunowen.

F. ovina, L.—**16.** The viviparous mountain form grew on sea sands at Killery mouth, and on the edge of the "Narrow Lake," Lough Mask; the blue-leaved maritime form on sands at Loughnafooey.

F. elatior, L.—**16.** Ballynahinch.

Asplenium marinum, L.—**16.** Dog's Bay and Ballyconneely.

Ophioglossum vulgatum, L.—**16.** Dog's Bay, Urrisbeg, Ballyconneely, &c. **17.** Athenry esker.

Botrychium Lunaria, Scop.—**16.** Dog's Bay and Ballyconneely. **17.** Athenry esker.

Isoetes lacustris, L.—**16.** Maumeen Lough.

Chara polyacantha, Braun.—**16.** Cregduff L. near Roundstone. Doon L., Aillebrack L., and Doonloughan L. near Bunowen.

National Library, Dublin.

VICIA OROBUS IN CO. ANTRIM.

BY C. J. LILLY.

In July, 1904, when searching for *Gymnadenia albida* at Tait's Hill, between Larne and Ballynure, I observed a large tuft of a vetch, which I took for *Vicia sylvatica*, in full bloom on an old wall: as *V. sylvatica* is not uncommon on the coast near Larne, I took no special notice of this plant, but was rather surprised to see it so far inland. During the summer of 1905 and 1906 I saw the same vetch in considerable abundance in a rocky moorland pasture at Lower Ballygowan Hill, near Headwood railway station, about three-quarters of a mile from Tait's Hill. On 17th July last I was looking over plants in the Belfast Museum with Mr. S. A. Stewart, and on turning up *Vicia Orobus*—a species hitherto unknown to me—I saw at once that it strongly resembled my Ballygowan plant; I sent a specimen accordingly to Mr. Stewart, who identified it as *V. Orobus*.

Subsequently, I made further search in the same locality, and found two specimens on similar ground at Spennin Hill, about one-half mile distant from Ballygowan Hill, which appears to be the head-quarters of this interesting plant. Although it has no tendrils, I observed that in some instances it had climbed to the height of two or even three feet among stunted hazel bushes, where its large purplish racemes were very conspicuous.

It will be recollected that *Vicia Orobus* was first found in Co. Antrim by Mr. Stewart in July, 1873—a single plant at the Sallagh Braes, about five miles to the north-east of Ballygowan Hill. The latter is an isolated patch of moorland surrounded by cultivation, and a veritable paradise for the botanist in June and July; the vetch seems to be confined to about half an acre of rough bushy pasture and hazel scrub, and in the same area I found no less than seven orchids, *Gymnadenia albida* and *G. conopsea* being very abundant, and *Habenaria viridis* frequent, also *Pyrola media* in great profusion, and several other uncommon plants.

I did not succeed in finding any more of *V. Orobus* at Tait's Hill, and searched several other patches of rocky ground in the neighbourhood without success, but there are some more mountain pastures in the district which I hope to explore next year, in order to define the distribution of this plant more accurately.

Larne.

REVIEWS.

THE STRUCTURE AND LIFE OF INSECTS.

Entomology, with special reference to its Biological and Economic Aspects. By JUSTUS WATSON FOLSOM, Sc.D., Pp. viii. + 435. With 5 plates and 300 text figures. London: Rebman Ltd., 1906. Price 14*s.* net.

The author of this beautifully produced book, who is lecturer on entomology in the University of Illinois, has favoured both students and teachers by its composition and publication. Our knowledge of insects grows so rapidly that a fresh presentation of the whole subject of entomology is always welcome, and Dr. Folsom, who is well known to zoologists for his researches into the morphology and embryology of the Collembola, has proved himself excellently fitted for the task.

At the commencement of the book, the author gives us a summary classification, indicating by the way his views on phylogeny and relationships. He upholds the monophyletic nature of the Arthropoda and the kinship between the Insecta and Crustacea, which has been recently advocated by Hansen, Lankester, and Carpenter, rejecting the dismemberment of the Arthropoda into a number of separate phyla as proposed by Packard and other zoologists. The only feature of this introductory chapter to which serious exception can be taken is the position of the Coleoptera in the diagnostic list of orders, between the Diptera and Lepidoptera, and in the diagram of phylogeny between the Thysanura and Orthoptera. Surely a kinship with the Neuroptera is far more probable than either of these alternatives.

No space in the book has been devoted to any systematic survey of the orders of insects. Consequently the author has ample space at his disposal for dealing fully with morphology, embryology and metamorphosis, aquatic adaptations, colour, the origin of adaptations and species, the life relationship of insects among themselves, with other animals, and with plants, their behaviour, their distribution in space and time, and their economic importance. In the excellent chapter on anatomy and physiology, occupying 120 pages, the account of the nervous system and

sense organs is especially good. The clear descriptions are illustrated by well-drawn figures and a few good photographs. Second-rate half-tone blocks such as illustrate (?) anatomical detail in certain recent American publications are pleasingly absent from the present volume. The chapter on development is good as far as it goes, but both embryological and post-larval growth might have been more fully treated with advantage. The recent positive statements of Heymons and Lécaillon that the "mid-gut" of winged insects arises from the ectoderm deserve at least a passing mention.

The summary of the various theories of organic evolution given by Dr. Folsom is effective and impartial. He appears to be a Darwinian in Darwin's sense (not in Weismann's), and his mind is open to the factors of isolation and mutation advocated in recent years by Romanes and De Vries. It is surprising, however, to miss from this summary any mention of Mendel's work. The inclusion of these general topics in an entomological text book is fully justified by the light which the study of insects can throw on their solution.

A strong feature of the book is the section devoted to the bionomics of insects. The chapters dealing with coloration, plant and insect relations, and insect habit, are full of interest, and some results of the recent researches of Janet, Möller and the Peckhams, on ants and other Hymenoptera are readily available for the English reader. Perhaps the author is too ready to accept as explaining details of insect behaviour the "tropic" terminology of Loeb and other recent experimenters. Reflexes doubtless play a large part in the actions of insects, but the "reduction" of memory and consciousness to reflexes is more than "improbable." The chapter on distribution contains a valuable summary of recent work on fossil insects, with figures of the most remarkable forms. The geographical section of this chapter gives the first indication that the book is primarily meant for American students, on account of the predominant attention paid to the problems presented by the distribution of insects in the United States. Many of these problems, however, have an interest for the European zoologist, who may be grateful to Dr. Folsom for bringing together in a convenient summary many facts scattered in the enormous economic literature of American entomology. In the discussion of the world-regions no mention is made of the proposal—first put forward by Merriam and subsequently advocated by Scharff—to establish the Sonoran as the headquarters of a fauna distinct from the Holarctic. And by some curious slip it is stated that the Euplœinæ—a group of butterflies most characteristic of the fauna of the Eastern tropics—"are restricted, almost without exception," to South America.

But for the book, on the whole, we have nothing but praise, and not the least obligation which Dr. Folsom has conferred on the student is the admirable bibliography occupying 57 pages and containing over 1,000 references.

G. H. C.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Two young Chimpanzees which have been lately purchased are now exhibited in the excellent new Ape-house. Another very interesting purchase is the curious Anoa from Celebes. Other animals recently acquired are a pair of Capybaras, a pair of Patagonian Cavies, a Civet Cat, a Ring-tailed Coati, a pair of Curlews, two Pileated Jays, eight Francolins, three Troupials, two Tanagers, and a Cow-bird. Four Lion cubs have been born in the Gardens.

Recent gifts include a Sulphur-crested Cockatoo from Dr. B. B. Ferrar, an Amazon from Miss Bradshaw, three Peafowl from Mr. T. Halpin. a Senegal Turtle-dove from Mr. H. B. Rathborne, five Guinea-pigs from Mr. T. Beatty, two Belgian Hares from Mr. G. P Beater, six Marsh Tits from Mr. W. J. Williams, a Greenland Redpoll, a Butcher bird, and a Fox-sparrow from Dr. J. Trunbull, a Black Vulture, a pair of Tyrant Birds, a pair of Yellow-billed Cardinals, a Black Troupial, a Bengalese Finch, and a pair of Guira Cockatoos from Mr. A. Goodbody, a Green Monkey from Mrs. Peyton, and a pair of Peafowl from Mr. Justice Wright.

DUBLIN MICROSCOPICAL CLUB.

October 10.—The Club met at Leinster House, the President (Prof. G. H. Carpenter) in the chair. The accounts for the past year were adopted, and the usual grant made towards the expenses of the *Irish Naturalist*, in which the Club's proceedings are published.

D. M'Ardle showed *Tetraphis pellucida*, Hedwig., bearing the terminal gemmiferous cups, which are formed of four or five broadly reniform bracts, and enclose numerous paraphyses and stalked lenticular gemmæ. This moss grows in dense tufts, bright green above, reddish below, one-half to one inch high. In the absence of fruit the plant may be known by these cups, which are borne on more slender and flexuose stems, bearing more uniformly-rounded ovate and more distant leaves than those on fertile plants, which have a stronger stem often branched, bearing imbricated leaves, the lower ones ovate and those near the apex of stem narrower. The genus is remarkable among mosses on account of the solid undifferentiated teeth of the peristome, and peculiar frondiform leaves which, after germination, appear on the protonema at the first development of the moss stem; in this species they disappear before the stem develops. The specimens were collected last year in the Correl Glen, Co. Fermanagh.

H. J. Seymour exhibited a section of a volcanic ash formerly much used as a road metal in one of the southern counties of Ireland. The material was most unsuited for this purpose, as it consisted of a number of fragments cemented together by a small amount of calcite. On the

solution of the latter substance, the whole rock fell into a powder, producing quantities of mud in wet weather. On his advice, a suitable rock occurring locally is now being used instead.

R. SOUTHERN exhibited a mounted specimen of the Enchytræid worm *Fridericia aurita*, Issel. This species was first described by the Italian zoologist, Dr. Issel, in 1905, in the *Zoologische Jahrbücher*, from specimens taken in Piedmont, Italy. Its only other locality at present known is in Lambay, where it was found last June. It is chiefly characterised by the shape of the spermatheca. Attention was drawn to the stoma-like guard-cells surrounding the dorsal pores.

Prof. G. H. CARPENTER showed new species of Pycnogonida collected by Dr. J. Stanley Gardiner in the Indian Ocean. The species, which belong to the genera Pallenopsis, Anoplodactylus, Colossendeis, and Rhopalorhynchus, will shortly be described and figured in the *Transactions* of the Linnean Society.

J. N. HALBERT exhibited specimens of a new Irish plant-bug, *Liburnia lugubrina*, Boh., found in marshy places near Mullingar. The species seems to be rare in Great Britain. It was introduced into the British list—without locality—many years ago, and no definite locality is mentioned for it in Mr. Edwards' recent monograph (Homoptera of the British Islands, 1896).

Dr. G. H. PETHYBRIDGE exhibited the parasite fungus *Septoria Petroselini* (Desm.) var. *Apii*, which was growing on and causing considerable damage to celery plants. The fungus is well known in England and in America, but its presence in Ireland has not hitherto been noted.

BELFAST NATURALISTS' FIELD CLUB.

OCTOBER 25.—OPENING CONVERSAZIONE.—The Forty-fourth Winter Session was opened by a conversazione, held in the large hall of the Y.M.C.A., which was largely attended by members and friends. Tea was served from 6.30 to 7.30 o'clock. The following is a list of the principal exhibits shown:—BOTANY: Botanical Section—Specimens from Club's herbarium. N. Carrothers—Mounted plants. Rev. Canon Lett, M.A., M.R.I.A., and Rev. C. H. Waddell, M.A., B.D.—Mosses, Liverworts and Lichens, together with Handbooks. H. C. Marshall—Propagation of British ferns, &c. Professor Gregg Wilson, D.Sc., M.R.I.A.—Microscopic demonstration—Plant sections, etc. GEOLOGY: Miss M. K. Andrews—Microscopic sections of Tertiary rhyolites from Co. Antrim. R. Bell—Cephalopoda. W. Christy—Chalcedony and opal from Carnmoney; fish teeth from the Cretaceous rocks. A. Duncan, B.Sc.—Carboniferous fossils, etc. W. H. Gallway—Chalcedonic geode from South America, containing globule of water. J. L. S. Jackson—Liassic fossils from Whitby; Nautilus; Ichthyosaurus; Plant Remains, etc. J. Strachan—Native Irish silicas, including quartz, chalcedony, flint, opal, hyalite and

jasper; Intra-basaltic deposits of Antrim, including iron ore, bauxite, quartz crystals in matrix of bauxite, lignite, and lithomarge. Specimens of opal, hyalite and onyx, from Sandy Braes, Co. Antrim. W. J. C. Tomlinson—Eocene fossils from Barton, Hants. J. Wright, F.G.S.—Foraminifera from gravel pits in the vicinity of Belfast. ZOOLOGY: John Donaldson—Pond Life (microscopic demonstration). George Donaldson—Butterflies, Moths and Beetles from India. N. H. Foster, M.B.O.U.—Eggs of Common and Arctic Terns, showing variation in size and colouration. W. Gray, M.R.I A.—Some forms of Hydrozoa; Multiple images in insect's eye. W. H. Gallway—Star Fishes and Sea Urchins; Pipe Fishes. W. A. Green—Long-eared Bat from Lough Mourne; Horned Toad from Mexico, Alligator, etc. F. M. Greeves—Facsimiles of eggs of extinct birds, carefully imitated from originals, viz.:—*Æpyornis maximus* of Madagascar, *Dinornis giganteus* of New Zealand, *Alca impennis* or Great Auk; also collection of lithographs of extinct animals. H. Malcomson—Collection of British birds' eggs. H. L. Orr—Some bees and wasps and their nests. Professor Symington, M D., F.R S.—Microscopic sections illustrating the structure of nerve cells and fibres. Mrs. Swanston—Collection of birds from Florida, U.S A. S. M. Stears—Glossy Ibis (*Plegadis falcinellus*), captured in Co. Down in September; Clutch of Sandwich Terns' eggs, taken in Co. Down. R. Patterson, M.R.I.A.—Variations in eggs of Herring Gulls; Egg of Sandwich Tern taken in Co. Down; First Irish Specimen of the Trumpet Fish (*Centriscus sccolopax*) taken off Co. Down coast. R. Welch, M.R.I.A.—Living Specimens of a very local land shell (*Helix pisana*), from Baltray sandhills, Co. Louth; Living specimens of two local slugs (*Amalia gagates* and *A. Sowerbyi*). MISCELLANEOUS: Miss Andrews—Views of St. Patrick's bell and its jewelled shrine. R. Bell—Pre-historic implements from Belfast hills. Thomas Brown—Case of unmounted gems; Amethyst crystals from Achill Island. W. A. Green—Bronze objects found on the pre-historic hearths, Dundrum; also stone implements, etc., from this and other sites of Early Man. D. E. Lowry—Obsidian flakes and arrow-heads, etc., made by the Indians of Mexico. J. Lizars—Microscopes and apparatus. R. May—Old wooden candlestick from Copeland Island; Ship's hour-glass by Lee, Belfast; Flint implements from the Soudan, Egypt, Japan, etc.: Recent local sand-dune finds. W. S. M'Kee—Polarisation of crystals, etc. Omagh Naturalists Field Club—Natural history photographs. R. Welch, M.R.I.A.—Natural history photographs. There were also microscopic demonstrations given by various members throughout the evening.

At 9.15 the President of the Club (W. H. PHILLIPS) took the chair, and delivered a short address. After welcoming the members of the Dublin Naturalists' Field Club and the Omagh Naturalists' Field Club, Mr. Phillips referred to the great success that had attended the summer excursions of the Club this year, and said this was almost entirely due to the energy of the Secretaries, Messrs. Galway and Tomlinson. Fourteen new members were elected, and a lantern display was then proceeded with, the views shown on the screen being taken principally during the summer excursions by the members of the Club.

DUBLIN NATURALISTS' FIELD CLUB.

OCTOBER 30.– CONVERSAZIONE in the Royal College of Science, Stephen's Green. This change from the usual meeting place of the Club arose from the fact that the Council of the Academy were introducing electric light into the Academy House, which was therefore not available. At 8.30 the President (C. B. MOFFAT, B.A.) took the chair, and after welcoming the visitors called upon Prof. CARPENTER, who delivered a short lecture on "Animal Form and Colour." The lecture, which dealt with protective coloration and mimicry in the animal world, was illustrated by a large series of coloured lantern slides. The remainder of the evening was spent in examining the numerous scientific exhibits which were on display. The following is a list of the more important:–J. ADAMS.—Specimens of Parsley Fern (*Cryptogramme crispa*), from Ballyknockan, Co Wicklow. Miss BERNARD.—Sketch of vegetation zones on slopes of Upper Lough Bray, August, 1906. BOTANICAL DEPARTMENT, SCIENCE AND ART MUSEUM.–Some Diseases of forest trees. W. B. BRUCE.–Collection of certain Genera (*Medicago*, *Melilotus*, *Trifolium*) of Leguminosæ, made during 1906. J. B. BUTLER.–(*a*) Copepoda, from Norwegian fiords; (*b*) Skins with ossicles of various Holothurians, Norway; (*c*) Living plankton, Dublin Bay. Professor G. H. CARPENTER.–Injurious Insects of the Year. Dissections of nervous systems of Vertebrates. Professor G. A. J. COLE.–(*a*) Exhibit illustrating succession of materials erupted during recent outbreak of Vesuvius; (*b*) Geological photographs from S. Africa. W. F. GUNN.–Exhibit illustrating the various storage organs of plants. Specimens of *Sisyrinchium californicum*, and *Diotis maritima* from their Irish stations. J. N. HALBERT.–Several Water-mites new to Ireland. Miss HENSMAN.–Samples of Seed in various stages of germination. Professor T. JOHNSON.–Sea-weeds and other natural history objects from Heligoland. Miss M. C. KNOWLES.–*Glyceria Festucæformis*, and other plants new to County Limerick. D. MCARDLE.–Some large Irish Mosses. Miss MCARDLE.–Specimens illustrating dispersal of seeds. Miss A. L. MASSY.—Deep sea Mollusca. F. NEALE.–Specimens of large Saw Fly (*Sirex gigas*). Nest with eggs of cave dwelling Spider (*Meta Menardii*) from Quin, Co. Clare. A. R. NICHOLS.—Humming Birds from Central America; (*a*) Sword-billed Humming Bird (*Decimastes enciferus*); (*b*) Dwarf Humming Bird (*Chætocercus bombus*). GEO. H. PETHYBRIDGE.—Map of Howth showing progress made during the year 1906 in vegetation survey of the district north of Dublin. A. ROYCROFT.—Specimens of granite from Carnsore Point. R. SOUTHERN.—Earthworm (*Eisenia veneta* [Rosa]), new to British Isles, with map of its distribution. New Irish Oligochæte (*Branchiura* sp. Beddard), *Victoria Regia* tank, Glasnevin, probably introduced from S. America. Miss J. STEPHENS.—Case of sponges from Natural History Museum, Merrion-street. D. K. STEWART.—Collection of certain genera (*Medicago*, *Melilotus*, *Trifolium*, *Lotus*) of *Leguminosæ*, made during 1906. I. SWAIN.–Structure of the Belemnite. Miss E. H. WILSON.—Kreuzotter (*Pelias berus*), from West Prussia.

There were six nominations of membership. Several past members replaced their names on the roll of the Club.

SEPTEMBER 29.—EXCURSION TO PORTMARNOCK AND MALAHIDE.—Members and visitors to the number of thirty took part in this excursion, which left Amiens-street by the 1.45 train. On reaching Portmarnock station the party walked across the dunes to the seashore, under the conductorship of W. F. Gunn. From this point until near Malahide the shore line is occupied by rocks of the Lower Limestone—dolomites, shales and purer limestone, which yielded abundant but rather fragmentary fossils. Near Malahide the dunes again occupy the shore line, and here the botanists were able to collect some of the rarer plants—*Thalictrum dunense, Trifolium arvense, Atriplex Babingtonii*, &c. At Malahide the party had tea, and returned to town by the 6.35 train.

NOVEMBER 10.—EXCURSION TO KILLAKEE.—Members and visitors to the number of thirteen, attended this meeting, which was devoted to the study of Fungi. Leaving Terenure at 1.30 the main party drove to beyond Rockbrook, and then ascended the slope of Cruagh as far as the edge of the wood. Here D. Houston, F.L.S., explained the life history of the fungi, and then led the party through the beech wood, collecting and discussing such representatives of the group as turned up. These included *Coprinus, Russula, Boletus, Polyporus, Clavaria*, and several Myxomycetes. Darkness put an end to the search, and the excursion returned to town, after having met for tea at Rockbrook Post Office.

NOVEMBER 13.—The first business meeting of the Session took place in the lecture theatre of the Royal College of Science. The President in the chair. There was a crowded attendance to hear a paper by Prof. G. A. J. COLE, F.G.S., on "Continental Glaciation in ancient and modern times." The lecture covered a large section of the subject, dealing with modern glaciation in the Alps, the origin of the Prussian Plain, modern glaciation in Greenland and Alaska, and the traces of former glaciation in Permo-Carboniferous times. Prof. Culverwell, T.C.D., spoke on the paper and discussed the different theories as to the cause of ice ages. Prof. Carpenter followed with remarks on the effect of the Ice Age on botanical and zoological distribution. R. Ll. Praeger pointed out the difficulties which would arise if the suggestion of the sun being a variable star were accepted.

The following were elected members:—Mrs. Sheehy-Skeffington, M.A.; Miss Powell, T. Irvine, T. Hallissy; and as associate members:—Gerald Tierney, P J. L. O'Connor. Two proposals for membership and two proposals for associate-membership were received.

BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

NOVEMBER 13.—Sir OTTO JAFFE, J.P., delivered his Presidential address, on the subject: "Weimar and its Associations with Goethe and Schiller." The address was illustrated by a special series of lantern slides.

NOTES.

ZOOLOGY.

Strangalia aurulenta in Co. Wicklow.

In June of the present year I received from my friend Mr. Jas. Black, among a number of insects for identification, a specimen of this beautiful longhorn beetle, which he had taken in the Avondale demesne near Rathdrum. This insect has hitherto been known in Ireland only from the south-west; its discovery in the south-east is therefore of considerable interest. Its British and continental distribution suggest that it belongs to the Lusitanian fauna.

GEO. H. CARPENTER.

New localities for Pelophila borealis.

The southern shore of Lough Gill, Sligo, has long been known as a locality for this most interesting northern member of our fauna. In June of this year, when on field work with our College students, specimens were found on the northern shore of the lake close to the ancient castle of the O'Rourkes. Numerous specimens were also discovered on the eastern shore of Lough Melvin, which we passed on the road from Manorhamilton to Belleek.

GEO. H. CARPENTER.

Royal College of Science, Dublin.

The Oblong Sunfish off the Irish Coast.

The Common Sunfish (*Orthagoriscus mola*) is fairly abundant off the Irish coast, but the Oblong Sunfish (*Orthagoriscus truncatus*), must be looked upon as one of our greatest rarities. The latter is truncated posteriorly, while the other is more oval in shape. The Common Sunfish grows to a great size, and attains a weight of from 300-400 lbs. The Oblong Sunfish is a much smaller species and much less heavy. There are other less evident characters which distinguish these two fishes.

Our oldest record of the Oblong Sunfish coming within the boundary of the Irish marine area, dates from the year 1837, when Mr. J. Wright observed one near Youghal. Another one was taken among seaweed off the coast of Waterford in 1845. Of this specimen we are certain that the determination was correct, as a fine water-colour sketch of the fish was made, which is preserved in the Dublin Museum.

Last July another Oblong Sunfish was taken in Tralee Bay, and sent to the fish-market in Dublin. It was acquired for the Museum collection from Mr. May, and I think it is the only Irish specimen which has been preserved. It was of a beautifully violet colour, becoming almost white underneath, the whole suffused in a silvery hue. It measured 2 feet 2½ inches in length, and weighed 18½ lbs.

R. F. SCHARFF.

Dublin Museum.

Stormy Petrel in Co. Down.

On October 16 a Stormy Petrel passed quite close to me, flying towards Sydenham from the direction of the Engine Sheds, and about a mile from the centre of Belfast. When I first saw it several Meadow Pipits were in pursuit, but they soon gave up the chase, and I watched it until it flew out of sight. There was a fairly strong wind blowing from the south-west at the time, and it was flying with the wind, and appeared strong enough on the wing.

HERBERT T. MALCOMSON.

Belfast.

Quail in Co. Armagh.

It may be of some interest that a Quail was shot in this county a short time since. Mr. Arthur Sinton was out partridge shooting about the middle of September, when to his surprise a Quail got up, which he promptly shot. He thinks there was another, or perhaps two, but is not sure on this point. He is getting the one he obtained stuffed by a well-known man in Belfast. I have avoided giving the particular locality for obvious reasons.

WM. M'ENDOO

Ballymore Rectory, Tanderagee.

Snowy Owl in Co. Mayo.

In the *Zoologist* for September Mr. W. J. Williams records a Snowy Owl (*Nyctea scandiaca*) in second year's plumage, shot at Belmullet on July 21.

Pugnacity of the Common Tern.

Since the appearance in the September issue of this Journal of a note under the above heading, my attention has been drawn by my friend, Mr. C. B. Moffat, to the great difficulty of distinguishing, on the wing, the Common Tern (*Sterna fluviatilis*) from the Arctic Tern (*S. macrura*). On looking into the matter more closely, it appears to me that my identification of the Balbriggan bird is open to some doubt. I am not prepared to assert that the bird was not the Arctic Tern, and, on the whole, it seems safer for the present to regard its identity as an open question. This much at all events is certain, that the bird belonged to one or other of the two species mentioned.

N. COLGAN.

Sandycove.

The Greater Black-backed Gull and its prey.

We have been watching the predaceous habits of the Greater Black-backed Gull on the long flat sands at Skerries during the month of September. On one occasion we observed through a telescope a murder being committed on the edge of the retreating tide. One of the children rushed out to the rescue, but only arrived in time to witness the last struggles of a young Guillemot, lying with its back broken in the water. The huge Black-backed, disturbed, rose slowly, flapped about half a mile down the shore, and promptly attacked and killed a second Guillemot. The whole proceeding we watched through a telescope. The Gull struck at the Guillemot repeatedly; the latter endeavoured to escape by diving, but the water being too shallow it was unfortunately unsuccessful. Later on we picked up the remains of the dead Guillemot and found that the Black-backed Gull had only cut it open with its powerful beak, and had eaten the entrails. We found several other young Guillemots killed in the same way, and in each case the Gull had devoured the inside only, not touching the flesh. Although we have watched the numerous and interesting seabirds at Skerries for many years in the month of September, we have never before noticed the Greater Black-backed Gull preying on the Guillemot.

F. W. Shaw.

Bushy Park, Terenure.

Woodcock killed by Gulls.

On 2nd November a Woodcock (*Scolopax rusticola*) was brought to my cabin on board R.M.S. "Virginian," which was caught at 7.30 a.m. by one of our crew, 3½ miles north of Innistrahull. It seemed quite healthy and in good condition, but apparently very tired. I put it in a locker, and two hours later, when it had to all appearance recovered from its recent fatigue, I carried it on deck. It crouched down with its head and neck outstretched seemingly not realising for a few seconds that it had its liberty, when suddenly it rose and made direct for Rathlin Island, distance about two miles. Scarcely had it flown 300 yards when it was intercepted by a flock of Herring and Lesser Black-backed Gulls. One Gull swooped down like a hawk and struck it on the back. The Woodcock, finding that it was hopeless to reach land, tried to regain the ship, but the whole flock—about twenty—closed in upon it and dashed it into the water and commenced to pull it to pieces. This incident appears to me to show that large numbers of exhausted and even healthy stragglers from flocks are killed yearly approaching our shores.

The Herring and Lesser Black-backed Gull are generally distributed round the coast. Both gulls are very quick in discerning whether a bird is able to protect itself or not. I have known a Lesser Black-backed Gull await patiently an opportunity of attacking a wounded Widgeon. If there had been several Woodcock they would, no doubt, have allowed them to pass unmolested.

J. TRUMBULL.

Malahide.

Glossy Ibis in Ireland.

During the month of September five Glossy Ibis were shot on the east coast of Ireland, and examined by me. They were all in immature plumage, and in poor condition—on the 7th a female, shot near Wexford; on the 10th, male and female, shot at Tramore, Co. Waterford; on the 11th, female shot on the North Bull, Co. Dublin; on 10th a male, shot near Clonakilty; and on October 1st a male, shot in Co. Clare—the first record from the west coast in this flight. Since then I heard of another bird seen at Donabate, described as a black Curlew, but no doubt an Ibis.

W. J. WILLIAMS.

Dame-street, Dublin.

Bat taking a Trout Fly.

A trout, about 2 lb. weight, was continually rising near a bend in the river where a breeze never touches the water. I went (September 10th) after tea to try him with a dry fly. Having tried in vain with a "Fisherman's Curse," 000 size, at 6 o'clock I put up a "Detached Olive" 00 hook. The first cast was short, and, while drying the fly, I felt a pull behind me, and saw that I had hooked a bat. Thinking that the bat must be foul-hooked, I laid the rod down and gently brought the animal towards me, when I discovered the hook to be deeply imbedded in the lower jaw behind the left lower canine tooth. It was a male Long-eared Bat. It was a bright evening, the sun still shining. I did not know that bats hawked for food so early. This one, at any rate must have gone at the fly, as the hook was inside the mouth. It also proves, I think, the accuracy of Mrs. Ogden Smith's imitations of the natural fly.

R. E. DILLON.

Clonbrock, Ahascragh.

BOTANY.

Spiranthes autumnalis in the Phœnix Park.

I think it may interest Dublin botanists to know that *Spiranthes autumnalis* still survives in its old locality in the Phœnix Park, "between Chapelizod and the Magazine," where, as quoted in Mr. Colgan's "Flora of County Dublin," it was stated to grow in Miss K. S. Baily's "Irish Flora," a work published in 1833. Here, on September 9, I had the satisfaction to come across three plants of this little Orchid, in good flower. I am not aware of the existence of any note showing that it has been observed in the spot—though, of course, it may have been—since Miss Baily's book was published; and Mr. Colgan, to whom I applied for enlightenment, tells me that he believes all later references to the Phœnix Park locality are based on the "Irish Flora" record. The spot being so close to Dublin, the absence of recent confirmations for a record so old as 1833, might lead one to suppose that the plant had died out, and I am glad to be able to state that this is not the case.

C. B. Moffat.

Dublin.

Glyceria festucæformis in Co. Limerick.

At the end of May last, when exploring some of the small islands of the Shannon off Morgans, in company with Miss Brisco and Mr. Donough O'Brien, we came on *Glyceria festucæformis* growing on the shingly northern beach of Trummera Big. This small island, the largest and highest of those we landed on, is only a few roods in area at high tide, and must be completely swept by winter storms. It is roughly triangular in shape. The southern end is a long, narrow sandy point, almost bare of vegetation, but at the time of our visit thickly studded by sea-birds' nests. The greater part of the shore, however, and especially the northern face, is stony and shingly, and it was here that we found *Glyceria festucæformis*. It grew in large isolated tussocks from just below spring-tide level right down to the water's edge. We landed shortly after high tide; and the waves were still lapping the roots of some of the clumps. It was the predominant plant on the beach, and the only one growing so low down on the shore. Higher up *Statice rariflora*, and a few stunted plants of *Aster tripolium* grew with it, and higher still on the beach *Cochlearia*, *Armeria*, *Glaux*, *Arenaria peploides*, &c., and just fringing spring-tide mark *Triticum repens* and *Matricaria inodora* grew in the greatest profusion. As it was early in the season, the *Glyceria* was immature, most of the flower-heads being still in their sheaths, but its general look, its mode of growth, its size and habitat, all tallied so exactly with Mr. Praeger's account of *Glyceria festucæformis* as it grows on the Co. Down coast, that I felt sure at

the time it could only be that grass. We brought away two roots. One was despatched to Mr. Praeger for his opinion, which coincided with my own, and the other was planted in Miss O'Brien's garden, where it flowered later. It is not wise, however, to dogmatise on immature material or material ripened under unnatural conditions, so, early in July I wrote to Miss O'Brien asking her if possible to get me a good gathering of the grass in full flower, from Trummera. This she very kindly did, sending me two large tussocks. Specimens of this later gathering were sent to Dr. Rendle, of the British Museum, who has confirmed the naming. This new station for *Glyceria festucæformis* is very satisfactory, as it further establishes Mr. Praeger's contention that the plant is native in Ireland.

M. C. KNOWLES.

Dublin.

Note on some Northern Fungi.

The following four Fungi were observed during the summer of 1906. They do not seem to have been previously recorded for Co. Antrim:—

Lepiota procera, Scop. (Parasol Mushroom). On sandy pasture, Massereene Park, Antrim.

Phallus impudicus, L. (Stinkhorn). In a wood in Massereene Park, Antrim.

Merulius lacrymans, Fr. (Dry Rot). This was observed growing on the woodwork of an outhouse at Windsor, Belfast. It need not necessarily be considered native in this locality, as the timber was probably foreign. Recorded by Templeton as occurring "near Belfast."

Hirneola auricula-judae, Berk (Jew's Ear). Occurred growing on old Elder trees at Muckamore, near Antrim.

In the *Irish Independent* of 7th September, 1906, the following note appeared:—"A large globular Fungus weighing 2¼ lbs. and measuring 27 inches in circumference, was discovered by Mr. H. R. M'Fadden in Lord Ranfurly's demesne near Dungannon, on Wednesday. The growth is perfectly round and quite solid." This in all probability refers to the Giant Puff Ball (*Lycoperdon giganteum*, Batsch). According to Lett's "Fungi of the North of Ireland" (1886) it had previously been recorded for Antrim and Down, but not for Tyrone.

J. ADAMS

Royal College of Science,
Dublin.

NOTICE.

CONTRIBUTIONS (Articles or Notes) on all branches of Irish Natural History are invited. Articles must reach the EDITORS, on or before the 10th of the Month, for insertion in the succeeding number. Short Notes will be inserted, if space permit, if received before the 15th of the Month. Contributors are earnestly requested not to write their communications on Postcards.

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Natural History Specimens sent to the Editors will be referred to authorities for identification.

G. H. CARPENTER,
Royal College of Science, Dublin.

R. LLOYD PRAEGER,
National Library, Dublin.

ROBERT PATTERSON,
Glenbank, Holywood, Co. Down.

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From Photo by E. A. BAKER.

A mighty column in The Garret.

From Photo by E. A. BAKER.

Picturesque corner on way to The River.

MITCHELSTOWN CAVE.

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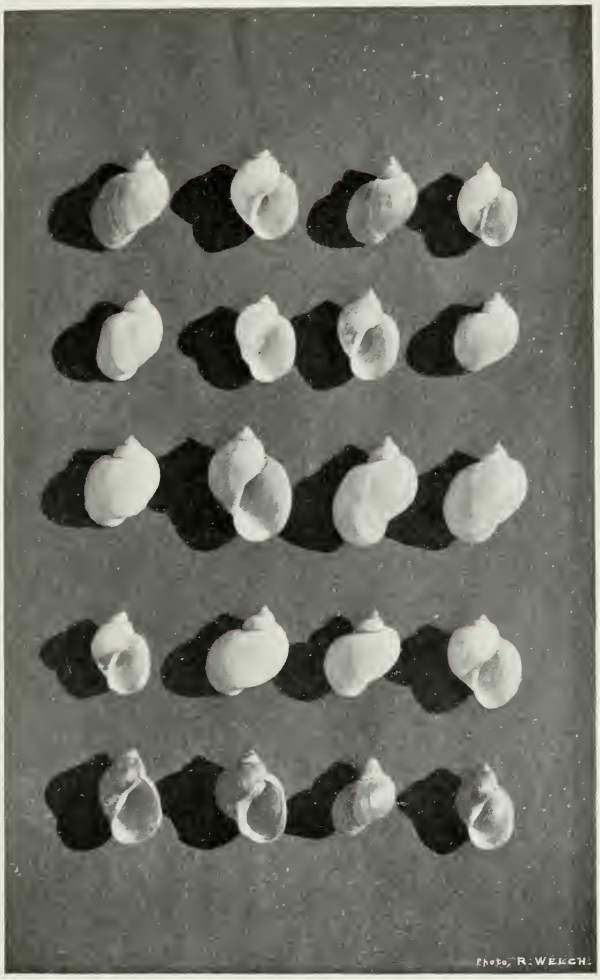

White forms of *Limnaea peregra*, mainly var. *boissyi* Dupuy. Carnboy Lough. Bottom row showing iron incrustation.

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Photo by G. E. Low. *Andre & Sleigh, Ltd.*

A WINTER SCENE.

Monkeys in the Snow.

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Nesting Site of Tree-Sparrow, Co. Derry.

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