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OF

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VOLUME XIX.

THE FRESHWATER RHIZOPODA AND HELIOZOA OF COUNTY WICKLOW.

BY JOHN HOPKINSON, F.L.S., F.G.S., F.Z.S.

About forty-five years ago a few members of the Dublin Microscopical Club commenced to exhibit and describe, at the monthly meetings, fresh-water Rhizopoda and Heliozoa, mostly collected in Ireland, occasionally in Wales, and once at least in Scotland. The proceedings at these meetings were reported in the *Quarterly Journal of Microscopical Science*, and the reports were reprinted in the Journal of the Club. The most energetic worker in this field of research and in microscopic pond-life generally was Mr. William Archer, the only other members of the Club who appear to have collected and exhibited Rhizopods being Dr. John Barker and Dr. Perceval Wright. Unfortunately these observers did not as a rule state where their specimens came from, and although we may reasonably assume that they were collected in Ireland when there is no statement to the contrary, we cannot be certain that such was the case. Occasionally however the locality was given, more often the county only.

To Mr. Bayley Butler we are indebted for the only attempt yet made to put together the results of these and other investigators of the Protozoa of any part of Ireland. In the 'Handbook to the City of Dublin and Surrounding District,' issued to the members of the British Association at the meeting in September, 1908, there are lists by him of Rhizopoda and other Protozoa which have been recorded from the province of Leinster. The lists include eight species of fresh-water Rhizopoda and eight of Heliozoa from Co. Wicklow. These numbers do not tally with his, for he includes under the Rhizopoda six species of Heliozoa, and the names of two Wicklow species are synonyms of others in the same list.

At the close of this meeting of the British Association I spent a week at Killough near Bray, on the Great Sugar-loaf Mountain, and although the weather was unfavourable for the collection of Rhizopods, every day being stormy, I obtained

fifty species, most of them new to Ireland and a few new to the British Isles. The names of all but one (*Chlamydomyxa montana*) were determined by the late Mr. James Cash, author of the 'British Freshwater Rhizopoda,' a work in course of publication by the Ray Society, with my assistance in the literature, etc. Mr. Cash died in February, 1909, and since then I have had to prepare his descriptions and drawings for the press. As it may be some time before the localities of many of the species thus found can appear in this work, I here give a list of all which are known to occur in Co. Wicklow.

For the reason above stated it is not possible to give the locality for some of the species enumerated; in such cases "Co. Wicklow" alone appears. The initials are those of Archer and Barker. My own collections were made in Calary Bog, from which small tufts of Sphagnum were taken here and there throughout its extent; and in a small sphagnous pool on the Great Sugar-loaf, above Killough, entered in the list as "Killough." All my specimens were obtained from Sphagnum or other bog-moss growing in the water, and the records are entered without initials.

RHIZOPODA.

AMŒBINA.

- Amœba proteus** (Pallas) Leidy.—Rocky Valley (J. B.): Killough.
A. limax, Duj.—Killough.
A. villosa, Wallich.—Rocky Valley (J. B.).
A. fluida, Gruber.—Killough.
A. verrucosa, Ehrenb.—Killough.
Gymnophrys cometa, Cienk.—Killough.
Biomyxa vagans, Leidy.—Killough.
Chlamydomyxa montana, Ray Lank.—Killough and Calary.

CONCHULINA LOBOSA.

- Arcella vulgaris**, Ehrenb.—Killough.
A. discoides, Ehrenb.—Calary.
Pseudochlamys patella, Clap. & Lachm.—Calary.
Centropyxis aculeata, Stein.—Killough and Calary.
C. lævigata, Penard.—Calary.
Diffugia oblonga, Ehrenb.—Killough and Calary.
D. Penardi, Hopk.—Killough.
D. bacillifera, Penard.—Killough and Calary.
D. pulex, Penard (?).—Killough and Calary.
D. lobostoma, Leidy.—Calary and Carrig (W. A.).
D. arcula, Leidy.—Killough.
D. constricta (Ehrenb.), Leidy.—Killough and Calary.

- Pontigulasia elisa** (Penard) Schout.—Killough.
P. bryophila, Penard.—Killough and Calary.
P. compressa (Carter) Cash.—Killough.
Lesquereusia spiralis (Ehrenb.) Bütsch.—Killough and Calary.
L. modesta, Rhumbl. —Killough.
Phryganella acropodia (Hertw. and Less.) Hopk.—Killough.
Nebela collaris, Leidy.—Calary.
N. tincta (Leidy) Averintz.—Killough and Calary.
N. militaris, Penard.—Killough.
N. tubulosa, Penard.—Killough.
N. flabellulum, Leidy.—Killough and Calary.
N. dentistoma, Penard.—Killough and Calary.
 var. **lævis**, Hopk. —Killough.
N. triangulata (Lang) Hopk.—Behind Carrig Mountain (W. A.).
Quadrula symmetrica, F.E. Sch.—Killough and Calary.
Heleopera petricola, Leidy.—Killough and Calary.
 var. **amethystea**, Penard.—Killough.
H. rosea, Penard.—Killough and Calary.
H. lata, Cash.—Killough.
Cochliopodium bilimbosum (Auerb.) Leidy.—Glenmalure (W. A.).
C. vestitum, Archer.—Glenmalure (W. A.).

CONCHULINA FILOSA.

- Euglypha cillata** (Ehrenb.) Leidy.—Killough.
E. strigosa (Ehrenb.) Leidy.—Killough and Calary.
E. cristata, Leidy.—Killough and Calary.
Placocysta spinosa (Carter) Leidy.—Glenmalure and Toole's
 Rocks (W. A.); Killough.
Assulina seminulum (Ehrenb.) Leidy.—Bray Head (W. A.).
A. minor, Penard.—Killough.
Cyphoderia ampulla (Ehrenb.) Leidy.—Killough and Calary.
Trinema enchelys (Ehrenb.) Leidy.—Killough and Calary.
T. complanatum, Penard.—Killough.
T. lineare, Penard.—Killough and Calary.
Sphenoderia lenta, Schlumb.—Killough and Calary.
S. fissirostris, Penard.—Killough.
Pamphagus hyalinus (Ehrenb.) Leidy.—Calary (W. A.); Killough.
Corythion dubium, Taran.—Killough and Calary.
Pseudodifflugia gracilis, Schlumb.—Co. Wicklow (W. A.).
P. fulva (Archer) Penard.—Co. Wicklow (W. A.).
Diaphoropodon mobile, Archer.—Glenmalure (W. A.).
Microgromla socialis (Archer) Hertw. & Less.—Calary, Carrig,
 and Glenmalure (W. A.).
Diplophrys Archeri, Barker.—Co. Wicklow (J. B.); Calary and
 Carrig (W. A.).
Amphitrema wrightianum, Archer.—Glenmalure and Toole's
 Rocks (W. A.).
A. stenostoma, Nüssl.—Killough and Calary.

HELIOZOA.

- Actinophrys sol** (Müll.) Ehrenb.—Killough and Calary.
Heterophrys myriopoda, Archer.—Carrig and Lough Dan (W. A.).
H. Fockei, Archer.—Lough Dan and elsewhere (W. A.).
Raphidiophrys viridis, Archer.—Carrig and Tinahely (W. A.).
Pompholyxophrys punicea, Archer.—Calary and Carrig (W. A.).
Acanthocystis chætophora, Schrank.—Co. Wicklow (W. A.).
A. pertyana, Archer.—Calary and near Carrig Mountain (W. A.).
Clathrullina elegans, Cienk.—Calary (W. A.).

As some of the above names are not the same as those under which the species were recorded, or appear in Mr. Butler's list, it will be well to make a few remarks on their synonymy.

Amœba proteus is Barker's *A. diffluens*; *A. verrucosa* is his *A. quadrilineata*. *Centropyxis aculeata* is Archer's *Arcella aculeata*. *Diffugia lobostoma* was referred by Archer to *D. oblonga*, his description showing that it was *lobostoma*. *Cochliopodium vestitum* is Archer's *Amphizonella vestita*. *Nebela triangulata* was described as a *Diffugia*; *Placocysta spinosa* has been removed from *Euglypha*. *Assulina seminulum* is Archer's *Euglypha tincta*; *Cyphoderia ampulla* is his *C. margaritacea*; *Pamphagus hyalinus* is his *Pleurophrys spherica*; *Pseudodiffugia gracilis* and *P. fulva* are his *Pleurophrys amphitrematoides* and *P. fulva*. *Microgomia socialis* has been removed from *Gromia*; it was also recorded by Archer as *Cystophrys haeckeliana*. *Diplophrys Archeri* was subsequently named by Archer *Cystophrys oculoa*. *Heterophrys myriopoda* includes *H. marina* of Barker's list. *Acanthocystis chætophora* is Archer's *A. turfæa*.

Notable features in the list are the comparatively large number of filose *Conchulina* and of *Heliozoa* found by Archer, my own collection chiefly consisting of lobose *Conchulina*. The absence of any *Hyalosphenia* is remarkable, my collections from similar situations in North Wales nearly always containing species of this pretty genus. *H. cuneata*, Stein, and *H. inconspicua*, G. S. West, are its only species hitherto recorded for Ireland.

In conclusion I may point out that a very similar collection of *Rhizopods* might be obtained from any county in Ireland. These most beautiful microscopic animals abound wherever there is pure water and growing vegetation, and a collection made in the summer or autumn would provide ample material for investigation throughout the winter, for although *Rhizopods* would not live long in a small quantity of stagnant water, they will live for months in wet *Sphagnum* or other bog-moss.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Maxwell's Duiker, a Crested Eagle, and a Paradoxure Cub. from Sir Philip Crampton Smyly; nine pigeons, from Mr. J. Clifton; a Common Gull, from Mr. F. W. Powell; a Magpie, from Mr. W. W. Despard; two Egyptian Geese, from Lady Dunleith; a Merlin from Mr. A. Rohu; two Turtle Doves, from Mr. H. B. Rathborne; a Sparrowhawk, from Mr. W. Freeman; a Kestrel, from Miss Bowles; and a Slowworm, from the Hon. Mrs. E. Guinness. A number of Pied Wag-tails have been added to the collection of Irish birds.

ROYAL IRISH ACADEMY.

NOVEMBER 30.—The stated general meeting of St. Andrew's Day, 1909 took the form of a Darwin Commemoration, in celebration of the centenary of Charles Darwin's birth and the fiftieth anniversary of the publication of the "Origin of Species." The President, Dr. F. A. TARLETON, F.T.C.D., opened the meeting with a tribute to Darwin's greatness as a naturalist and the extent of his influence on scientific thought. Prof. G. A. J. COLE then spoke on Darwin's geological work, pointing out that geology had been the leading interest of his earlier years, and emphasising the importance of his geological researches during the voyage of the *Beagle*. Darwin's theory of coral-reef formation had been abundantly confirmed by the recent deep boring at Funafuti. Dr. R. F. SCHARFF discussed Darwin's influence on the study of animal and plant distribution, a subject which had appealed to him through his collecting and observation on the Galapagos Islands. The theory of the permanence of the great oceanic basins was, however, losing ground among modern students of distribution, who are sceptical as to the value of "accidental" means of dispersal. Prof. G. H. CARPENTER dwelt on the importance of Darwin's zoological studies in South America as leading his mind to the conception of the principle of organic evolution, and on the immense influence of the theory of Natural Selection over modern zoological study. It was pointed out that Darwin himself was no believer in the "all-sufficiency of Natural Selection," and that his disciples should preserve an open mind in face of modern advances in the study of heredity and variation. Prof. T. JOHNSON discussed Darwin's influence on botanical science, gave instances of the light thrown upon the history of the vegetable kingdom by recent discoveries among fossil plants, and elucidated the theory of natural selection with special reference to plant structure. Prof. A. F. DIXON spoke of Darwin's influence on the study of Anthropology, emphasising the presence in the "Descent of Man" of many ideas that have borne fruit in recent discoveries and the confirmation afforded to the main thesis of that book by the structure of the most primitive of human remains.

DUBLIN MICROSCOPICAL CLUB.

NOVEMBER 10.—The Club met at Leinster House.

A. R. NICHOLS (Vice-President) exhibited the Marine Polyzoon, *Lepralia pertusa*, Esp., on a shell of *Pecten maximus* from Roundstone, Co. Galway. Although widely distributed and found at several places on the English and Scottish coasts, this species appears to be rare on the Irish coast, and has only previously been recorded from off Belfast Lough.

F. W. MOORE showed *Uredo Lynchii*, a fungus which is found only on Orchids. It was established on *Epidendrum vitellinum*, a Mexican Orchid. This species was first noticed growing on a species of *Spiranthes* from Trinidad, at the Royal Gardens, Kew, in 1885. Since then it has spread to several collections, and this is the second occasion on which it has been found on orchids in the Glasnevin collection. As a rule orchids are particularly free from fungoid pests, probably owing to the thick nature of their epidermis.

W. F. GUNN showed sections of the seed coats of *Brassica campestris* (Swede) and *B. rapus* (Rape). The seeds of these two species of Brassica so closely resemble one another in their external and naked-eye appearance, that it is impossible to determine by this evidence alone to which species a sample of seed should be referred, and it becomes necessary to resort to other means of identification. Since 1871 quite a number of workers, mostly on the Continent and in America, have investigated the histology of the seed coats, and amongst others Schröder, Sempolowski, Wittmack, and Hohnel have published the results of their work, and more recently A. J. Pieters and V. K. Charles, of the United States Department of Agriculture, have carried out an exhaustive enquiry. It is now possible to distinguish between a number of the economic species of Brassica such as Cabbage, Black Mustard, Charlock, Turnip, &c., by the structure of their seed coats. The differences between Swede and Rape are less marked than in the other species of this genus, but Messrs. Pieters and Charles claim that by special methods of staining and mounting, distinctive characters are obtained which differentiate them from one another. The slides shown, however, which were made by a professional mounter from commercial seed, were not sufficiently characteristic to be of practical value for identification, and we are still without a convenient means, suitable for everyday use, of determining these two species.

N. COLGAN exhibited living specimens of the Two-spotted Sucker-fish, *Lepadogaster bimaculatus*, and of the Gephyrean worm *Phascolion Strombi*, which he dredged in ten fathoms off Dalkey sixteen days previously. The worm, which was lodged in an empty Tooth-shell, *Dentalium entalis*, one inch long, was kept in captivity in a deep glass bowl the bottom of

which was covered with a layer of sand an inch and a half deep. Living under these conditions it continued to be quite active for fully a fortnight so that its behaviour could be readily observed. Although the naked Gephyreans usually live buried in sand or mud, it might have been expected that this shell-inhabiting species would have unlearned its ancestral burrowing habit on adopting the very effective defence of a strong shell. But the observations made did not bear out this expectation. On the night of the 25th October the shell, with its tenant, was left lying flat on the sand at the bottom of the bowl. Next morning the shell was found completely buried. On the morning of the following day the worm was detected at work. The slender proboscis was seen to issue rapidly from the shell and bury itself in the sand in a business-like, purposeful way. Then a vigorous tug having reared the shell on its broad or mouth end into a semi-erect position, it began to sway gently up and down so that the wide mouth was gradually forced into the sand. This action was repeated on the evening of the same day, when the shell was found standing almost erect on its broad end, with one-third of its length buried, two hours after it had been laid on its side. Again, on the 31st October, the shell being once more laid flat on the sand was found after five minutes raised at an angle of about thirty degrees. From this it gradually declined until the tip had nearly reached the sand, when a vigorous pull from the buried animal dragged the shell for one-fourth of its length into the sand in an almost horizontal direction. The row of bristles at the top of the proboscis is no doubt fully expanded when the animal has penetrated the sand, and serves as an anchor or purchase while the shell is dragged down by a vigorous muscular contraction.

The Sucker-fish exhibited, which was hardly an inch in length, was seen on three distinct occasions between the 8th and 10th November to float belly upwards on the water surface in the vessel in which it had been confined since its capture a fortnight previously. The action was not so much a floating as a sucking on to the water surface, the tip of the snout and the lower rays of the ventrals rising well above the surface, while the pectorals maintained a regular motion. On the first and on the second occasion, when found in this posture, the fish immediately turned over and darted to the bottom on being lightly touched by the finger. On the third occasion it was less sensitive, for after floating for ten minutes, it suffered itself to be gently pushed across the vessel without altering its reversed position at the surface. Gosse appears to have been the first to notice this curious habit, which he describes in one of his beautifully illustrated books, "A Year at the Shore," published in 1865, where (p. 162) he states that the fish while floating remains perfectly still, and that he thinks he has only seen the practice carried on at night. The specimen shown had floated indifferently by night or by day, and seldom remained quite still while floating. Usually it kept revolving by frequent twitchings of the tail; on one occasion it was seen to move across the water by the action of the tail and pectorals while maintaining its reversed posture and sucking on to the water surface.

BELFAST NATURALISTS' FIELD CLUB.

NOVEMBER 6.—GEOLOGICAL SECTION.—EXCURSION TO SQUIRE'S HILL.—The object of the excursion was to examine the Chalk quarries on the side of Squire's Hill. There was a large attendance of members. In the first two visited the chief features of interest were the fine exposures of hard white chalk, traversed by vertical dykes of basalt, the chalk in their vicinity being much altered. In the third quarry a good section was exposed of Chloritic Sands, passing upwards into Chloritic Chalk, surmounted by hard white chalk.

NOVEMBER 24.—GEOLOGICAL SECTION.—Lecture by Mr. James Strachan on "Petrological Types of Basalt in County Antrim." The chief portion of the lecture was devoted to a suggested rational classification of the basaltic rocks of Co. Antrim, according to their varying basicity. Three main classes were recognised and sub-divided as follows:—I. BASALTS WITHOUT OLIVINE (basaltic Andesites). A. Flow type—Basalt of Spanish Bay, Giant's Causeway. B. Intrusive type—Dolerite of the neck at Carnmoney Hill. II. OLIVINE BASALTS. A. Flow type—The common olivine basalt of the district, with olivine increasing from occasional grains to plentiful porphyritic crystals. B. Intrusive type—The common olivine-dolerite of the district, with varying amount of olivine—*e.g.* dolerite of the neck at Scawt Hill, and that of Ballygalley Head. III. BASALTS RICH IN OLIVINE. A. Flow type—Containing excess of olivine in large phenocrysts, minimum of felspar and augite, and colourless interstitial glass; north side of Carnmoney Hill. B. Intrusive type—Dolerite rich in olivine; Slieve Mish. These types of basaltic rocks were all illustrated by hand-specimens and numerous microscopic sections. In conclusion, the lecturer referred to several peculiar features of the local basalts, such as the fairly common occurrence of "tube-amygdaloid" at the basal portion of many of the Co. Antrim flows, and the complete inclusion of primary minerals, such as felspar and augite, in natrolite and other zeolites.

NOVEMBER 23:—GEOLOGICAL SECTION.—Dr. A. R. DWERRYHOUSE, F.G.S., Lecturer in Geology in the Queen's University, delivered the first of a series of lectures on practical petrology to members of the Belfast Naturalists' Field Club. The lectures deal with the identification of minerals by means of the microscope, and with the classification of rocks. A noteworthy feature of the course is that each lecture is followed by a demonstration class, in which the subject of the discourse is treated in a practical manner, so as to give each member an opportunity of gaining experience in the methods employed. By kind permission of the Vice-Chancellor (the Rev. Dr. Hamilton) the lectures are being given in the geological department of the University.

REVIEW.

A GUIDE TO FUNGI.

Fungi and how to know them; an introduction to Field Mycology. By E. W. SWANTON. Pp. xii. and 210, 16 coloured and 32 black and white plates by M. K. Spittal. London: Methuen and Co., 1909. Price 6s.

With the flowing tide of popular books on natural history subjects arising from the recent development of the "Nature Study" movement comes the present volume to supply a "long felt want." As the author points out in his preface, the study of common wild flowering plants has perhaps been given an undue importance in present day schemes of nature study to the detriment of most of the other groups of plants. With the appearance of the present book, however, which is intended to serve as an introduction to the larger standard works on the fungi, no excuse can exist for further neglecting the study of this interesting group.

The first part of the book deals, in six chapters, with generalities, such as details of structure and development, spore dispersal, habitats, saprophytes and parasites, economic and edible species, and gives hints on collecting, exhibiting, and preserving fungi. A short bibliography follows, and then a much needed glossary of the technical terms used in Part II. This second part, which occupies about three-quarters of the book, is devoted to the classification and description of those "larger fungi" belonging to the Basidiomycetes and the Ascomycetes, which are for the most part common in the British Islands. Perhaps the most pleasing feature of the book from the beginner's point of view is the wealth of good illustrations, many of them being coloured, and most of them drawn by Miss M. K. Spittal. With the aid of these and the clear descriptions given it should be possible for the serious student to attain in a short time that degree of expertness by which he would find that it is (in the author's words) "no more difficult to identify a fungus than it is to diagnose a flower." Excellent as the plates are, however, a serious inconvenience, which could easily have been avoided, exists in the fact that the explanations of them are printed on the *back* of each, necessitating a constant irritating turning forwards and backwards. It is also unfortunate that the names of authors are everywhere omitted after the species, as the book thereby loses much of its scientific value, and there is no reason why even a beginner should not learn to give his specimens the full and correct names from the start. A tendency on the part of the author is noticeable in the opening chapters to regard the *fructification* of the fungus as the fungus itself. Thus to take one instance only out of several, he states "the activity of the mycelium is confined to a certain period. If the fungus is not produced during that time," &c. . . . meaning if the "fructification of the fungus" is not produced, &c. There are some other points in the book on which

differences of opinion might reasonably exist, but, bearing in mind the class of readers for whom the book is produced, it is not necessary to enter into a discussion of them here. On the whole the book appears to be admirably adapted for its purpose, and it is to be hoped that it may find its way into the hands of many young naturalists in Ireland. For, while a considerable amount of attention is being paid at the present time in this island to the parasitic and economically important fungi, which this book does not pretend to deal with, there is a serious lack of workers in the groups of larger fungi which this book treats of so well, and the distribution of which in Ireland, particularly in the west, has been hitherto unfortunately so much neglected.

G.H.P.

OBITUARY.

FREDERICK PRYOR BALKWILL.

F. P. Balkwill was the eldest child of Joseph Hancock Balkwill, and was born at Plymouth on 24th December, 1832. A member of the Society of Friends, he was educated at the Quaker Schools of Hitchin and Sidcot. Entering the family business of Balkwill and Co. at Plymouth for apprenticeship, he passed to Messrs. Allen and Hanbury's, being registered in the Pharmaceutical Society in December, 1854. Becoming a partner in the Plymouth house, he became a leading man in public affairs in that town. Finding indoor occupation irksome, he retired from the business, and in 1873 removed with his family to Ireland, settling in Dublin. He returned to England in 1883, living successively at Birmingham, Evesham, Nottingham, and finally at York, where he died while writing a letter to his daughter. He was long troubled with angina pectoris, and a mental breakdown about 1902 checked his activity in recent years. He died on November 3rd, 1909.

Mr. Balkwill was a Fellow of the Linnean Society, retiring in 1874, and devoted much attention to the botany of the West of England. He was a well-known chess player and climber, and his deep religious convictions led him often to open-air preaching.

F. P. Balkwill's contributions to science were as follows:—

The Foraminifera of Galway. *Journ. Microsc. Nat. Sci.*, vol. iii., 1884, pp. 19-26, 78-90, 4 pls. (with F. W. Millett.)

Recent Foraminifera of Dublin and Wicklow. *Proc. R. Irish Acad.* (2), vol. iii., 1882, pp. 546-550. (with Joseph Wright.)

Report on some recent Foraminifera found off the coast of Dublin and in the Irish Sea. *Trans. R. Irish Acad.*, vol. xxviii., 1885, Science, pp. 317-372, 3 pls. (with Joseph Wright.)

We are indebted to Miss Margaret A. Balkwill for the above particulars.

C. DAVIES SHERBORN.

NOTES.

The Late J. H. Davies.

In connection with Canon Lett's obituary notice of Mr. J. H. Davies, I wish to mention, as showing the early attachment of our late friend to botanical science and his competence as a bryologist, that on November 2nd, 1857, he was appointed curator for mosses by the Thirsk Natural History Society and Botanical Exchange Club. This was our first medium for the interchange of plants, and Mr. J. G. Baker, then a young man, but now an F.R.S., was appointed at the same meeting curator of flowers and ferns.

S. A. STEWART.

342, Springfield-road, Belfast.

BOTANY.

Geaster rufescens in County Waterford.

At the end of September, Mr. Louis Grubb sent to me, from Carrick-on-Suir, a Geaster, which Mr. H. C. Hawley names *G. rufescens*, Persoon. He found it at Sheskin, "growing up through the hard coal ashes that formed a walk about 540 feet over river level." Three specimens were seen. The only previous Irish record for this curious and interesting fungus appears to be Monkstown, County Dublin (G. Pim in "British Association Guide to County Dublin, 1878.")

R. LLOYD PRAEGER.

Dublin.

Irish Carices.

The Pfarrer Kükenthal has recently examined some critical forms of Sedges which I collected in Ireland; they include the following:—

- Carex vulpina*, L., var. *litoralis*, Nolte.—Shore of Strangford Lough.
C. caryophyllea Later., forma *umbrosaeformis*, Kükent.—Glen Cahir, Co. Clare. It is the var. *elatior*, Bogenhard, Fl. Jena, p. 378, 1850, under *C. praecox*, and unreported previously from Britain.
C. Oederi, Retz, forma *canaliculata*, Callme.—Toome Bridge, Co. Antrim, by the sides of the lough. Also a new form for the United Kingdom.
C. Goodenowii, Gay, var. *tornata* (Fries).—Near Newton, Co. Galway. New to Ireland.
C. Goodenowii, Gay, ad var. *strictiformis*, Kük. vergens.—Toome Bridge, Co. Antrim.
C. flava × *Oederi*.—Shore of Lough Derg, near Rossmore, Co. Galway.
C. arenaria, Huds., forma *remota*, Marss.—Wicklow.
C. extensa, Good., var. *latifolia*, Boeck. = var. *Ecklonii*, Kükent.—Shore of Strangford Lough.

High-street, Oxford.

G. CLARIDGE DRUCE

ZOOLOGY.

The American Facies of the British and Irish Fauna.

I have been reading with much interest Mr. Southern's recent paper on British Oligochaeta (*Proc. R.I. Acad.*, vol. xxvii.), especially his examination of their distribution with a view to "find out whether they fall into the usual geographical groups which are believed to constitute our native fauna. These are four in number:—(1) North American, (2) Northern and Alpine, (3) Lusitanian, (4) Germanic."

It may be well to state that in my studies of British Mammals I can find no evidence for any former land connection *via* the Atlantic such as could have been available for the passage of the ancestors of our present mammalian fauna. On the contrary, all the evidence goes strongly to indicate that for mammals the connection between America and Eurasia has been *via* Bering's Straits and in, geologically speaking, recent times. My view would be that such mammals as have a discontinuous distribution, including Britain or Western Europe and America, must have been at one time inhabitants of intervening areas across Asia, from which they have since retired. This type of discontinuous distribution is not so frequent in mammals as in other groups. It is well illustrated by the Pikas, or tailless Hares, whose area of distribution extends from South-eastern Europe to the Rocky Mountains, with fossil representatives in the Tertiaries of Europe. The steps between the status of these animals and the Pygmy Shrew, an animal now found (with slight alterations of form) from Ireland to America are probably represented by the Reindeer, and the group of Varying Hares, which had formerly a similar area of distribution, from which they have now, however, in part retired. I do not necessarily contend that the same reasoning should be applied to the lower members of our fauna, and to those plants often styled the American group, but I suggest that the wind rather blows in that direction. I hope to return to this matter at greater length in my book on British Mammals now in course of preparation.

G. E. H. BARRETT-HAMILTON.

Kilmanock House, Campile, Co. Wexford.

Recent Records of Irish Birds.

CROSSBILL (*Loxia curvirostra*). Nest with four eggs "in County Wicklow," on June 9.—R. Hamilton-Hunter. Several flocks about Dublin—W. J. Williams. Two individuals, at Maam Cross, in August—P. W. Bahr. All in *British Birds* for October.

NIGHTJAR (*Caprimulgus europæus*). Nest with one egg, in County Waterford, May.—R. Hamilton-Hunter, *British Birds*, October.

MONTAGU'S HARRIER (*Circus cineraceus*). Adult male shot at Rathdrum, County Wicklow, August 27; immature male captured on Lambay, August 16.—W. J. Williams, in *British Birds*, October.

RUFF (*Machetes pugnax*). A female shot near Ballycorick, County Mayo, August 30.—R. Warren, in *Zoologist*, October.

Notes on Recent Irish Birds.

An adult and female Osprey was seen on Lough Erne for some days, and eventually shot by a gamekeeper's son on the 4th October, while perched on a dead tree near Castle Archdale, Irvinestown. A Great Skua was shot near Portrush, Co. Antrim, on October 24th after a gale from the north-east. Bird was a male in adult plumage. A Snowy Owl (male) was shot near Ennis, Co. Clare, on November 1st. A Grey Phalarope was found dead at Kilbeggan, Co. Westmeath, and another was killed at Arran Lighthouse against lantern November 15th. A third was shot at Tramore, Co. Waterford, October 27th. A Ruff (male) in adult plumage was shot in Bog of the Ring, Balbriggan, on November 18th. A Glossy Ibis was caught in a trap near Banagher November 15th. The bird was in beautiful adult plumage, and the body fat. A Sabine's Snipe, very dark variety, was shot near New Ross, Co. Wexford, on November 19th.

W. J. WILLIAMS.

Rathgar, Dublin.

Invasion of Crossbills.

The irruption of Crossbills into the British Isles last summer was remarkably widespread, extending from the North of Scotland to the South of England, and westwards to Galway in Ireland. Many were seen in this district in July and early August.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

Jays in Ulster.

About the beginning of the nineteenth century Jays were still to be found near Shane's Castle and elsewhere near Lough Neagh (Dubourdieu). Mr. Thompson in the middle of the century knew of none in the North of Ireland.

Jays have of late years been extending their range, and have since 1901 been repeatedly obtained near Navan. Mr. S. Scroope found a nest on 6th June, 1909, in a tall fir that stood in a wooded demesne in that part of Meath. It was about 40 feet from the ground, and 10 feet out on a branch from the trunk of the tree; it contained three newly-hatched young and an addled egg, which Mr. Scroope obtained.

The further spread of Jays into Southern Ulster is evidenced by one sent to Messrs. Williams and Son from Maguire's Bridge, Co. Fermanagh, on the 7th November, 1906; while Major Hamilton, of Castle Hamilton, Killeshandra, Co. Cavan, writes to me on 13th November, 1909.—'For the first time Jays have appeared in the county. One was shot to-day and I have sent it up to Williams.'

These birds are so shy and fond of hiding in thick woods that they may be established in a place for some time before they attract notice.

R. J. USSHER.

Cappagh, Co. Waterford.

Late Swallows.

During the dry, frosty weather in November, after the thermometer outside my window had registered 29° at night, I saw an immature Swallow flying about in the afternoon sunshine. close to this house on 23rd November. I have made several notes of Swallows seen by me in November, but this is the latest, though one was sent to Mr. W. J. Williams which was shot in Co. Dublin on the 8th December, 1908, and Lieutenant-Colonel Hardy noticed in the *Field* three seen near Queens-town on 1st December, 1879.

R. J. USSHER.

Cappagh, Co. Waterford.

Sparrows chasing Pigeons.

I have on several occasions seen sparrows pursuing the domestic pigeons which fly about the neighbourhood of Rathmines, and have never been able to discover the cause. The pigeon was seen to fly hastily from the ground where it had been feeding and coil round and dodge its pursuer several times, till it eventually rested on some neighbouring roof. The sparrow alighted close by, and finally flew away not unfrequently with feathers in its bill. At first I was led to the conclusion that feathers were wanted for nesting, but as it occurs at all times of the year I think nothing can be attributed to it but the pugnacity of the sparrow.

NORMAN E. STEPHENS.

Rathmines-road, Dublin.

Ring-dove feeding on Ivy Berries.

When driving from Greyabbey to Newtownards I observed a Ring-dove feeding upon Ivy berries. So voraciously was it eating them that it allowed us to pass it within easy reach of the jarvey's whip. I have come across no record of its eating this fruit, so the fact may be worth noting.

HUGH L. ORR.

Belfast.

GEOLOGY**Mineral Vein in Carboniferous Limestone at Cloghran.**

Some few months ago I visited a quarry situated about a mile south of Cloghran, and found an exceptionally good mineral vein. Small crystals of quartz were freely developed, and in some cases showed the prism terminated at both ends by pyramid (rhombohedral) faces. Larger crystals were rarer; one had a diameter of almost 2 ins. Calcite crystals showing the prism capped by rhombohedral planes also occurred, along with traces of malachite and copper pyrites, whilst on a heap of freshly-broken stones I found a piece of barytes.

I. SWAIN.

University College, Cork.

THE BIRDS OF INCH AND UPPER LOUGH SWILLY.

BY D. C. CAMPBELL, M.B.O.U.

LOUGH SWILLY with its varied shores, wooded and heather-clad, encircling its clear waters, has a fascination for the nature lover. To the naturalist, and especially to the ornithologist, it offers a wide field for observation and research. The district of Inch and Upper Lough Swilly is very rich in bird life. The woods at Burt and Rathmullan, the rocky headlands of the island and the great stretches of slobland with a large expanse of fresh water, bordered here and there with reeds and sedges, provide suitable haunts for many species. The island of Inch is about seven miles in circumference and rises to about 700 feet in the centre.

During many years I visited the district from time to time, and watched the ever-changing phases of bird life, and I received many specimens for identification, some of which proved to be rare and interesting species. That the following lines may not be a mere list of names I add a few observations which I have made from time to time on the different species.

The Missel-Thrush (*Turdus viscivorus*, Linn.), Song-Thrush (*T. musicus*, Linn.), and Blackbird (*T. merula*, Linn.) are common. The Missel-Thrush is locally called the Butcher-bird. I found a nest of this species in a most unusual situation, viz., on the ground on a slight ledge overhung by earth and rock on the bank of a stream. Suitable nesting trees were not far off. I have noted Song-Thrushes coming in numbers to the shore of Lough Swilly during severe frost and picking the winkles from the rocks and breaking them as they do snails. The Ring-Ouzel (*T. torquatus*, Linn.) visits the rough ground on the higher parts of the island, but is rare. Large numbers of Fieldfare (*T. pilaris*, Linn.) and Redwing (*T. iliacus*, Linn.) spend the winter in the district. In April, just before leaving, the warbling of the Redwings—recalling to me the rippling music of a mountain brook—almost, if not quite, approaches a song.

The Wheatear (*Saxicola ananthe*, Linn.) arrives during the first week of April, but I have a note of its having been seen at Kilcar, West Donegal, on 29th March, 1909, surely a very early date for N.W. of Ireland! I have noted that in my opinion the spring song of the Wheatear much resembles the

early song of the Whitethroat. I have only one record of the Whinchat (*Pratincola rubetra*, Linn.). A nest was found by my friends, Mr. Samuel Bryson and Mr. Thomas Gibson in May, 1891 (*I. N.*, vol. iii., page 185). The Stonechat (*P. rubicola*, Linn.) is very common. I have seen this species frequenting the shore during frost and seeking its food among the rejectamenta left by the tide. The Robin (*Erithacus rubecula*, Linn.) calls for much observation. I only mention that I heard a young bird in the nestling plumage singing in the late summer.

The Chiffchaff (*Phylloscopus rufus*, Bech.) is the first warbler to reach us. I once heard the note on 26th March, but the usual date is 1st to 4th April. The Willow-Wren (*P. trochilus*, Linn.) follows a few days later. I invariably heard the first Chiffchaff singing from the same high trees and the first notes of the Willow-Wren were from the same sallows year after year. Does not this point to the *same* birds returning to the old haunts? The Wood-Wren (*P. sibilatrix*, Bech.) was found by Mr. Hart at Carrablagh, and was observed by me at Derry last May. The Whitethroat (*Sylvia cinerea*, Bech.) arrives about middle of April. These three species are called White Wrens in this district.

The Sedge-Warbler (*Acrocephalus phragmitis*, Bech.) is common on the banks of the Inch stream. The Grasshopper-Warbler (*Locustella naevia*, Boddaert) has occurred some five miles from Inch and two miles from Derry. My friend, Mr. Bryson, described a song which he heard near Inch which I am confident was of this species. The Goldcrest (*Regulus cristatus*, Koch) and Hedge-Sparrow (*Accentor modularis*, Linn.) are common. I have heard three Hedge-Sparrows singing along a hedge not more than ten to fifteen yards apart and seemingly answering one another.

The Dipper (*Cinclus aquaticus*, Bech.) frequents the stream at Inch. It is called in some districts the Waterhen. I have only heard the song in September.

The Great Tit (*Parus major*, Linn.), Coal-Tit (*P. ater*, Linn.), and Blue Tit (*P. caeruleus*, Linn.) are all common. The Long-tailed Tit (*Acredula caudata*, Linn.) occurs in the woods, and during autumn and winter may be seen in flocks of eight to ten. I have never seen a better example of protective colour-

ing than a nest of this species shown to me by Mr. W. E. Hart, which was built of grey lichen among raspberry canes. The lichen exactly matched the under sides of the raspberry leaves.

The Wren (*Troglodytes parvulus*, Koch.) is of course common. I have noted the great variety of materials used by the Wren in the construction of its nest according to the situation and natural surroundings. I once found a nest built against a brown wall of partially withered ivy, into which a great quantity of brown human hair had been interwoven. A brother workman had performed the part of barber for a ploughman close by!

The Creeper (*Certhia familiaris*, Linn.) is common in the woods, the local name is the "Woodpecker." I have only heard the song once in April.

The Pied Wagtail (*Motacilla lugubris*, Temminck) is very common. The Grey Wagtail (*M. melanope*, Linn.) occurs in small numbers. In my experience the Pied Wagtail sings but rarely and then usually in the *off* season. I have heard its song in January, July, September and October, sometimes when the weather was far from fine. I have found a nest of this species built in an old magpie's nest on the top of a high beech tree.

The Meadow-Pipit (*Anthus pratensis*, Linn.) and Rock Pipit (*A. obscurus*, Latham) are common. I have one record of the Waxwing (*Ampelis garrulus*, Linn.) from Inch district. A fine specimen was shot by Mr. A. Hutchman on 4th December, 1901. The Spotted Flycatcher (*Muscicapa grisola*, Linn.) is common.

The earliest record I have for the Swallow (*Hirundo rustica*, Linn.) is 2nd April, the latest about 16th April. I have seen the Swallows on a warm afternoon alighting in numbers on the mud left bare by the tide, and feeding on the flies which swarmed over the steaming sea-grass. The Martin (*Chelidon urbica*, Linn.) is local, but visits the district. I have noticed that the Martins spread over the country and mix with the Swallows for a short time before they all leave in autumn. I have seen them so in localities where never one was seen at other times. The Sand-Martin (*Cotile riparia*, Linn.) used to breed in numbers in the sand-bank at Inch station. Then they practically deserted the spot, only one pair nesting in

1894. Then they returned and built in another bank close at hand. But of late years they have almost deserted the locality. It is hard to explain these erratic movements, as the banks are almost unchanged. At Magilligan, Lough Foyle, I found the Sand-Martins nesting singly for miles along the shore in holes about 50 to 100 yards apart. I had the pleasure of seeing the Swallow, Martin, Sand-Martin and Swift all flying together at same time and place at Inch.

The Finches are represented by the usual species. The Greenfinch (*Ligurinus chloris*, Linn.), Chaffinch (*Fringilla cœlebs*, Linn.), and House-Sparrow (*Passer domesticus*, Linn.) are of course very common.

The Goldfinch (*Carduelis elegans*, Stephens) used to visit Inch in some numbers, but has almost disappeared. Of the Hawfinch (*Coccothraustes vulgaris*, Pallas) I have one record, and a most interesting one regarding the date. A fine specimen was shot by Mr. T. Motherwell at Garsherry, a few miles from Inch, on 5th July, 1901 (*I. N.*, vol. x., p. 174). It was feeding on cherries in the garden. This species was reported to me as nesting near Derry in 1907, but I could never authenticate the record. The Brambling (*Fringilla montifringilla*, Linn.) visits the district in winter. The Siskin (*Chrysomitris spinus*, Linn.) is seen in winter, and has been reported by Mr. H. C. Hart as breeding near Rathmullan.

The Linnet (*Acanthis cannabina*, Linn.), called the "Whin Grey," is common, also the Lesser Redpoll (*A. rufescens*, Vieillot), which is called "Mossy Grey" or "Mosey Grey." The Twite (*A. flavirostris*, Linn.) nests on the moorlands, probably all over the district. It is called locally the "Thistle Grey" or "Thristle Grey." The Bullfinch (*Pyrrhula europæa*, Vieillot) is not common. It is an increasing species, however, in some localities. I have seen three nests within a very small radius—two of them only some 10 to 15 yards apart.

The Corn-Bunting (*Emberiza miliaria*, Linn.), the Yellow Bunting (*E. citrinella*, Linn.), and the Reed-Bunting (*E. schenckii*, Linn.), are all common. The two former visit our city in winter and feed upon the grain about the quays and markets. The Reed-Bunting is called the "Blackcap." The local name in some parts of Co. Antrim is "Ringrash" (= Ringrush). The Snow Bunting (*Plectrophenax nivalis*, Linn.) visits the moors and mountains in winter. A flock frequented

the shores of Lough Swilly one winter, and was seen at Buncrana.

The Starling (*Sturnus vulgaris*, Linn.) has increased very much of late years. I can remember thirty-five years ago when a Starling's nest was a great prize—now the Starlings breed commonly and in numbers all over the district.

On 9th June, 1899, Mr. John Hunter shot a Rosy Pastor (*Pastor roseus*, Linn.) between Bridge End and Inch. It was an adult female in fine plumage. It had frequented the neighbourhood for some days, and was much chased by other birds.

The Chough (*Pyrrhocorax graculus*, Linn.), although a coast bird, occasionally comes up the Swilly, and has been seen near Rathmullan. I have the following note on this species. The sons of Mr. P. Johnston climbed over the cliffs near Dunfanaghy and brought up two young birds from a Chough's nest. Their father was much annoyed, and made the boys take back the birds and leave them on the top of the cliffs. Much to his surprise the parent birds managed to convey the young ones down to the nest.

The Magpie (*Pica rustica*, Scopoli), Jackdaw (*Corvus monedula*, Linn.), and Rook (*C. frugilegus*, Linn.), are very common: the Hooded Crow (*C. cornix*, Linn.) is fairly so.

The Skylark (*Alauda arvensis*, Linn.) is very abundant and his exuberant song may be heard from July to August. I have frequently noted the period of song while on the wing and found the average time to be from 2½ to 5 minutes, exceptionally 5 to 7 minutes, and very rarely up to 10 minutes.

The Picarine group is represented by five species. The Swift (*Cypselus apus*, Linn.) arrives with wonderful regularity usually from 5th to 10th May. I have noticed that often one or two birds precede the main body. These pioneers seem to wander, as they may frequent a place for a day at time and then disappear. The Nightjar (*Caprimulgus europæus*, Linn.) visits different parts of Donegal, and has been shot at Portsalon and heard at Fahan. It has been reported to me from Burtwoods, Inch. One of the rarest birds found at Inch was the Roller (*Coracias garrulus*, Linn.); one was shot by Mr. John M'Connell on Burt slob in October, 1891. It frequented a field of beans in stooks—but I should think it was searching for beetles rather than beans. Another Roller was shot by Mr. T. Steen at Ture, Co. Donegal, on 27th September, 1900 (*I.N.*, vol. x, p. 23). It frequented the neighbourhood for some days and was

thought to be an escaped parrot. The former specimen is in our Derry Museum, the latter in Dublin Museum.

The Kingfisher (*Alcedo ispida*, Linn.) occasionally visits the fresh water at Inch, and has bred during some seasons in holes at the sluices. It has also been seen at the pier, Bunrana.

The Cuckoo (*Cuculus canorus*, Linn.) is common. The belief still exists here that "she changes into a hawk in winter."

Among the birds of prey, we have the three Owls—the Long-eared Owl (*Asio otus*, Linn.) is common; the Short-eared Owl (*A. accipitrinus*, Pallas) has been shot once when flying over the Bank at Inch. The Barn Owl (*Strix flammea*, Linn.) is not very common.

The Peregrine (*Falco peregrinus*, Tunstall) visits the district regularly. It is called the "big hawk" or "the hawk." A Peregrine visited our city in June, 1892, and took up its abode in the tower of the Guild-hall from which it emerged from time to time to seize a passing pigeon. It was an escaped bird, for when I examined it on capture I found a small piece of leather attached to one leg. The Kestrel (*F. tinnunculus*, Linn.) is very common; the Merlin (*F. acesalon*, Tunstall), rare. The Sparrow-Hawk (*Accipiter nisus*, Linn.) is the commonest bird of prey; it is very daring.

The Shag (*Phalacrocorax graculus*, Linn.) visits Lough Swilly, but I have never noted it as far up as Inch. The Cormorant (*P. carbo*, Linn.) is much in evidence. I have noted it often roosting in numbers on trees. Its marvellous powers of digestion were exemplified to me by one kept as a pet by a friend. When fish failed, my friend shot about a dozen sparrows, which the cormorant swallowed with gusto. The Gannet (*Sula bassana*, Linn.) visits the Swilly in some numbers, and comes well up the lough. I have seen a flock fishing so close to the shore that the birds were diving almost into the surf. 16

The Heron (*Ardea cinerea*, Linn.) is common, and nests in some numbers at Fahan and Fort Stewart. My friend, Mr. W. F. Hart, has noticed how persistently the Hooded Crows persecute the Herons at Kilderry by attacking them when they come to their nests with food for the young, and compelling them to disgorge. The crows carried this so far in some cases that the young Herons were practically starved, and the parents in consequence changed their nesting-place. The Bittern (*Botaurus stellaris*, Linn.) has occurred once. One was shot by Mr. D. Deeny on 10th January, 1900.

The large expanse of fresh water with great ground growth of weeds provides a fine feeding resort for the Anatidae. Swans, Geese, and Ducks abound. The Whooper (*Cygnus musicus*, Bechstein) is very rare. Bewick's Swan (*C. Bewicki*, Yarrell) is a common winter visitor, flocks coming in during severe weather. During a spell of hard frost in the winter of 1907 a Black Swan came with the Bewicks, and remained at Inch for a few weeks. The Mute Swan (*C. oïor*, Gmelin) has increased very much of late. Years ago a few birds frequented the fresh water at Inch. Year by year these increased until now up to 100 birds may be counted. Only two pairs nest at Inch, one pair on the Farland bank or island, and the other on a little grassy mound inside the Burt bank, and just beside the Letterkenny railway line. The great increase in Mute Swans is clearly due to an influx from other places. The wild geese are represented by five species. The Grey-lag (*Anser cinereus*, Meyer) is not common. The common wild goose is the White-fronted (*A. albifrons*, Scopoli). It visits the sloblands in large numbers in winter, and remains until late spring. I have seen a flock on 23rd May, and it has been reported to me even at later dates. These geese become very tame at Inch, and I have seen a flock feeding close to the railway line, not more than 70 to 80 yards from the passing train.

I had the pleasure of obtaining the first Irish specimen of the Pink-footed Goose (*A. brachyrhynchus*, Baillon) on 21st October, 1891. Passing the poulterers I noticed a wild goose lying on the counter. The legs looked pink, so I went in and examined the bird, and was delighted to see that I had found *A. brachyrhynchus*. The man told me that he had received the bird from a farmer from Newtowncunningham-side, a few miles from Inch. The Bernacle (*Bernicla leucopsis*, Bechstein) is not common. A few have been shot at long intervals. The Brent (*B. brenta*, Pallas) visits the salt water in large flocks. I have never known a Brent to alight on the fresh water, although it is only separated from their salt water resort by a narrow bank. It is very averse to fly over land. It has greatly decreased of late years on Lough Swilly.

The ducks are very numerous, and all the common species are found, but some kinds have decreased at Inch, it may be owing to the increase of shooting.

The Sheld-duck (*Tadorna cornuta*, Gmelin) breeds in large numbers now, in the holes in the stone embankments and in

rabbit burrows. It has increased much in recent years, not only here but on Lough Foyle as well. The taking of the young to the water must be an anxious time for the parents. I came across a case where a little nestling wandered and walked through the open doorway into the kitchen of a farmhouse. I witnessed a wonderful instance of the pluck and perseverance of the ducklings. I came upon a pair of Shelducks leading their brood to the sea. As I came up they were almost at the water's edge, and one of the old birds tossed and tumbled over on the sand to draw me away, while the other hurried the little ones on. But there was a sea on, and the surf rolled the wee birds over and over like balls up the sand. Again they tried and again they were rolled over, till first one and then another managed to get through the surf. After four or five tossings all got safely out. The Ruddy Sheld-duck (*T. casarca*, Linn.) visited Inch in some numbers in August, 1892, when this southern species came to Ireland. The Mallard (*Anas boscas*, Linn.) is common. I have noticed some strange nesting sites. It nests on low fir trees on the shores of Mulroy Bay, and I got eggs taken from a nest on the Magilligan sand-hills. A few specimens of the Gadwall (*A. strepera* Linn.) have been shot. The Shoveler (*Spatula clypeata*, Linn.) is a resident species, and breeds in increasing numbers. In the spring of 1905 fifteen nests were found on one slobland. Twelve to fifteen years ago it seemed to be decreasing. I have found nests on such bare ground that there was practically no cover, and yet by scraping out the ground and drawing over the short grass the bird managed to conceal the eggs fairly well. The local name is the "Spoonbill Wigeon" or "Whiteside." The Pintail (*Dafila acuta*, Linn.) is called the "Cran Wigeon." It is common, and visits Inch more in the late winter or early spring. The Teal (*Querquedula crecca*, Linn.) is a common resident species. Mr. A. Hutchman reported to me that on 20th October, 1896 he had shot a Garganey (*Q. circia*, Linn.) at Inch. Unfortunately he has not preserved it, but from his description and his confirmation from the coloured plate I think his identification was correct. The Wigeon (*Marcca penelope*, Linn.) is one of the commonest winter visitors, and very large numbers frequent the fresh water where there is a thick growth of weeds. The Pochard (*Fuligula ferina*, Linn.) locally called the "Redhead" or "Brownhead" is fairly common in winter. The Tufted Duck (*F. cristata*, Leach) is

not common. The Scaup (*F. marila*, Linn.) used to visit Inch in vast flocks, and frequented the salt as well as the fresh water, but of late years it has decreased greatly. It is locally called the "Black Wigeon." I have seen it at Inch in some numbers as late as the third week in May—a few, probably wounded birds, remain over the summer. The Golden-eye (*Clangula glaucion*, Linn.) is a winter visitor in some numbers. Of the Long-tailed Duck (*Harelda glacialis*, Linn.) I have noted a few occurrences of females or immature males. I have only seen one mature male. The Common Scoter (*Oedemia nigra*, Linn.) visits Lough Swilly, but I have never seen it as far up as Inch. I have only a note of one specimen of the Goosander (*Mergus merganser*, Linn.) shot at Inch by Mr. H. Leebody. The Red-breasted Merganser (*M. serrator*, Linn.) is common. I have not been able to find its nesting place, but I believe it breeds somewhere in the Lough Swilly district, as I have seen it in spring and summer. The beautiful little Smew (*M. albellus*) visits Lough Swilly, and I have seen a few specimens.

The Ring-Dove (*Columba palumbus*, Linn.) is common. The Rock-Dove (*C. livia*, Gmelin), visits Inch Island, and comes to feed on the stubbles. The Grouse (*Lagopus scoticus*, Latham) is found in small numbers in the district, and is plentiful on many of the surrounding moors.

The Pheasant (*Phasianus colchicus*, Linn.) occurs in the woods at Burt, Rathmullan, and has visited Inch Island. I once received, on 1st March, a clutch of twelve eggs taken on Inch Island, from a nest in the heather, surely an unusually early date.

The Partridge (*Perdix cinerea*, Latham), occurs, but is not common. The Quail (*Coturnix communis*, Bonnaterra) visited the district in some numbers in the influx of this species in 1893. For about ten years afterwards I heard nothing of it. Then it came back in 1903, and Mr. Gibson was informed of a nest at Grainan Hill, near Inch. Then again, in August, 1904, a nest with sixteen eggs was found in the same locality. I think, of late years, the Quail has been a regular visitor.

The Land-rail (*Crex pratensis*, Bechstein), is, of course, common. During the exceptionally cold spring of 1891, when there was little or no grass in the meadows, I found the Corncrake nesting in a shrubbery close to our house, and on 21st May, I found a nest in long grass, in semi-marshland beside the water.

Twice I have found the Corncrake in winter, once in December, and once on 3rd January. The Water-rail (*Rallus aquaticus*, Linn.) is not common, it used to breed in the marshes round Inch. The Waterhen (*Gallinula chlorepus*, Linn.), and Coot (*Fulica atra*, Linn.), are very abundant. An enormous number of Coots nest amongst the sedges. I have known over fifty nests to be found by boys in one stretch of under half a mile. I have one record of the Crane (*Grus communis*, Bechstein). A fine specimen was shot by Mr. John M'Connell on Burt slob on 24th June, 1896 (*Irish Naturalist*, vol. v., p. 214.)

The birds that attract most of our attention on the sloblands are the waders. They are in evidence at all seasons, and the sweet but plaintive calls of Plover and Sandpiper in the spring-time have a wonderful fascination. The Ringed Plover (*Ægialitis hiaticula*, Linn.), breeds on the shores, and in numbers on the Farland sandbank.

The Golden Plover (*Charadrius pluvialis*, Linn.), is common in winter. The Grey Plover (*Squatarola helvetica*, Linn.), is a winter visitor in small numbers. The Lapwing (*Vanellus vulgaris*, Bechstein), swarms on the sloblands in the breeding season. The Turnstone (*Strepsilas interpres*, Linn.), is a rare winter visitor.

The Oyster-catcher (*Hæmatopus ostralegus*, Linn.), is common on the Swilly, and a large flock is always to be seen on the shore by the golf course. The Grey Phalarope (*Phalaropus fulicarius*, Linn.), was shot at Inch during the visit of this species in October, 1891, and Mr. John M'Connell shot a specimen on 26th October, 1894. I have never seen one since.

The Woodcock (*Scolopax rusticula*, Linn.), is a common winter visitor, and a few pairs breed in the Rathmullan woods.

The Common Snipe (*Gallinago caelestis*, Frenzel), breeds in small numbers. The "bleating" may be heard in spring to great advantage from the high banks at Inch. The Jack Snipe (*G. gallinula*, Linn.), is fairly common in winter.

The Dunlin (*Tringa alpina*, Linn.), is, to me, one of the most interesting breeding species. At Inch it nests all over the bare slob-lands. The nest is usually nearer the water than the nests of the Lapwing and Redshank, and made in a

small depression, in the midst or by the side of a small tussock of grass. During the breeding season, the birds are very tame, and will allow one to approach to within a few yards. But I never found them very near the nest or flying round, and showing great anxiety like the Lapwing and Redshank, before incubation commenced. When the young are hatched, the conduct of the parents is entirely different. Then they become even bolder and more heedless of danger than the Redshanks. In June, 1903, when I was searching for a brood of young, one of the old birds alighted some way off, and walked right up to within five or six yards of me, and then both birds flew, to and fro, a few yards overhead, and one (presumably the male), gave the peculiar breeding call, the beautiful clear, rippling whistle, which once recognised, can never be mistaken. This whistling call can be heard at Inch all through the nesting season. I have been struck by the fact that it is very hard to localise the exact spot from which the call comes; one can only judge of the direction. I have frequently observed flocks of from twelve to twenty Dunlins at Inch in May. They appeared to be in full breeding plumage, but unlike the nesting pairs, were very wild, and would never admit of a near approach. I have often wondered how it was that these birds at Inch were not nesting.

The Little Stint (*T. minuta*, Geisler), has occurred once at Inch—a pair were shot at Inch by Mr. John Hime, in the winter of 1890.

The Curlew Sandpiper (*T. subarquata*, G \ddot{u} ldenst \ddot{a} dt), has been reported to me from L. Swilly, but I have never seen a specimen. The Purple Sandpiper (*T. striata*, Linn.), and the Sanderling (*Calidris arenaria*, Linn.), both occur on the coast, and I have seen them from time to time. I am confident that they visit Lough Swilly, although I have not yet seen them. The Knot (*T. canutus*, Linn.) is a fairly common winter visitor. A pair of Knots, in full breeding plumage, visited Portsalon, Lough Swilly, in 1898, and one was obtained by Mr. H. Williams (on 13th August).

The Ruff (*Machetes pugnax*, Linn.), occasionally visits Inch. I have seen four or five specimens, shot usually at end of September or in October, mostly females, but one male (1892). I have one record of a male in breeding plumage, received by Mr. E. M'Court, in April.

The Common Sandpiper (*Totanus hypoleucus*, Linn.) is a common summer visitor to the mountain streams around Lough Swilly. I have only once seen it at Inch. The Redshank (*T. calidris*, Linn.) breeds abundantly on the slob-lands. It leaves its winter haunts along the shores during the first or second week of April, and about a fortnight later the nest may be found, and very hard it is to find, although the old birds betray its presence by dashing overhead, and uttering their pleading alarm notes, "tu-hu, hu-hu." From this cry the bird receives here its name "Tu-hu," or rather "Big Tu-hu," the Dunlin, or Ringed Plover, being called the "Wee Tu-hu."

The Greenshank (*T. canescens*, Gmelin), is a rare winter visitor, or touches on passage in early spring. The Bar-tailed Godwit (*Limosa lapponica*, Linn.) is common in spring and autumn, and a few remain during winter. Of the Black-tailed Godwit (*L. belgica*, Gmelin), I have two or three records. The Curlew (*Numenius arquata*, Linn.) is present in great numbers, except during the breeding time. I saw a pure white Curlew shot on the Foyle on 12th November, 1901. The Whimbrel (*N. phaeopus*, Linn.), calls in numbers during May and September.

Of the Black Tern (*Hydrochelidon nigra*, Linn.) I have one record. Mr. H. Williams shot an immature bird at Inch about 1890. The Common Terns (*Sterna fluviatilis*, Naumann) are much in evidence on Lough Swilly from middle of May until October. They nest in large numbers on the Farland sandbank in the freshwater at Inch. In a year of flood, as in 1907, their nests have all been submerged, and the eggs washed away or into the sand-holes. Then, when the water subsided, I have seen new nests made higher up upon the grass, and built more substantially than the first ones. But one year even these second nests were swept away. The Lesser Tern (*S. minuta*, Linn.) also breeds in small numbers on this sandbank, the only case I know of this species nesting by fresh water. All the common species of gulls are found. The Blackheaded Gull (*Larus ridibundus*, Linn.) is very abundant; a pair nested among the Terns in the grass on the Farland sandbank in June, 1907. The Great Black-backed Gull (*L. marinus*, Linn.) also nested on this sandbank. In the first week of June, 1894, Mr. John M'Connell found a nest with three eggs in the grass in the centre of

the island. The Great Black-back frequents Inch during the shooting season to prey upon the wounded birds, but I never knew of it to remain, except on this occasion, during the breeding season. It was interesting to find a nest on a low sandbank, surrounded by fresh water, and some seventeen miles from the open sea. The Lesser Black-backed Gull (*L. fuscus*, Linn.) is common, so is the Herring Gull (*L. argentatus*, Gmelin). On 24th May, 1897, I saw a Lesser Black-backed Gull diving into the waves from some height, just like a Gannet. I have a note of a Herring Gull living in semi-captivity for 27 years. It went off for some time every year in the breeding season, but always returned when the important duties of this time were over. The bird is still living.

The Common Gull (*L. canus*, Linn.) is fairly common. On 17th January, 1892, I saw a Common Gull dive down and pick a large living eel (about 14 inches long) from the water near the shore. It carried it some way in its bill, and tried to swallow it, but failed. However, it held on to its capture. An immature Herring Gull took in the situation from some distance, and coming up, seized the eel from the other bird, and carried it off.

I have one reported record of the Glaucous Gull (*L. glaucus* Fabricius). On 3rd November, 1896, Constable Johnston, R.I.C., told me of his sergeant shooting a large gull at Linsfort, Lough Swilly, which he sent through a friend to the Glasgow Museum. He got a letter from the Museum saying it was a Glaucous Gull. The Kittiwake (*Rissa tridactyla*, Linn.) is fairly common, and comes up the lough as far as Rathmullan.

The Arctic Skua (*Stercorarius crepidatus*, Gmelin) has been seen at Inch by Dr. H. Leebody, and by Mr. H. Williams on 9th September, 1892. The Razor-bill (*Alca torda*, Linn.) and Guillemot (*Uria troile*, Linn.) are common. The Black Guillemot (*U. grylle*, Linn.) is not common in the lough. The Puffin (*Fratercula arctica*, Linn.) is fairly common on Lough Swilly.

The Great Northern Diver (*Colymbus glacialis*, Linn.) is a fairly common winter visitor. Of the Black-throated Diver (*C. arcticus*, Linn.) I have one record. Dr. Henry shot a mature bird on 7th November, 1892.

The Red-throated Diver (*C. septentrionalis*, Linn.) is common in winter, and has been seen once by Dr. Leebody and

once by myself in summer. It is called locally the "Norman cock." The Great-crested Grebe (*Podiceps cristatus*, Linn.) is not common—specimens are shot from time to time in winter. I found this species breeding at Portlough, County Donegal, a few miles from Inch, and about five miles from Derry. I saw two pairs on the little lough. Of the Red-necked Grebe (*P. griseigena*, Boddaert), I have one record. Mr. John Bond shot one at Lough Swilly in 1875. It is now in our City Museum. The Slavonian Grebe (*P. auritus*, Linn.) is a common winter visitor, and sometimes remains over summer. Dr. Leebody saw a pair in full breeding plumage at Inch in May, and on 14th June, 1893. I received a bird in the same plumage from Lough Foyle. The Little Grebe (*P. fluviatilis*, Tunstall) is common.

The Manx Shearwater (*Puffinus anglorum*, Temminck) is common on the coast, but I have never known it to come far up the lough.

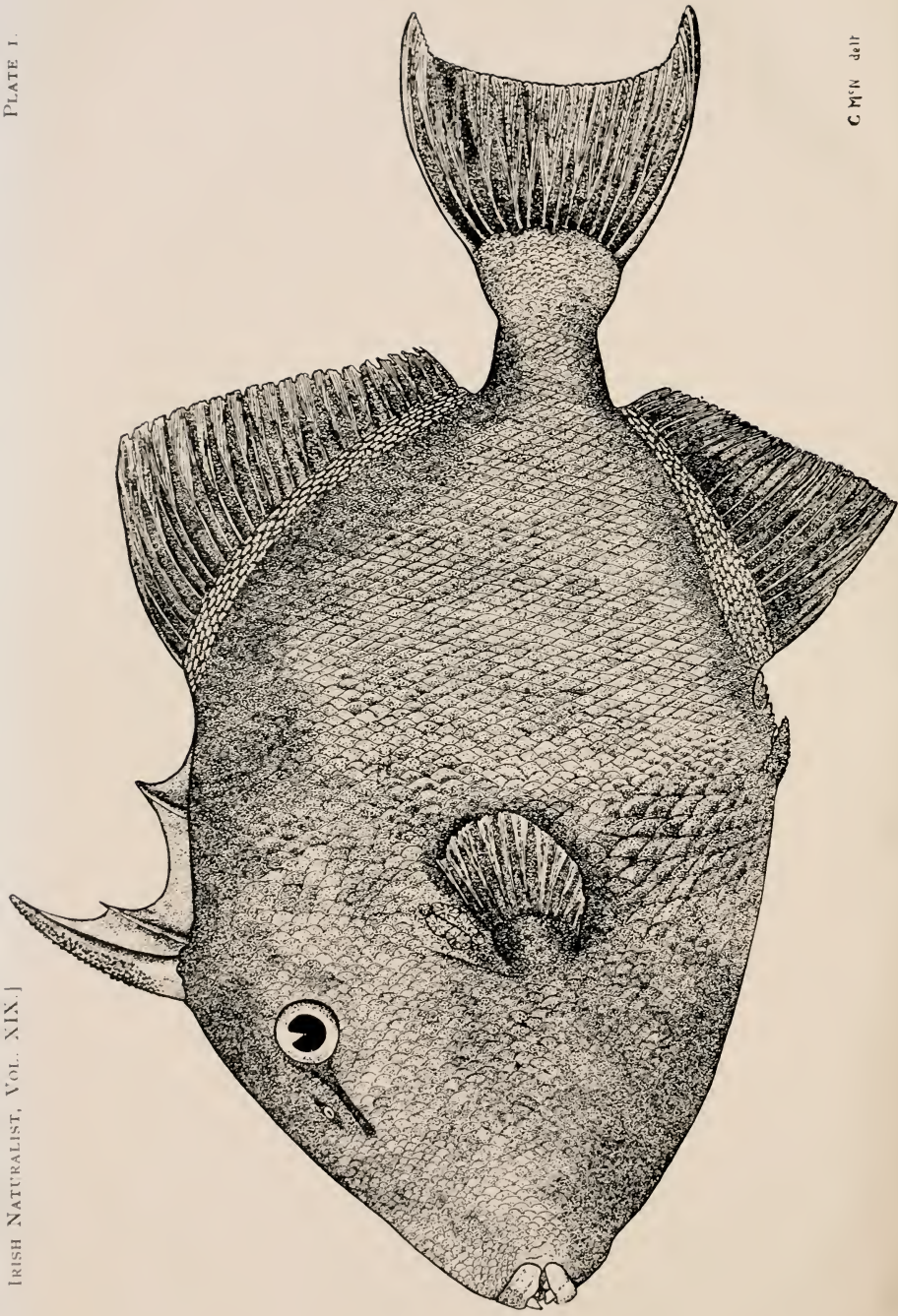
The Fork-tailed Petrel (*Oceanodroma leucorhoa*, Vieillot) visited us in some numbers in October, 1891. On 28th September one was found dead in a garden at Buncrana evidently blown in by storm, others were found and seen about our city. The Stormy Petrel (*Procellaria pelagica*, Linn.) has visited Lough Swilly. The last record I have is of one shot by Mr. A. Bond at Inch, on 25th September, 1899. This species breeds on Tory Island and around the Donegal coast.

Templemore Park, Londonderry.

NEWS GLEANINGS.

Natural Science in the National University.

The foundation of the National University of Ireland has resulted in increased facilities for the study of natural history. At University College, Dublin, H. J. Seymour has been appointed to the newly founded professorship of Geology, and J. Bayley Butler to the lectureship in Botany. At University College, Cork, Major H. J. Cummins and I. Swain have been appointed respectively to the new chairs of Botany and Geology, Prof. M. M. Hartog of the old Queen's College, taking that of Zoology.



THE PILE-FISH (*Balistes capriscus*),
Courtmaesherry, Co. Cork.

[To face page 29.]

C. M'N del.

$\frac{2}{3}$ Natural Size.

THE FILE-FISH IN IRISH WATERS.

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

[PLATE I.]

A specimen of this fish (*Balistes capriscus*) was taken in a trawl near the entrance of Courtmacsherry Bay, Co. Cork, in 8 fathoms of water, and sent to the Irish National Museum by Mr. J. Driscoll of Courtmacsherry. Having on several occasions captured rare kinds of fish for the Museum, he knew that this was something quite out of the common and despatched it without delay, on the 24th of September last, to Dublin.

The sketch (Plate 1) of the fish, by Miss McNab, shows clearly its distinguishing features, namely, the small mouth and powerful teeth, the thick plate-like scales, and the peculiar spine in front of the first dorsal fin. The second much shorter spine has the power of locking or fixing the first in position, thus acting as a trigger. This has given rise to the name of "Trigger-fish" a term often employed for this species. The name "File-fish" is derived from the roughness of the front surface of the large spine, a feature which will be readily noticed in the annexed plate. The strong teeth suggest a carnivorous habit, and indeed the File-fish is a shallow-water species living chiefly on shells which it nibbles off the rocks and crushes with its powerful jaws.

The species figured seems to be identical with the American so-called "Leather-jacket" (*Balistes carolinensis*), which is so common on the coasts of some of the southern United States. It is less abundant in the Mediterranean, and the question arises if this Irish File-fish is a stray visitor from a Mediterranean or from an American stock.

Only once before has this fish been noticed on the Irish coast, namely, in 1853, by Prof. Melville, near Galway; and that specimen I believe is no longer in existence. Our present fish measures about 9 inches in length. The colour had unfortunately entirely faded when it reached me. It is generally of an olive-grey tinge. During life there are vividly blue and violet spots about the head, the first dorsal fin being bluish, and the second yellow, spotted with blue. These brilliant colours quickly disappear after death.

NOTES ON NEW IRISH BEETLES.

BY J. N. HALBERT, M.R.I.A.

During a collecting trip to the Lough Neagh district, organised by the Royal Irish Academy Fauna and Flora Committee, in the summer of 1902, I found a few specimens of a small black-banded *Cryptophagus*, which was evidently different from any of the species of this genus known to occur in Ireland. These specimens remained unidentified until quite recently, when I found time to compare them with types and descriptions of the European species. It was then apparent that the insect is to be referred to *Cryptophagus bimaculatus*, Panz., a species which is unrecorded from the Britannic area. It will be remembered that there are already three beetles recorded from the Lough Neagh district which are quite unknown elsewhere in the British Isles, these are the ground-beetles *Dyschirius obscurus* and *Bembidium argenteolum*, and the rove-beetle *Stenus palposus*. The addition, therefore, of a fourth species would seem to indicate that the entomological treasures of this most interesting district are not yet exhausted.

CRYPTOPHAGUS BIMACULATUS, Panz.

Cryptophagus bimaculatus is a small species, the largest of the Lough Neagh specimens measuring about 2 mm. in length. The general colour of mature specimens is reddish brown, rather shining, with an ill-defined black band across the wing-cases; in most specimens this band is interrupted towards the suture, causing the spotted appearance which has evidently suggested the name of the insect. Viewed under a high magnification the fore-body is seen to be deeply and closely punctured. The thorax is about double as broad as long, strongly and regularly serrated along the side margins, where there is no trace of the conspicuously larger tooth, situated near the middle, which is such a constant character in this genus. Indeed the absence of a larger projecting tooth, combined with the banding of the elytra, are sufficient to distinguish *C. bimaculatus* from all of the known British species of *Cryptophagus*.

My specimens were captured by sweeping amongst large beds of rushes on the shore of Lough Neagh bordering the

Shane's Castle demesne. At the time (June) only a few were secured, but my friend, the late Mr. C. W. Buckle, who was an enthusiastic and successful collector, made a special search for the insect and succeeded in capturing a small series between the months of June and September.

According to Ganglbaur, *Cryptophagus bimaculatus* is a rare species, occurring in northern and central Europe, and Heyden records it from Siberia.

It seems desirable to record here the following Lough Neagh insects, as they are additions to the known beetle-fauna of Ireland. *Homolota picipes*, Thoms., Shane's Castle (July), two specimens taken by Mr. Buckle. *Homolota gemina*, Er., I found this species commonly at Portmore Lough in August by sweeping reeds. I am indebted to Dr. David Sharp for kindly verifying the identification of these two species. *Stenus incrassatus*, Er., Shane's Castle. *Stenus nigritulus*, Gyll., a few specimens of this distinct species were found under flood refuse, and by sweeping reeds at Shane's Castle. *Phyllotreta vittula*, Redt., a single specimen, a little larger than the typical form, occurred at Shane's Castle. *Ceuthorrhynchus arcuatus*, Herbst., captured by sweeping vegetation on the banks of a stream flowing into the lake at the Shane's Castle shore. This species is said to be very rare in Great Britain; Canon Fowler mentions comparatively few localities, ranging from Surrey to Yorkshire.

The following insects were deleted from the Irish list in 1902 on account of the erroneous identification of the specimens from which the records were made; they must now be reinstated, as they undoubtedly occur in the Shane's Castle district:—*Cercyon minutus*, Muls., *Conosoma pedicularium*, Grav., common amongst gravel, etc., on the shore; and *Atomaria gutta*, Steph., the last species occurred abundantly on reeds in the same locality as *Cryptophagus bimaculatus*.

THAMIARÆA HOSPITA, Mark.

This interesting little rove-beetle was discovered for the first time in Ireland last year (February) in the borings made by a fine colony of Goat Moth caterpillars (*Cossus ligniperda*) infesting an old decaying oak tree in the Lucan demesne. Several kinds of beetles are known to occur in trees that have

been attacked by *Cossus*, though this seems to be the first characteristic *Cossus* guest recorded from Ireland. The present species has been found in many south of England localities, and abroad it is said to be widely spread in central Europe. Though usually found in company with *Cossus*, it is, according to Ganglbauer ("Die Käfer von Mitteleuropa", iii.), occasionally associated with one of the ants (*Lasius fuliginosus*) a species which commonly nests in old trees and posts.

BARYPEITHES PYRENAEUS, Seidl.

Mr. R. Gordon recently brought for identification a small brownish weevil which he found during September, 1908, amongst grass on the banks of the River Tolka near Finglas. The specimen was recognised as belonging to the genus *Barypeithes* but it is somewhat injured, and evaded first attempts at specific identification. Eventually it was forwarded to M. Louis Bedel of Paris, who reports that he is convinced that the "*Barypeithes* est un male de *Barypeithes pyrenaicus* (Seidl.), espèce qui se trouve dans ses Pyrénées, en Normandie, et en Grande Bretagne" he further remarks "votre spécimen est petit, décoloré et très usé (probablement trouvé mort?)."

The insect occurred with a number of other species, and as its rarity was unsuspected, no special note was made at the time of capture. It is likely, however, that M. Bedel's surmise as to the condition in which it was found is correct. It is to be hoped that fresh examples in good preservation will soon be forthcoming from the same locality, and as a hint to collectors it may be as well to point out that in England this insect has been found at the roots of grass, in faggots, under bark, and by beating hawthorn.

This species seems to be very local; the only localities in which it has been hitherto found are the Pyrenees, Normandy, and the Plymouth district in Great Britain. In the last locality it was discovered by Mr. Keys as long ago as 1888, though not definitely recorded as a British species until 1897 (*Entom. Monthly Mag.*, xxxiii.)

Mr. Gordon is to be congratulated on his discovery of this interesting insect in Ireland. The known range indicates that it is a south-western form, and it probably must be referred to the small group of Lusitanian animals that are being gradually brought to light in this country.

LIMNOBARIS PILISTRIATA, Steph.

Mr. G. C. Champion has recently pointed out that there are two species of *Limnobaris* in Great Britain, and at the same time recorded the structural characters by which they may be separated (*Entom. Monthly Mag.*, xli. 1905). A comparison of the available Irish specimens of this genus shows that they are all to be referred to *Limnobaris pilistriata*, Steph., and not to *L. T-album* which they were formerly supposed to represent. Amongst other characters the present species may be recognised by its larger size and more elongate shape, the irregular punctuation of the wing-cases, and the evidently coarser pubescence. *L. pilistriata* is widely spread in Ireland, having been found in the Counties of Antrim, Down, Armagh, Mayo, Galway, Westmeath, King's County, Wexford, Clare, Limerick, Waterford, Cork and Kerry. It is recorded from various localities in England, and seems of more local occurrence there than *L. T-album*. According to Reitter it is found in northern and western Europe.

National Museum, Dublin.

NOTES.

ZOOLOGY.

Stork at Tuam.

A common White Stork was seen by me flying over just outside Tuam on December 19 last. It was a solitary specimen going S.E., and flying low. I do not remember ever seeing one of these birds by itself before; they are common in Rhodesia (and in other parts of Africa) at certain seasons of the year, usually in flocks 20 to 50, but sometimes in immense numbers, and go by the name of "Large Locust Bird." They are very fond of hanging about the towns.

J. FFOLLIOTT DARLING.

Tuam.

Jays in Ireland.

With regard to the comparatively recent increase of Jays in Ireland (*supra*, p. 13), it may be worthy of remembrance that Jays were introduced to parts of the S.E. of Scotland some years ago, and I understand have

increased in numbers since. I think the more minute particulars of introduction there may be obtainable from Mr. Robert Sewill, or Mr. F. W. Gladstone, or from Sir Herbert Maxwell. It might be desirable to place all such facts in chronological procession.

Larbert, N.B.

J. A. HARVIE-BROWN.

The Jay in Ulster.

Mr. R. J. Ussher in his interesting notes on "Jays in Ulster" (*supra*, p. 13), remarks that "Mr. Thompson in the middle of the [nineteenth] century knew of none in the North of Ireland." In reference to this, a vivid recollection of my childhood may perhaps be permitted. It was, I think, about the year 1853, that a Jay appeared in our garden and remained through part of the autumn, feasting on the ripe pears. It was bold and pugnacious, allowing no other birds to come near the fruit, except the little Titmice, which might be seen clinging to and boring into the pears. No one, however, thought of grudging the fruit.

W. E. HART.

Kilderry, Co. Donegal.

Crossbills in Donegal.

On the last day of December, my daughters brought in an account of certain birds, new to them, that they had seen; which, from their description, could evidently be nothing else than Crossbills; a conjecture, I have now had the satisfaction of verifying; having been able to watch them for a considerable time, so near that, with the binocular, the peculiar form of the mandibles was quite distinguishable. It was amusing sometimes to see one of the little creatures clip off a twig with a larch-cone attached, and fly with it to a more convenient perch.

W. E. HART.

Kilderry, Co. Donegal.

Kingfisher in Co. Dublin.

On December 30 and 31, I saw a Kingfisher (*Alcedo ispida*, Linn) on the Dodder between Rathfarnham Road and Orwell Road. In Ussher's "Birds of Ireland" it is mentioned as a scarce bird, so I thought it worth recording.

NORMAN E. STEPHENS.

79, Rathmines Road, Dublin.

[The presence of Kingfishers in this locality is well known to several Dublin Naturalists. We hope that our readers will protect these interesting birds so near the City.—EDS.]

Phoca vitulina off Co Wicklow.

I saw a full-grown specimen of the dark variety of this seal at Greystones last July. It appeared several times on the rocks during the day till finally hunted away by the report of a gun.

NORMAN E. STEPHENS.

Rathmines-road, Dublin.

GEOLOGY.

Caves in Co. Cork.

In the *Journal* of the Cork Historical and Archæological Society, vol. xv., no. 182 (April-June, 1909), Mr. R. W. Evans describes a brief visit to the limestone caverns of Carrigacrump and Cloyne, which are still almost unexplored.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Patas Monkey, from Miss F. C. Tate; a Macaque, from Mr. P. G. Shilston; an Otter, from Mr. T. M'Dermott; a Hedgehog, from Mr. Doyle; two Hairy Armadillos from Sir Charles Ball; two Grey Finches, from Capt. J. W. H. Seppings; a Blue and Yellow Macaw, from Mrs. Scudamore; some Irish song-birds, from Mr. G. St. C. Feilden; a Mallard and duck, from Rev. Canon Brandon; a Sparrow-hawk, from Mr. P. Higgins; and an Indian Python, from Miss Odette.

Another Patas Monkey, and a Pied Wagtail have been purchased, while a Martial Hawk-Eagle has been deposited in the Gardens.

DUBLIN MICROSCOPICAL CLUB.

DECEMBER 8.—The Club met at Leinster House. Dr. G. H. PETHYBRIDGE (President) exhibited the parasitic fungus *Rhizoctonia violacea*, Tul. The ravages which this fungus is capable of producing have been the subject of study since 1728. It attacks a variety of plants, but is perhaps best known as a serious enemy of the saffron-producing crocus and of Lucerne. It frequently attacks garden vegetables such as seakale, carrots, and also potatoes. Berkeley stated in 1879 that the disease caused by it is known to gardeners in England as "coppery web." The specimen exhibited was parasitic on potato tubers from Co. Roscommon, and that the disease must be fairly common in that district follows from the fact that potatoes affected with it are said locally to be suffering from "moss burning." The life history of the fungus is very imperfectly known, but it is apparently closely related to a fungus extremely common on the potato, which in Ireland at least seems to cause but little damage, namely, *Rhizoctonia solani*, Tul. During recent years it has been shown that this last-named fungus is really a *Corticium*, and it has been named *Corticium vagum* B. et. C., var. *solani*, Burt. Saccardo and others following him conclude that the two species are identical, but it is doubtful if this is correct. The present exhibit showed clearly the "miliary bodies" (possibly haustoria) characteristic of *R. violacea*, but not present in *R. solani*, and the characteristic sclerotia of *R. solani* were entirely absent in the exhibited specimen of *R. violacea*. This fungus does not appear to have been recorded before as occurring in Ireland.

G. P. FARRAN showed specimens of the copepod *Copilia quadrata* from Christmas Island, Indian Ocean, to demonstrate the remarkable development of the eyes and the extreme sexual dimorphism found in that genus.

R. SOUTHERN exhibited specimens of the Eel-worm, *Rhabditis brassicae*, Southern, recently described in the *Journal of Economic Biology*, 1909, vol. iv., pt. 3, p. 91. The worms were found in decayed turnips from Co. Westmeath. The remarkable structure of the hermaphrodite gland of the female was pointed out. This species will also feed on potato tubers if the epidermis is injured.

BELFAST NATURALISTS' FIELD CLUB.

DECEMBER 15.—GEOLOGICAL SECTION.—JOSEPH WRIGHT, F.G.S. lectured on Foraminifera. He described the structure and position in the animal kingdom of this group of Protozoa, and afterwards summarized his researches into their glacial and post-glacial distribution in the British Islands.

IRISH FIELD CLUB UNION.

ACCOUNTS, 1909.

RECEIPTS.		EXPENSES.	
	£ s. d.		£ s. d.
To Balance,	. 11 17 3	I. Swain, Lecture in Cork and Limerick,	. 2 9 11
Affiliation Fees—		R. Ll. Praeger, Lecture in Belfast,	. 1 11 9
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Audited and found correct.		J. DE W. HINCH,	

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

CORRESPONDENCE.

M.A.—We do not answer anonymous communications. If you will address us in your own name, we shall be happy to help you so far as we can.—EDS.

CAVE-HUNTING.

BY R. J. USSHER, D.L., J.P., M.R.I.A.

Presidential Address delivered before the Dublin Naturalists' Field Club, 18th January, 1910.

It will not be necessary to explain to this meeting of Irish naturalists that the interest and importance of cave-hunting (or cave exploration) centres not in the cavities themselves, but in the investigation of the records they hold for us of ages of which we have little other trace. Within the last century a vast number of caves have been explored in many lands, and the work has been found to repay the greatest care, and has become an art in itself, perfected by the labours of many years of men like Pengelly; so that these ancient storehouses of information have been largely examined. In Ireland, however, we are behind-hand, for though our country contains such vast extents of limestone with innumerable caves, systematic work has only been done in five or six localities, and the country at large (especially the great central plain) is almost untouched by the cave-explorer.

I would therefore bring before the Field Club, which has done such varied and excellent work in many branches, this special field of research of such engrossing interest and importance, and in which any member may help by prospecting for caves, and this may lead to more exhaustive work. The earth-stopper employed by a hunt-committee was my guide in 1878 to my first bone-cave at Ballynamindra, Co. Waterford, and wherever limestone is quarried the workmen ought to be enlisted to look out for caves and fossils. I am not of course speaking of those artificial souterrains so common in raths which were constructed by the ancient Irish, nor of caves in sandstone and other rocks such as are excavated by the sea. It is in limestone, so soluble by water, that we find those valuable cavities which may prove to be storehouses of relics for the zoologist and antiquary. Every limestone district is more or less pierced by subterranean channels, through many of which streams still flow, while elsewhere the ancient river-tunnels were long ago left high and dry when the water found a lower level. In these we find the beds of sand, gravel, or hardened mud deposited by streams and floods that once flowed there, and surface-earth intruded through fissures in the roof

becomes spread out and mixed with the river-borne sediments. Thus we find that caves contain very different strata, indicating the changed conditions of bygone ages.

Floors of stalagmite formed by the drip from the limestone roof, not only sheet over the other deposits, but seal them up and preserve them from disturbance, and in some cases a sheet of stalagmite intervening between beds of other materials, supplies a valuable land-mark.

Thus the contents of a cave supply several chapters in the history, each of which is illustrated by the bones and other relics it contains. The uppermost bed contains the most modern objects, and the deeper we go the more ancient will be the cave fauna, unless where burrowing animals have disturbed the strata. It is therefore of the first importance that indiscriminate rooting-up should be avoided, and that the several strata should be distinguished, constant notes, drawings and measurements taken, and all objects found in one bed kept separate from those in the next, with labels and other safeguards against confusing them.

The best illustration I can give is Kent's Cavern in Devonshire, so carefully worked by Mr. Pengelly for 14 years. He strained a wire from front to back of the principal chamber, and measured all the distances to right or left or below this. He took out the contents in cubes, and assigned to the objects found in each a separate box labelled with its position.

Upon the surface were found masses of limestone, blocks fallen from the roof; between and under these a blackish mould formed of leaves and other rubbish blown in during centuries. In this were found bones of domestic animals and of wild animals that are not extinct, with a great variety of human relics going back to Roman times and earlier. This stratum told of the historic period, and is computed to represent 2,000 years at least. Beneath it was a floor of granular stalagmite, that had in places attained a thickness of five feet. Beneath this was a light red cave-earth, the sediment of ancient floods, and in this were the relics of the Pleistocene fauna—the Mammoth, Rhinoceros, Lion, Hyæna, Irish Elk, and Reindeer, but no domestic animals.

With these extinct animals were associated the beautifully-formed spear-heads made from flint flakes by Palæolithic men, whose hearth-place, a bed of charcoal, was strewn with the chips of flint. We are brought face to face with the home life

of men who hunted the Mammoth and Rhinoceros in England, and who had to make large fires in the cave to keep out the Hyænas, Lions, and perhaps the Machairodus, whose teeth occurred in the cave-earth.

Beneath this was another stalagmite floor, crystalline from its antiquity, and attaining in places as much as twelve feet in thickness. Below this again was a different deposit, a dark red sandy paste, but of rock-like hardness in places, composed of sandstone that had been drifted in from distant hills before the deep valley in front of the cave had been cut out. This rock-breccia, as it was called, contained multitudes of bones of the great Cave-Bear, but no others except two jaws of Lion and a jaw of Fox. Of Hyænas and Mammoths there was no trace, yet even in this deepest deposit primæval men had left flint weapons formed of massive cores, showing that they had not arrived at the high art of fashioning spear-heads out of flakes.

Of Irish bone caves the first two discovered were in Co. Waterford. At Shandon, near Dungarvan, was an enormous cavern. In 1859 some workmen found there, as they thought, a lot of mutton bones, and threw them aside, but when they came to the tibia of a Mammoth they showed it as the bone of an Irish giant. The late Mr. Brennan, to whom we owe our knowledge of the discovery, went to see where it had been found, and succeeded in finding many more bones of Mammoth, Bear, Horse, and Reindeer. The most abundant were those of the Reindeer. These bones are in the National Museum. In 1875 I found Professor Leith Adams continuing the researches in Shandon Cave, on which he published a report in the *Transactions of the Royal Irish Academy*.¹

He incited me to look out for similar caves, and in 1879, in company with him, I started work at a small cave south of the Cappagh station at Ballynamindra. It was nearly filled up with deposits, only six inches deep of an orifice being visible at first. We found uppermost, a dark brown earth containing the yellow broken bones of domestic animals and man; with these were charcoal, hand-made pottery, bone implements, an amber bead and a polished stone celt. In the grey earth beneath this, which formed the second stratum, many bones and portions of antlers of Irish Elk. These were split, and

¹ *Proc. R. Dublin Soc.*, 1859. *Nat. Hist. Rev.*, 1859. *Trans. R. I. Acad.*, vol. xxvi., 1876.

the ends of the marrow-bones broken off, as used to be done by all ancient peoples to the bones of Ox and other large animals. In the same stratum was much burned wood, the charcoal forming a layer in one place, also sea shells and hammer-stones chipped by repeated blows. These facts all point to the cave having been the retreat of the men who hunted and ate the Irish Elk. Under the grey earth was a floor of crystalline stalagmite, which in one place was 3 ft. 6 in. thick; and under this again, reposing on a floor of gravel or embedded in the stalagmite, were the jaws, teeth and bones of a huge species of Bear, and some bones of Reindeer.

The Ballynamintra Cave, therefore, though a small one, gives testimony to three ages; the Neolithic men left relics in the brown earth on top, the elk-hunters in the grey earth, and before the crystalline stalagmite was deposited the Grisly Bear lived on the gravel floor left by a subterranean river. The collections of objects found occupy a separate case in our Museum of Natural History.¹ In 1898 Mr. Plunkett of Enniskillen described to the British Association the finding in a Co. Fermanagh cave of a Bear's skull, which is also in the Museum.²

In 1901, accompanied by Dr. Scharff and Mr. Coffey, I worked a cave in Keshcorran Mountain, Co. Sligo, one of thirteen which penetrate a range of cliffs about 300 feet above the mountain's base. There were two distinct strata; the uppermost, like that at Ballynamintra, contained bones of domestic animals and man, a polished stone celt, a bronze-ringed pin, part of a little iron saw, and a large bone needle and comb. But it also contained a metatarsus of Reindeer, beneath which charcoal was found, and this seems fair proof that the Reindeer had been brought in for food by man. The second stratum yielded many bones of Brown Bear and of the Arctic Lemming, an animal first found in Ireland by Dr. Scharff, who, while we were digging at the mouth of one of the caves, stooped down and exclaimed: "This place is a mass of little bones." This species of Lemming is not now found nearer than Greenland. Some remains of Wolf were found in both strata, as well as those of Red Deer.³

¹ *Proc. R. I. Acad.* (2), vol. ii., 1881 (abstract). *Sci. Trans. R. Dubl. Soc.*, vol. i., 1881 (full Report).

² *Brit. Assocn. Report*, 1898, p. 885.

³ *Trans. R. I. Acad.*, vol. xxxii., B, pt. iv., 1903.

In 1902 we commenced the digging out of a series of caves at Edenvale and New Hall, in Co. Clare. These occupied me for three summers, and the number of bones and teeth sent up from them were estimated by Dr. Scharff at 70,000. Here again were two strata which had unfortunately been much mixed by the digging of Badgers, but in the upper one we found numerous human bones, with those of domestic animals and charcoal, and relics of many ages, from the flint scrapers and delicately pointed bone implements to the gold bracelet, objects of bronze and iron, plated buckle and band of bronze. A stone lamp, blackened internally by smoke of the wick, had been used by the cave dwellers.

Bones of extinct animals were most abundant in the second or lower bed, but were by no means confined to it, and the cut and roasted bones of Bear, and a canine of that animal rudely cut across, showed that this animal had survived until hunted by man. The Arctic Lemming left remains in both strata, some of them looking fresh. Of Irish Elk and Reindeer (as well as Red Deer) great numbers of bones were found, sometimes broken as if by man, and from these caves Dr. Scharff has recognised the jaws of a large Wild Cat and of Arctic Fox, both of them new to Ireland. Among the remains of birds of many species were some of Crane, said to have been common in Ireland in the twelfth century, and also two bones of Great Spotted Woodpecker, and a large mandible of Hawfinch. These seem to have been members of the ancient fauna, though now rare and accidental stragglers. Elaborate reports on these caves have been published.¹

In 1904 the Mammoth Cave near Doneraile in North Cork became the scene of our labours, and it has proved to be by far the most important bone-cave in Ireland yet discovered. From it during five summers I have sent to the National Museum 86 baskets of fossil bones. These represent an earlier period than we know from the other caves I have referred to, except that of Shandon, and man and his domestic animals were practically absent. This cave system consisted of long, deep, narrow galleries worn along main joints by the solution of water. These had coalesced in places, forming large halls. Floors of crystalline stalagmite were frequent, sometimes covering the beds of sand and sometimes forming ceilings overhead, the materials on which they had been deposited

¹ *Trans. R. I. Acad.*, vol. xxxiii., B, pt. i., 1906.

having been washed away. There was practically one deposit, triturerated Old Red Sandstone carried by streams from the distant hills into the limestone tract.

There was one and the same mammalian fauna, the bones being often admirably preserved except where the carnivora had gnawed and broken them. The prevailing animal was the Reindeer, which must have inhabited the district in enormous numbers at a time before the Red Deer existed, as the latter, though so common in other caves, was not found here. Remains of Irish Elk occurred in several places, but were scarce. Mammoth bones, which I had never found before, occurred in all parts of the cave system, and they had plainly been brought in by the Bears and Hyænas, as the marks of gnawing on them were conspicuous. We found many remains of young Mammoths down to those of the youngest calves, and a fine series of young and old teeth. Of carnivora the Bear was most numerous, and, so far as we could discriminate by position, it was the more ancient, though found throughout. The Hyæna (first discovered here in Ireland) inhabited several of the galleries, left its prey and coprolites there, and in some cases died there at a good old age. The bones of Hyænas were not gnawed as those found in English caves were, probably from the abundance of other food. We found remains of Wolves, though not numerous, and also of Foxes, and of a very large description of Hare, which occurred among the very oldest finds. Of bones and teeth of Lemmings there were enormous numbers, which time did not permit us to exhaust, as the process of riddling sand for them was a special and tedious work. In this cave Dr. Scharff has recognised the Scandinavian as well as the Arctic Lemming. The absence of several mammals common elsewhere was remarkable. Besides the Red Deer, the Pig and the Badger were wanting, facts which seem significant of the antiquity of this fauna.¹ We hope to report fully ere long on these extensive finds.

A few words upon the methods of cave-work. It is not those caverns which are wide open, and contain abundance of loose wet earth, that are the most promising. Bone-caves are often choked up, almost to the roof, with successive deposits, and the entrance of the Mammoth Cave at first only afforded us access on our hands and knees. A cave that slopes inwards

¹ *Proc. R. I. Acad.*, vol. xxv., B, No. 1., 1904. *Irish Nat.*, vol. xv., 1904 pp. 237, 249.

is very laborious to work, as the materials must be carried up the slope. If level, they can be wheeled out in a barrow upon a line of planks, and the materials brought out should be carefully searched by daylight, if possible under shelter, as rain reduces them to mud. I found it an excellent plan to lay a couple of corn-sacks on the ground, like a carpet, and empty the barrow on these. When the clay or sand was searched the bags could be lifted, and the materials on them thrown out of the shed. Miners' picks were used, which have a point on one side only, as the second arm would hit against the cave-roof.

A datum-level should be marked on the walls with paint, and carried through all branches of the cave, and frequent sections should be made with measuring-rods, tape and plumb line, showing the strata before removal, the outline of the walls, and the position of any remarkable object. The first thing, after taking preliminary measurements of this sort, is to sink a trench across the mouth of the cave which need not be more than 4 feet deep. If more than one distinct stratum is met with it is best to work the first stratum out in each bench before disturbing the second; but if no such distinction can be made, the contents should be cut out in benches 4 feet deep from the surface, 2 feet from back to front and from side to side of the cave. The worker should be provided with candles, which he can stick anywhere in the clay (lamps are unmanageable). He should have a hand-basket beside him in which to place the relics, and a small bottle in his pocket for the smaller objects. Care should be taken when a bone is met with not to pull it out of the clay, but dig round and under it so as to save it entire, as fossils are very brittle. The person in charge should be notified when a new bench is begun, and then all the objects from the former bench should be placed in a separate bag, with a label indicating the stratum and their position in the cave. They should be allowed to dry, and carefully packed in boxes or covered baskets. Samples of the strata should be kept, and water-worn or glaciated stones should be preserved and labelled. When the contents are removed 4 feet deep, if the cave admits of it, a second series of excavations may be made of the same depth; and finally the rocky floor should be reached, at least in places, as the geological evidence is of the utmost importance even where animal remains are absent.

A FEW NOTES ON THE CAVE OF CLOYNE.

BY F. HYDE MABERLY, M.D.

THE Cave of Cloyne, while low and devoid of spectacular interest, merits more attention than has hitherto been paid it, on account of its extent, which is comparable to that of Mitchelstown Old Cave. Mitchelstown New Cave, according to the map published last year¹, is contained within a rectangular area of 400 by 300 yards. Mitchelstown Old Cave according to the same authority would be contained in an area of about 225 by 160 yards.

Cloyne Cave so far as the writer has been able to judge from an imperfect exploration, would require an area of about 200 by 200 yards to contain it, and may stretch for a greater distance.

The only reference to it I have come across is in Smith's History of Cork, 1893, p. 111. "At the end of the Garden," *i.e.*, the bishop's, "is what we call the Rock Shrubbery, a walk leading under young trees, among sequestered crags of limestone, which hang many feet above our heads, and ending at the mouth of a cave of unknown length and depth, branching to a great distance under the earth, and sanctified by a thousand wild traditions, and which I have no doubt, sheltered the first wild inhabitants of the town itself, 'Cluain' being the Irish name for a cave or place of retirement."

This account is by Dr. Bennett, Bishop of Cloyne, 1794-1820. The cave lies beneath a field, on the north side of the road which runs from Cloyne Round Tower, past the old bishop's garden, and about a quarter of a mile from the town.

The west side of the field is bounded by the garden wall, that next the road is bordered by an irregular row of trees, and contains some narrow openings, leading into low passages, which doubtless communicate with the remainder of the cave, but are too low to make it advisable to start an exploration from this spot, unless one has plenty of time on one's hands.

The north boundary is a hedge standing on a low limestone cliff.

Crossing the field from the road, one notices a blocked-up swallow-hole in the middle, one of several former entrances which have been carefully filled up; there are two smaller

¹ Hill, Brodrick, and Rule, *Proc. Royal Irish Academy*, vol. xxvii.

swallow-holes similarly filled up near it; consequently the present entrance must be sought for in the cliff before-mentioned, after passing down a wooded slope and crossing a low stone wall.

Some fifty yards west of this entrance, in front of the cliff before-mentioned, stands a limestone block, known as "The Headless Coach." Local tradition declares this to be an enchanted vehicle, which formerly, drawn by headless horses, and driven by an acephalic coachman, paid nightly and unwelcome visits to those houses in the town where a death was imminent, and returning to the cave was again turned into stone. Behind this rock is a very narrow entrance to one of the finest galleries in the cave, which also forms the most direct route to the "Altar," of which more hereafter.

That part of the cave visited was found to consist of a number of low roofed chambers, together with an apparent maze of connecting passages.

I say "apparent," because a short study shows that these have resulted from the widening of fissures in the limestone; these run at right angles to each other, consequently the maze really consists of a number of passages having an approximately N.N.E.-S.S.W., and E.S.E.-W.N.W. (magnetic) direction.

This fact when appreciated helps the explorer considerably, for when progress is barred, one can so to speak, turn down a side lane into the next street, and continue one's original direction.

Unfortunately from the sightseer's point of view the cave is disappointing; here are no lofty vaults, no glittering icicles or translucent veils of stalactite, no marble-like stalagmite shafts, but everything is covered with a dull pall of deposited mud, for Cloyne lies in a vailey, the gradient in the caves is very slight, and the winter floods stagnate for lengthened periods, the flood marks standing six feet high on the sides of the cave in places. No part of the cave visited seemed more than nine feet high.

The entrance, like those to so many of these caves, lies at the foot of a low limestone cliff, and looks like a large rabbit burrow; it slopes sharply down, and is so low that it must be passed by lying flat and "squirming" through; once past this point it is possible to stand upright, but another dozen paces reveal a hole, somewhat larger than a cycle wheel, and

about four feet from the ground, through which the explorer must pass.

One is now fairly in the cave ; to the west run a number of passages parallel with the face of the cliff ; one of them a few yards away contains a large opening correlated to the one we have just emerged from, by its shape, position, and aspect.

To the south the passages run in similar groups towards the road.

Progressing in this direction and referring occasionally to the compass, without which it is quite possible to execute an unintentional *volte face* while at the same time securing one's retreat by a ball of string, one sooner or later comes across one of the chambers, while a little further exploration will reveal the formation locally known as the "Altar."

From the wall of a low but roomy chamber projects a block of stalagmite-covered material, six feet high, and as many wide ; two short columns descend from the roof to the front of this shelf, while the back-ground and roof are adorned with wavy festoons of crystalline rock.

A little in front of this and standing about four feet high, is a fantastic block, which requires but little imagination in the dim light, to transform it into a seated lion with drooping head.

The "Altar" is near the largest swallow-hole visible in the field, and faces about north and south ; close to this chamber and to the west of it, is a straight passage nearly forty yards long, and opening to its west side into a network of low and narrow passages having no exit to the west ; there are many small sink-holes in the floor of these, which necessitate careful walking.

Travelling in a south and west direction from the "Altar," that is towards the road, the roots of trees are presently seen to protrude from the roof, and the rumble of vehicles overhead may be heard.

In several places hereabouts the rock is intersected by numerous vertical black and brittle laminae which strike east and west.

In the vicinity of the road, most of the southerly-trending passages become too low to permit of further exploration, or in summer end in pools of water, while in autumn when one is wading knee deep most of the time, the increasing

depth of water has probably barred further advance, long before this point was reached.

Returning to the "Altar" cave and working from it in a N.E. direction, one reaches another wide chamber, in which, however, one cannot stand upright; the roof is covered with short pipe-stem stalactites, and supported by a pillar-shaped mass somewhat like a font; from this, one of the passages parallel with the face of the cliff can be reached, which followed in a west direction crosses one's original track.

The gallery opposite the "Headless Coach" runs straight in for about thirty yards, from which point a passage can be picked in a S.E. direction to the "Altar Cave." I have not examined the entrance mentioned by Bishop Bennett in his garden.

Given plenty of time I think one might be able to work one's way from the openings by the road to the present entrance, a distance in a straight line of perhaps two hundred and fifty yards. In conclusion, I should like to thank Mr. Creed, owner of the ground for permission to explore, as well as Capt. the Hon. F. G. Hood, R.E., for assistance in doing so. A. W. Walton, son of the Cathedral sexton, has accompanied me through the Cave on several occasions.

Crosshaven, Co. Cork.

NOTES.

BOTANY.

Carex rostrata, var. *utriculata*.

Carex utriculata, Boott, in Hooker Fl. Bor. Amer., ii. (1840), p. 221.

C. rostrata, With. var. *utriculata*, Bailey in Proc. Am. Acad. Arts and Sciences, 1886, p. 67.

In "Mem. Torrey Bot. Club," i. (1889), p. 59, Prof. Bailey gives this sedge specific rank, saying that a study of much material, in field and herbarium, renders the differences between the European *C. rostrata* and this plant apparent. Dr. Britton, in "Man. Fl. Northern States and Canada," keeps it as a species. Boott figures it in his "Ill. Genus *Carex*," i., p. 14, t. 39 (1858), and specimens are in the herbarium at Kew.

Pf. Kükenthal in "Das Pflanzenreich"¹ ("Cyperaceæ, Caricoideæ," 1909), gives the Irish plant recorded in error as *C. rhynehophysa* as *C. rostrata* var. *utriculata* (Boott).

¹ See *Ann. Scott. Nat. Hist.*, January, 1910.

Bailey says, "from the European species *C. utriculata* is separated by grosser habit, lack of stoloniferous character, broader and proportionately shorter leaves, heavier and more scattered spikes, of which the lower are less peduncled, and much sharper scales" (*l.c.*). Bailey notes that Schkuhr in the index to his "Nachtrag," (1806) makes "*C. rostrata* Weith" a synonym of *C. ampullacea*. "Weith" is undoubtedly meant for "With."

In the United States *C. utriculata* occurs "In bogs entirely across the continent north of Ohio" (Bailey *l.c.*) In Canada, "A very common *Carex* in marshes and streams from the Atlantic to the Pacific" (Macoun "Cat. Canadian pl.," pt. 4 (1888), p. 171.

ARTHUR BENNETT.

Croydon.

Erica Mackaii (?) in Donegal.

I have received from Miss Lily Crofton, specimens of a Heath, which she found last summer growing in quantity on the shores of a lake near Gweedore. It most nearly approaches *E. Mackaii*, previously known only from a limited area in Connemara and in Northern Spain; but it differs from typical *Mackaii* in some important characters. Miss Knowles and I hope to investigate the plant's standing during the coming summer.

R. LLOYD PRAEGER.

Dublin.

ZOOLOGY.

Nyssia zonaria in Co. Mayo.

When on a visit at Bingham Castle last May, I observed this insect abundantly on the sandhills on Blacksod Bay, also on the Atlantic shore, and on sandhills on the adjoining coast.

THOMAS GREER.

Tullyhogue, Co. Tyrone.

Aculeate Hymenoptera at Poyntzpass.

I took specimens of the following species near Poyntzpass during last year:—*Salix exaltatus*, F., ♀, in a lane south of Poyntzpass with high sheltering banks. It seems a favourite locality for *Salix*, as I have taken *S. fuscus* there several times. This species does not seem to have been recorded from Ulster. *Pemphredon lethifer*, Shuck, ♀, taken at the end of July in my own grounds. I have also taken it at Coolmore. This species makes its nest in the stems of the bramble, and like others of the genus provisions them with Aphides. *Passaloeus corniger*, Shuck, ♀, taken in my own grounds in beginning of October. I was much puzzled about this species owing to the scantiness of the hairs upon it, but Mr. E. Saunders very kindly determined it for me. Like the preceding species it makes its nests in bramble stems, also in decaying wood. It does not appear to have been recorded from Ireland previously. *Halictus nitidiusculus*, Kirby, taken on the roadside a short distance from Poyntzpass; there was a small colony in a bank. As these Halicti are

somewhat difficult to separate I forwarded a specimen to Mr. E. Saunders who confirmed by determination. It appears to be a new record for Ulster.

W. F. JOHNSON.

Poyntzpass.

Carychium minimum near Limerick.

In the end of January while walking "cross-country" at Ballinacurra, near Limerick, I came across a deposit of drift of various kinds, and thinking that it might contain some shells I took home just one handful to examine at my leisure. On doing so, I found a few species represented, but *Carychium minimum* seemed to be rather plentiful, so much so that I started to count them, and from the one small parcel of drift, composed of leaves, grasses, and small twigs, &c., I obtained no less than 217 specimens. The drift had evidently come from an osier plantation which during a very high tide in the month, had been flooded from a stream which some few miles further on flows into the Shannon, and the water on going down had deposited the debris in pockets on the side of the plantation nearer to the stream. I intend to collect some more of this drift, and if any reader wishes some I will endeavour to supply on receipt of address.

HARRY FOGERTY.

Limerick.

Recent Bird Records.

BLACK-TAILED GODWIT (*Limosa belgica*). A small flock frequented Cork Harbour in December, 1908, and another flock was seen near Cork and Youghal in the following winter. Mr. Warren, who records these occurrences, adds some notes on Godwits in the Moy estuary (*Zoologist*, January, 1910).

CROSSBILL (*Loxia curvirostra*). One at Donaghadee last October (*British Birds*, December, 1909). One on coast of Connaught (*ibid.*, February 1910).

SISKIN (*Carduelis spinus*). Mr. R. Hamilton-Hunter records observations on several nesting pairs in north Wicklow (*ibid.*, November, 1909.) Rev. Allan Ellison supplements these notes with others (*ibid.*, February, 1910).

GREENLAND FALCON (*Falco candicans*). An immature male shot near Larne, in December, 1909, is recorded by W. C. Wright (*ibid.*, February, 1910).

GLOSSY IBIS (*Plegadis falcinellus*). W. C. Wright records an immature bird shot at Ballyfrenis near Donaghadee, last October (*ibid.*, February, 1910).

GEOLOGY.

A Parallel to the Submerged Cromleac of Rostellan, Co. Cork.

In the *Geological Magazine* for January, a photograph (plate iv.), appears of a submerged cromleac near Etel, Morbihan, resembling in its position the Rostellan cromleac, illustrated in *Irish Naturalist*, xvi. plate 32.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

JANUARY 25.—Annual meeting in the lecture theatre of the Royal Dublin Society, the President (Rt. Hon. JONATHAN HOGG, D.L.) in the chair. The Hon. Secretary (Dr. R. F. SCHARFF) read the Report of the Council for 1909. There were 185,758 admissions to the gardens, and the receipts amounted to £2 245, both figures being very similar to those for 1908. The receipts from new members, £840, show, however, a great increase.

A special appeal to the members was issued, asking them all to aid the Council in making the aims of the Society better known and in obtaining more subscribers to the Gardens and more members for the Society. The response to this appeal was splendid. Never in the history of the Society have so many new members joined, so that nearly £100 more than in any previous year was realised from this source of income.

In response to many representations on the part of members of the Society, it was decided to reduce the admission fee on Wednesdays to sixpence instead of one shilling. This accounts for a great increase in the sixpenny and threepenny takings during the year. Special facilities are also now given to members of the Society who are either heads of schools or large firms. They may obtain cheap tickets for their pupils or employés available on any day of the week.

The Society has sustained a great loss in the death of its past President, Prof. D. J. Cunningham. Only a few years ago the Council had to give expression to their regret for his departure from Dublin when he took up other duties in the University of Edinburgh. But, though far removed from the scene of his former activities, he never for a moment lost his keen interest in the welfare of our Zoological Gardens. The Council always felt that their past President and former Secretary followed every step in the gradual development and progress of the Society with the same attention and keen sympathy that he had displayed when still in Ireland. It is especially during the rebuilding of the old Lion House that the Council were vividly reminded of Professor Cunningham's devotion to the Zoological Gardens in connection with the beautiful "Roberts House," which was built largely after his own ideas as an adjunct to the old house, the latter being only now superseded.

On the 24th March, Canon Carmichael kindly gave a lecture on the subject of "Animals that I have known." Although no lantern slides were shown on this occasion, the lecture was a splendid success, being attended by crowds of visitors, including His Excellency the Lord Lieutenant. As before, the Council of the Royal Dublin Society lent their fine theatre for this lecture.

Instead of having Military Band Performances, the Constabulary Band played once, on June 12th, while a small ladies' orchestra performed on Saturday afternoons during the months of June, July, and August, on the Haughton House Balcony. This music seemed to be appreciated by the public.

Early in the year the Committee which had been charged by the City of Dublin Corporation to relieve the distress arising from want of employment, placed a number of the men free of charge at the disposal of the Council. Under Mr. F. W. Moore's direction, they repaired the existing walks, and constructed several new ones which had been urgently needed, so that the men were most useful in carrying out a piece of work which will eventually benefit the citizens of Dublin.

The rebuilding of the old Lion House was a great event in the history of the Gardens. The plans had been long and carefully considered by a special Committee, the whole system of new cages containing several entirely novel features. Every cage in the new house consists of two divisions, one of which is partly above the other and can be used when the first division requires cleaning or when an animal is shifted along to another den. Another improvement is one which has already been successfully tried in New York, and which the Committee, charged with the consideration of the plans wisely recommended to the Council for adoption. The difference between the heavy iron bars, which greatly obstruct the views of the Lions, Tigers, and Panthers, and the new steel wire fronts is a most striking one, and the members of the Press, who were invited on the 16th September, when the first section of the new house was opened, were loud in their praises of this innovation. The work, which is now completed, was carried out by the architects, Messrs. Batchelor and Hicks, of Dublin; an esteemed member of Council, Mr. C. J. M'Carthy, giving, wherever possible, the benefit of his advice. Minor alterations, repairs, and improvements were almost constantly made in other buildings. These included during the past year repairs to the Aquarium tanks, the Giraffe House, Monkey House, Nesbitt Aviary, the usual extensive painting, and some necessary drainage operations.

No new buildings, other than the Lion House, could be attempted, Even as it is, the Society was to some extent in debt at the end of the year. Many new schemes, however, have been mooted as desirable whenever funds are available. More cages for Birds are urgently wanted especially for those requiring heat; the Bears require better accommodation; the Reptiles and Amphibians want more room and more light. It has been suggested by some enthusiasts that these neglected creatures ought not to share a house with diving birds and fishes, but that they are of sufficient importance to possess a home of their own. In that case a new Aquarium would have to be built. This in itself would be a boon to the Gardens. The existing structure certainly cannot be said to be suitable for the purposes for which it was intended. Some think the Badgers and Foxes should have a proper ornamental enclosure, where they can be seen at all times. Others would spend money on laying out the far side of the lake with large runs for the Deer, and provide mud baths so that the Wild Boar might be seen wallowing in his element. An Ostrich House is considered by some as the greatest desideratum of all. It has often been spoken about. Finally, many members of the Council are agreed that an Hospital, where the sick can be tended, where newly arriving ruminant animals can be deposited during their state-imposed period of isolation, and where every new comer may remain fo

a few days' inspection, quarantine, or repose, is one of the most pressing needs of our Gardens. It is to be hoped that some benefactor will come forward and provide the funds to enable the Council to carry out one or more of these useful schemes. All of them are feasible. Money is all that is required to carry them out.

Very great difficulties had to be overcome in housing the stock during the building operations. The Lions and Lionesses had to be kept apart, with the result that fewer cubs were born than usual. In fact only two cubs were born, the offspring of Conn and Vesta, which occupy the outdoor den. This is the fourth occasion, therefore, on which cubs have been born and reared entirely in an unheated outdoor cage.

A splendid young Lioness was sent to the Zoological Gardens at Sydney in Australia, and a pair of cubs went to Rangoon in Burma. All these Irish-reared Lions reached their destination in excellent health and condition. In spite of the inconveniences arising from the causes alluded to, the number of Lions and Lionesses at present in the Gardens is only one less than last year. Altogether the Gardens possess nineteen Lions and Lionesses, of which fourteen are Irish-born animals. As the Society is now provided with special breeding dens, from the neighbourhood of which the public can be excluded, it is to be hoped that some of the other large carnivores may be induced to take advantage of these facilities by imitating the example which has been set them by the Lions.

Again three Puma cubs were born in the new outdoor Carnivore House. Two of these were females and one was a male. Among other births in the Gardens, a Zebu Bull and two Barbary Sheep, a Mongoose Lemur, Golden Agouti, a Canada Tree Porcupine, a Great Wallaroo, and several prairie Marmots are perhaps the most important.

As during the year 1908, so also in 1909 almost all available funds were reserved to defray the cost of the new Lion House. Still a few gaps among the animals had to be filled. The few necessary purchases made were two Coypus, one Hoolock Gibbon, a Sea Lion, several monkeys, and a number of Birds; while a young Lioness, as already stated, was exchanged with the Sydney Zoological Gardens for several different members of the Kangaroo tribe.

During the past year the Council have had to deplore a most serious loss in the sudden death of the young female Giraffe, which was so generously presented to the Society by General Sir Reginald Wingate in 1903, and which had always been in the best of health. Professor Mettam, who has acted for many years as the Society's prosector, reports that the death of the Giraffe was probably primarily due to an attack of colic. This caused the animal to throw herself violently about and she fractured her jaw during a fall.

Another valuable animal which was lost during the year was a young female Chimpanzee, popularly known as Jane, which was found to be suffering from a degeneration of the liver. A young Seal died from gastritis, and a male Rhea from tuberculosis, while two Kangaroos succumbed to a new disease which has not yet received a name. Almost all other deaths were due to natural causes. Some Birds and an Otter escaped from

the Gardens. On the other hand, many ducks and other birds reached the Zoological Gardens of their own free will, determined apparently to settle down there for good.

The Society's Bronze Medal for competitors under 18 years of age for the best set of pictures was awarded to Mr. S. M. Linden, on the recommendation of the Council's Photographic Committee.

The Honorary Officers and Council were elected, Dr. R. R. Leeper Prof. J. Wilson, and Mr. J. M. Colles being chosen to fill vacancies.

The cash account shows a balance of £2,057 at the commencement of the year, and of £762 at the close, but there are outstanding liabilities estimated at £6co. £2,360 have been expended on buildings and repairs during the year.

DUBLIN NATURALISTS' FIELD CLUB.

NOVEMBER 9. CONVERSAZIONE.—The Annual Conversazione was held in the Royal Irish Academy House. It was attended by a large number of members and visitors. A good series of natural history exhibits were on view during the evening, and included the following:—C. F. Ball, odoriferous plants. Miss S. Bernard—*Lycopodium annotinum*, from Langdale Pikes. J. Bayley-Butler—living Reptiles, Amphibia, etc.; microscopic exhibit. Botanical Division, Natural History Museum—Stereoscope, with views of tropical vegetation; *Lentinus lepideus* var. *hibernicus* (from Glasnevin). George H. Carpenter—Photographs and literature from the Darwinian Centenary Celebration at Cambridge. G. Caulfield—Autumn tints, berries, and miniature shrubbery. G. A. J. Cole—Casts of remains of primitive man and his relations. N. C. Igan—Various forms of *Senecio aibescens*. (See *Ir. Nat. and Journ. of Botany*, Dec. 1902). H. Gore Cuthbert—Irish insects. A. M. Dingwald—Water-colour sketches of hardy trees. H. W. Dunlop—Mounted seaweeds. Mrs. Espinasse—A fungus from Mauritius; cone from the silver-leaved tree, Cape of Good Hope. G. P. Farran and S. W. Kemp—New marine records for Ireland:—*Cyclosalpa vovgula*, *Porocidaris purpurata*, *Poranior-morpha vilesa*, *Psilasieropsis patagiatus*, *Mimaster Tizardi*. N. H. Foster—Maps to illustrate the distribution of woodlice in Ireland. R. Graham—Ornamental and berried shrubs. W. F. Gunn—Roots of sand-dune plants; experiment illustrating osmosis; parasitic fungi of fruit-trees; microscopic exhibit. J. N. Halbert, M.R.I.A.—Irish dragon-flies, from the National Museum. Thomas Harford—Spores of *Equisetum*. J. de W. Hinch—Specimens illustrating the geological history of the Burrow at Portrane. J. Stafford Johnson—Microscopic mounts, showing features of pond life. T. Johnson—*Rafflesia* from Java. J. N. Milne—Irish non-marine Mollusca. A. R. Nichols—Rare Irish Polyzoa. H. L. Orr—Maps showing geographical distribution of Irish wasps. George H. Pethy-bridge, Ph.D., B.Sc.—Photographs of botanical interest; potato-mites. J. Pollock—Foeti of *Lacerta vivipara*; fossils from quarry near Skerries. A. Roycroft—Carboniferous fossils from St. Doulagh's. R. F. Scharff—Skull and antlers of Reindeer from Ashbourne, Co. Meath; skull and antlers of Red Deer from Moate, Co. Westmeath; wall map of Irish Elk. H. J. Seymour—Geological exhibit. Thomas Smyth—Microscopic exhibit.

R. Southern, B.Sc.—New Irish marine worms. A. W. Stelfox—European examples of *Zonitida*; living specimens of *Helix nemoralis* var. *roseozonata* from Fermanagh, and *Helix hortensis* from Derry, collected Sept., 1908. Miss J. Stephens—Some Irish sponges. I. Swain, B.A.—Gnathobase of *Eurypterus* from Kiltorcan beds. R. J. Ussher, M.R.I.A.—Nests of British birds, chiefly from Ireland. Miss E. H. Wilson—The Bleeding Tooth Shell; bark cloth; thorns from African thorn bush, Uganda; Sahara palm lizard; Sahara sand fish; seed-pods of *Martynia* and *Brachychiton*. At 8.30 the chair was taken by the President, G. H. Pethybridge, Ph.D., who called on the Rev. W. S. GREEN, M.A., to deliver his lecture, "Scenes in the West of Ireland." The lecture was illustrated by numerous lantern slides, and dealt with the experiences of the lecturer during the course of his scientific work on the West Coast of Ireland.

JANUARY 15.—About 40 members and friends visited the Zoological Gardens, and under the conductorship of the Superintendent, Captain Arbuthnot, examined the many features of interest in the Gardens. The conductor pointed out how a number of sick animals, which had come to the Gardens, either from their homes or from other Zoological Gardens, had quite recovered owing to the great care bestowed on them.

JANUARY 18.—The annual business meeting of the Club was held in the Royal Irish Academy House, the President (George H. Pethybridge) in the chair.

The Hon. Secretary (J. Bayley Butler, M.A., M.B.), read the annual report for the year. A slight increase of membership was noted. Reference was made to some rare plants found during the summer excursions, notably—*Festuca uniglumis* and *Trifolium glomeratum* at Brittas Bay, and the exceedingly rare *Eriophorum latifolium* at Fassaroe. The Hon. Treasurer (H. Gore Cuthbert) then read his report, which showed the financial position of the Club to be much the same as last year. Both reports were adopted. The list of officers and committee members for 1910, as announced, was—President, R. J. Ussher, D.L., J.P., M.R.I.A.; Vice-President, W. F. Gunn; Hon. Treasurer, H. Gore Cuthbert; Hon. Secretaries, J. Stafford Johnson, B.A.; Alfred H. Toppin. Committee, C. F. Ball, J. Bayley Butler, M.A., M.B.; Prof. G. H. Carpenter, B.Sc.; Miss F. Elmes, M.A.; Miss Garner, J. de W. Hinch, Miss M. C. Knowles, C. B. Moffat, B.A.; George H. Pethybridge, Ph.D.; R. Ll. Praeger, B.A., B.E.; R. Southern, B.Sc.; Alex. Williams, R.H.A. Votes of thanks were passed to the outgoing officers, the Academy, and the Dublin Press.

On the termination of the business R. J. Ussher delivered his presidential address on "Cave Hunting," which was illustrated by many fine lantern slides, and dealt with several caves explored some years ago by the President himself, and the many interesting remains found therein. The address is published in our present issue.

FEBRUARY 5.—A visit was paid by the Club to Bray Head and Kilrudery, where, under the conductorship of Prof. G. A. J. Cole, M.R.I.A., a large number of interesting geological features were examined. Some recently uncovered rocks provided excellent examples of the action of ice on rocks, while in places the layers showing the deposition of sand and mud were seen to great advantage. The conductor dealt at great length on the formation of fissures in the rocks and the difficulties they presented to engineers when constructing water-works

FEBRUARY 8.—The fourth business meeting of the Club was held in the Royal Irish Academy house, the Vice-President (W. F. Gunn) in the chair. GEORGE RYCE, B.A., A.R.C.S., gave an interesting lecture on the mining and uses of Potash Salts. In the course of his lecture he exhibited many fine lantern slides, showing the machinery and methods of work in the potash mines of Germany, from which practically all the potash salts of the world are obtained. The lecturer also dealt very fully with the relation of potash salts to artificial manures, and showed the results of experiments carried out in Ireland on the subject of these manures. W. F. Gunn and H. W. D. Dunlop discussed the lecture with special reference to the value of artificial manures and the action of potash salts on cereals. George Ryce, B.A., was elected a member.

DUBLIN MICROSCOPICAL CLUB.

JANUARY 12.—The Club met at Leinster House. Dr. G. H. PETHYBRIDGE (President) exhibited the parasitic fungus *Colletotrichum Lindemuthianum* Briosi et Cavara, growing on bean pods. These had been obtained in the autumn of 1909, from a fruiterer's shop in Dublin, and were doubtless grown in this country. The fungus has not been hitherto definitely recorded for Ireland though enquiry showed that it has apparently been noticed occasionally. It is very prevalent in some parts of the United States of America and to such an extent that in some cases beans cannot be successfully grown. Considerable work has been done on the disease produced by it especially at the Cornell University Agricultural Experiment Station but no satisfactory method of combating it has yet been discovered. It is interesting as being one of the few cases in which a fungoid disease is transmitted from one season to the next by means of the seed, and when once a crop is infected with the disease it is practically impossible to secure healthy seed from it.

J. N. HALBERT exhibited a new British beetle *Cryptophagus bimaculatus*, Panz. It occurs, not uncommonly, amongst the large reed beds on the shores of Lough Neagh at Shane's Castle. The species may be easily separated from the known British *Cryptophagi* by the black marking on the wing cases, and the structure of the side margins of the thorax. It inhabits northern and central Europe and Siberia. (See *Irish Naturalist*, 1910, pp. 30-1).

D. M'ARDLE showed adventitious budding in recently collected specimens of *Lejeunea flava*, Luz., one of the rare foliaceous liverworts. The process was shown in various stages of development, from the early buds with simple cells, to others with the cells divided, further changes showing traces of leaves, and lastly a shoot with perfect leaves and stipules or under-leaves formed on the stem. The next stage would be the formation of root-hairs, and the young plant under favourable circumstances, when separated from the parent would develop and bear fertile antheridia and archegonia and also repeat the life history through what is known as the asexual mode. A diagram of the plant highly magnified accompanied the exhibit. *Lejeunea flava* is also interesting as being a native of the Amazon valley.

REVIEWS.

PLANT FORM AND MIGRATION.

Die nordischen *Alchemilla vulgaris*-Formen und ihre Verbreitung, Ein Beitrag zur Kenntniss der Einwanderung der Flora Fennoscandias mit besonderer Rücksicht auf die finländische Flora. Von HARALD LINDBERG. Pp. 170 with 20 plates and 15 maps. *Acta Societatis Scientiarum Fennicæ*, Tome xxxvii, No. 10. Helsingfors, 1909.

The production of this admirable monograph of the *Alchemilla vulgaris* group of segregates has evidently been a labour of love with Dr. Lindberg. He has devoted many years to the work and has not only made himself master of all the literature of the subject but has examined from 8,000 to 10,000 specimens drawn from such widely separated regions as the Dublin Hills, the Greenland coasts, the shores of the White Sea, and the basaltic plains and plateaux of Iceland and the Faeroes. The result is to give so complete a presentment of the distribution of the forms through Northern Europe that the author is fully justified in the hope expressed in his introduction that future research will not materially modify the conclusions arrived at.

The monograph is divided into three sections, the Historical, the Special and the General, and a brief survey of these will best exhibit the singular thoroughness of the work which is at once scholarly and scientific. It is, in short, *gründlich*, to borrow a word from the tongue in which Dr. Lindberg writes. The first section is made up of an exhaustive and most interesting survey of the literature of *Alchemilla vulgaris* and its segregates from the appearance of the Kreuterbuch of Brunfels in 1488, where "unser Frawen mantel" is first figured, down to C. G. Westerlund's *Studier öfver de Svenska formerna af Alchemilla vulgaris*, published at Norrköping in 1907. The first part of this historical survey from Brunfels to Linné is arranged in chronological order, the second from Linné down to the present century is grouped by countries, Great Britain leading, followed by Denmark, Norway, Sweden, Finland, and Russia. Hardly any work of importance appears to have been overlooked. Even the scanty botanical literature of this remote old island of ours has been conscientiously explored, and Mackay's *Flora Hibernica* and the modest *Irish Naturalist* have been dragged into light. But Mr. Praeger's *Gleanings in Irish Topographical Botany* has eluded the author's research, with the result that the Irish distribution of the three segregates known to occur in our island has been understated by from 6 to 7 county divisions. Passing to Scandinavia, the rich botanical lore of Norway and Sweden, so far as it bears on the author's theme, is skilfully condensed and reviewed. The by no means meagre contributions of Danish and Finnish botanists are also passed in review, and the result of Dr. Lindberg's polyglot researches is to provide the student with the quintessence of all that has been written on the subject of the *Alchemilla vulgaris* group in Northern Europe from the banks of the Liffey to the banks of the Neva.

In this historical survey the abstract of Svaute Murbeck's important papers on Parthenogenesis in the group is of special value, as showing the permanence of the various forms and the general improbability of the occurrence amongst them of those hybrid products which are the despair of the monographer in such genera as *Salix* and *Rumex* and *Epilobium*. The conclusions arrived at by Murbeck after long continued research were published in the *Botaniska Notiser* in 1897 and 1901. Here he shows that amongst the Northern and Mid-European *Alchemilla* forms perfect pollen grains are rarely or never produced, so that the embryo is developed out of the ovum without fertilization. The seed in fact must be regarded as a portion of the mother plant which has become independent by a purely vegetative process and in consequence of its asexual or apogamous origin is capable of producing only the distinctive characters of that mother plant.

The concluding pages of the historical section pp. 36-38 will probably be read with the greatest interest and with the closest scrutiny by Irish botanists who are prone rather to synthesis than to analysis; for in these pages Dr. Lindberg defends the position he has confidently taken up that the various northern forms of the *Alchemilla vulgaris* group are "good species." He notes the difference of opinion which has existed and still exists amongst botanists as to the constancy and precise value of the distinctions relied on for the separation of these forms, and he frankly admits, too, the variability within the limits of each form of the very characters relied on as distinguishing it from neighbouring forms, such as the lobing of the leaf, the number of teeth in each lobe, and the greater or less degree of hairiness of leaf and stem and inflorescence. And yet there is no trace of hesitation in the final judgment which he pronounces in these words: "I am entirely of Buser's opinion that the northern *Alchemilla* forms known to me are as clearly distinct one from the other as any species recognized as 'good' by all botanists." But there is a marked sobriety in Dr. Lindberg's analysis of the old collective species of Linnæus. He admits to the large north European area of which he treats, an area including roughly all Europe north of the 55th parallel of latitude, only fourteen segregate species with one sub-species and one variety, and treats as a botanical curiosity M. Gandoger's elaboration of no less than seventy-six species out of the Linnean aggregate. In this penetrating analysis of the French botanist (*Flora Europæ*, Tome viii.) eighteen species additional to those accepted by Dr. Lindberg, from Buser and other authors are allocated to northern Europe; and it may be of interest to Irish botanists to learn that three of these eighteen, *i.e.*, *A. hibernica*, *A. omissa* and *A. pilulosa*, are credited to Ireland.

In judging of the validity of the fourteen species accepted by our author, the critic is not left to depend solely on the descriptions in the text, full as they are. He is provided with a series of admirable plates, almost life size, reproduced by process from herbarium specimens and representing all the forms dealt with. So accurately and so beautifully are these reproductions executed, even the texture being faithfully rendered, that the student as he pores over them is at times almost beguiled into imagining that he has before him a selection of

sheets from Dr. Lindberg's herbarium. An honest and careful study of these plates and of the appropriate text will go far towards convincing the most confirmed "lumper" that for the majority of the segregates the distinctions are real if not always easy to be grasped or expressed.

The following are the species accepted by Dr. Lindberg for northern Europe—*A. minor* Huds., *A. alpestris* Schmidt, *A. pratensis* Schmidt, *A. pubescens* (Lam.) Buser, *A. plicata*, *A. pastoralis*, *A. micans*, *A. strigulosa*, *A. subcrenata*, *A. acutangula*, *A. glomerulans* and *A. obtusa*, all of Buser, *A. hirsuticaulis* of the author himself and *A. acutidens* of Buser as amplified by the author so as to include three of Buser's species. Of these fourteen species only the three first-named are Irish. These also occur in Great Britain, and both in Ireland and in Great Britain the first is by far the most wide-spread and abundant, and the last the rarest. The only form not common to the two islands is the sub-species *A. minor* Huds., **filicaulis* (Buser), Lindb.-fils. This is absent from Ireland, but occurs in Forfar and Inverness in Scotland, and in several stations in the Shetlands.

The second division of the monograph, the systematic or special part gives the fullest possible description and synonymy of each form with an introductory synopsis and an exhaustive list of localities arranged by countries, special prominence being given to the area with which the author more particularly deals, Fennoscandia or Finland and the adjacent peninsula of Scandinavia to which it is joined by the wide Karelian Isthmus. A set of fifteen well executed outline maps of Northern Europe on a sufficiently large scale (6-in. by 8½-in.), is given, one for each of the forms dealt with and on these the distribution is clearly marked by a red dot for each distinct station, so that the peculiar range of each of the segregates can be seen at a glance. The numerous definite British localities given for these forms are taken from herbarium specimens submitted to the author by Messrs. W. H. Beeby, G. C. Druce, H. and J. Groves, E. S. Marshall, and C. E. Salmon. The Irish distribution is mainly drawn from E. F. Linton's paper on the "Distribution of the *Alchemilla vulgaris* group in Ireland," published in the 9th volume of the *Irish Naturalist* (April, 1900), the names of many well-known Irish botanists, Miss M. C. Knowles, R. Lloyd Praeger, S. A. Stewart and others appearing frequently in Dr. Lindberg's lists of localities. To these are added a few localities drawn from material supplied to the author by G. C. Druce, C. E. Salmon and the writer of this notice. Although these records add but one county, Dublin, to the hitherto known Irish distribution of the group it may be well to cite them all here. They are as follows:—

A. pratensis Schmidt—Antrim, Sallagh Braes, 1897, C. H. Waddell (h. C. E. Salmon).

A. minor Hudson—Dublin, Ballynascorney, 1881; Blanchardstown, 1903; Crooksling Glen, 1903, all N. Colgan in Herb. Colgan. Antrim, Sallagh Braes, 1897. C. H. Waddell.

A. alpestris Schmidt—Dublin, Ballynascorney 1881 and 1903; Kelly's Glen, 1903; Glassamuckey Glen, 1905; north slope of Seecaun, 375 m., 1903, all N. Colgan in Herb. Colgan.—Sligo, Ben Bulbin, 1906 G.

C. Druce (hb. Druce)—Antrim, Sallagh Braes, 1897, C. H. Waddell (hb. C. E. Salmon).

To touch on a point of nomenclature, it should be noted that the name *A. minor* Huds, has been substituted in the monograph for *A. filicaulis* Buser applied by E. F. Linton in the *Irish Naturalist* in 1900, to what was then and still remains by far the most widely distributed in Ireland of the three forms which occur there. This change is justified by Dr. Lindberg in a passage on p. 22 of which the following is a rendering:—

“I have adopted Hudson's name for *A. filicaulis* Buser var. *vestita* because Hudson meant to refer to the hirsute form. This appears partly from his use of the words *foliis sericeis*, which cannot apply to *A. filicaulis* Buser, partly from the fact that this hairy form is the only one which occurs in England, while the smooth form, in the British area, is only to be found in a few places, as in North Scotland.”

Having dealt thus fully with the first and second sections of the monograph, little space is left for the discussion of the concluding or general section, although this may probably prove the most interesting of all to many students of distribution, since it deals with the migrations of the various forms into Fennoscandia. In this section the author necessarily traverses wide fields of speculation where glimpses are caught of that old Littorina Sea which once rolled over the low-lying coasts of the Baltic and the Gulf of Bothnia. While adopting as true for southern Sweden the view of Nathorst and Areschoug, that its older flora arrived there from the southward on the melting of the ice sheet, he considers such an origin doubtful for the alpine flora of northern Scandinavia. In support of this view he discusses the probable migration path of *A. glomerulans*, the most distinctively arctic and alpine of the *Alchemilla* segregates and wide-spread in Lapland, Greenland and Iceland.

Dr. Lindberg is to be congratulated on the production of a work which is destined to become an indispensable text-book for all who study this difficult and interesting plant group. His Northern *Alchemilla vulgaris* Forms is in all respects a worthy addition to the Transactions of the Finnish Society which has done so much to further the cause of Natural History in Northern Europe.

N. C.

THE EAGLE'S NEST.

The Home-Life of a Golden Eagle. Photographed and described by H. B. MACPHERSON. London: Witherby and Co., 1909. pp. 45, 32 plates. Price, 5s. net.

It will be hard to beat Mr. Macpherson's wonderful achievement. Whether we consider the extreme wariness of the subjects chosen, or the inaccessibility of the nesting place—a narrow ledge on the edge of a Grampian precipice—or the severity of the Scottish weather during the Spring of 1909, or the length of time (eleven weeks) during which the nest was under constant observation, our appreciation of the admirable results attained can hardly be over-estimated. For the first time the domestic details of the early life of a Golden Eagle are fully revealed,

and some curious facts are stated. While the young eaglet was helpless in the nest, unable to move, the mother was most careful to remove every offensive object at once, but later on when the young bird was able to walk about the ledge, the nest became a mass of decaying abominations, as little or nothing was removed. For the first few weeks the young one was fed regularly twice a day only, at daybreak and about 5 p.m., but when older a "snack" was administered about noon, and when much older the gorging was frequent. We also learn that at first the eaglet was fed solely upon grouse, though the parents devoured hares and rabbits beside the nest, the grouse being carefully plucked and headless before being given to the youngster. When older the hind legs of a hare formed a favourite lunch. The 32 photographic plates are equally successful and wonderful. We congratulate Mr. Macpherson on his unique contribution to British ornithology, and we cordially recommend the lover of wild life to obtain this book.

R. P.

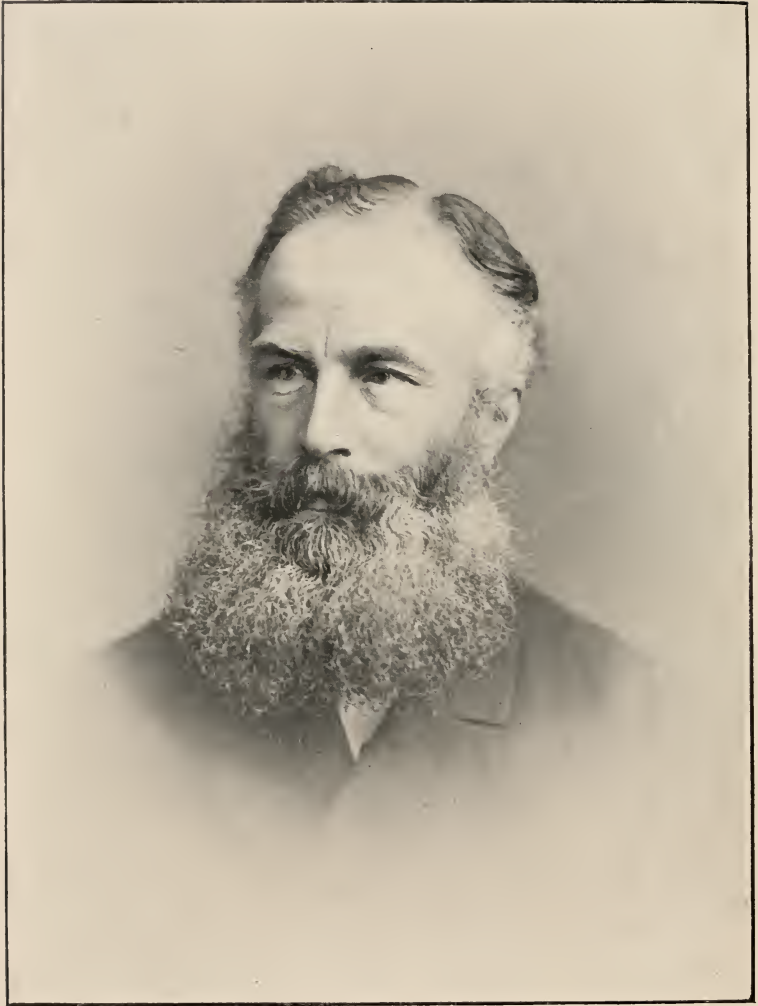
INSECT STRUCTURE AND DEVELOPMENT.

Sur la Morphologie de l'Insecte. Pp. 76. **Sur l'Ontogenèse de l'Insecte.** Pp. 130. Par CHARLES JANET. Limoges, 1909.

Students of insects cannot but feel constant gratitude and admiration for the beautifully clear series of memoirs which M. Janet continues to publish in welcome succession. The logical French mind is apparent in the first of the memoirs now before us. M. Janet returns to the consideration of the segmentation of the insect body and finds fresh support for his thesis that the metameres are arranged in "triads" or groups of three. To make out this suspiciously symmetrical plan it is necessary to ignore the maxillular segment of the head advocated by Hansen and Folsom, and to hypothecate three segments between the ninth abdominal and the anal for two of which little or no evidence can be adduced.

The second memoir is a suggestive essay on insect growth and transformation, dealing for the most part with changes after hatching. The division of the whole life-history into an ovulo-ovarian, an embryolarval, and a nympho-imaginal stage is open to criticism, for the insect larva is in no sense a prematurely hatched embryo, but rather a modification from the primitive wingless insect stock, adapted for some special mode of life. The successive stages are traced with special reference to that highly specialised fly as the green-bottle (*Lucilia caesar*) and to the ants, instructive and suggestive comparisons being made with other insects.

G. H. C.



EDWARD PERCEVAL WRIGHT.

To face page 61.

EDWARD PERCEVAL, WRIGHT.

THE death of Edward Perceval Wright, which took place on March 4th, caused sincere regret among the numerous group of friends and acquaintances whose affection and regard Wright's genial and striking personality had won. Wright was born in Dublin in 1834, where his father was a barrister. He was educated at home, and began life as a clerk in a commercial company at the age of 16. This post he resigned when he entered Trinity College in 1853. Before this, however, he had already begun to study Natural Science under George J. Allman, the University Professor of Botany, so that in the year after entering he was able to commence the publication of the "Natural History Review." He continued editor of that quarterly journal till 1866. His earliest contributions to science, dealing chiefly with the flora and fauna of the south and west of Ireland, appear to have been made in that Journal, and show his keen interest from the first in field-work and observation. He visited the caves of Mitchelstown in 1857, with Haliday, and by discovering there specimens of blind springtails, he first showed the interest of the living fauna of Irish caves. In the same year he took his degree, and was appointed Director of the Museum in Trinity College. In 1858 he was appointed Lecturer in Zoology in Trinity College and Lecturer in Botany in Dr. Steeven's Hospital Medical School, and he was chosen Secretary for the Royal Geological Society of Ireland and Secretary for Section D. of the British Association. He continued secretary of this section for several years and was always very much interested in the work of the Association. It is a proof of Wright's remarkable energy and capacity for work that while he was discharging all these duties he was at the same time able to keep pace with his undergraduate medical studies and did not give up his work in Natural Science. In 1862 he took his M.D. degree, and determining to practice as an oculist, with characteristic energy he studied this branch of surgery specially in the Medical Schools of Berlin, Vienna, and Paris. By 1865 he had begun to make a position for himself among Dublin oculists. In this year he visited the Aran Islands and made a contri-

bution towards the knowledge of their flora. It was during the same year that Wright was appointed *locum tenens* for Harvey, then Professor of Botany in Trinity College—an event which seems to have caused him to determine definitely to take up Science as his profession. Consequently he gave up ophthalmological work in 1866. In 1865 his attention was called to the fossils of the Jarrow colliery, and with Huxley he published in the following year an important memoir on the fossil Amphibia of the Kilkenny Coal-measures. The greater part of 1867 was occupied by Wright in a expedition to the Seychelles Islands, which he made with the object of studying the fauna and flora of this group. Notwithstanding the loss of his collecting apparatus and materials by shipwreck on the way out, he brought home important collections, which were described subsequently by him in a long series of papers published in various journals. These papers in their happy style often reflect some of the southern sunshine of which Wright was so fond, and the story of how he brought home a live leopard, which terrified the custom-house officers at Suez, and transported living specimens of the fish *Haplochilus Playfairii* Gthr. from the Seychelles to France possess anecdotal as well as scientific interest. He spent the spring of 1868 in Sicily collecting with Haliday, and the autumn of the same year dredging off the coast of Portugal. The spoils of these tours were also described, and the papers dealing with them form very interesting reading for naturalists, not only on account of the scientific results obtained, but also of the enthusiasm for nature which appears in every line.

In 1869 Wright was appointed University Professor of Botany and Keeper of the Herbarium in Trinity College. During the first years of his professorship he was still engaged in work on his Seychelles and South European collections. In 1877 Wright commenced to publish a series of memoirs on the structure and development of Algae, which won the appreciative recognition of Bornet in 1879. The value of his work was enhanced by the fact that it was constantly controlled by observations on living specimens, a feature, according to Bornet, then exceptional in the work of British algologists. The work on Algae was put aside to draw up the Report, with Th. Studer, on the Alcyonaria of the *Challenger* expedition. This was not completed till 1888. During this time Wright spent a great deal of energy on arranging the Herbarium, and if it had

not been for his devotion and painstaking toil at a critical time, the usefulness of the collection would have been seriously impaired. The history of these events he records in the first number of the "Notes from the Botanical School of Trinity College"—a journal which owes its existence to Wright's energy and generosity. He further showed his affection to the department of which he was head by presenting to it his valuable collection of botanical books and journals. In 1894 Wright visited the Pyrenees, and brought back several additions to the Herbarium, and the spring of 1895 he spent collecting in Algiers. In 1904 he resigned his professorship after a tenure of 35 years.

In addition to his researches on Distribution and on Systematic Biology, Wright bore an active part in many scientific societies and was officially connected with several scientific publications. Among these activities may be mentioned his connection with the "Natural History Review," as founder and editor, as Secretary with the Dublin University Zoological and Botanical Association, with the Royal Geological Society of Ireland, and with Section D. of the British Association. He was an original member of the Dublin Microscopical Club, whose meetings in his rooms at Trinity College are happy memories to many naturalists. He was president of the Natural History Society of Dublin in 1872, and in 1874 he became Secretary of the Royal Irish Academy and editor of its publications. He was also editor for some time of the publications of the Royal Dublin Society. In these various capacities he showed remarkable energy in forwarding the welfare of the institutions with which he was connected, and his generosity, when need arose, could always safely be counted upon. He displayed the same activity and generosity towards antiquarian research, and the Royal Society of Antiquaries of Ireland marked its appreciation of his services in forwarding its aims by electing him President in 1900.

Wright had a great interest in his fellow-workers in science, and his desire to help the work of others brought him into personal contact with a large number of his colleagues, not only in the British Isles, but also on the Continent and in America. It was always a pleasure to him to speak of these friends, and anecdotes of them formed a feature of his conversation.

HENRY H. DIXON.

A HOLIDAY IN SOUTH-WESTERN IRELAND.

NOTES ON SOME FALSE-SCORPIONS AND OTHER ANIMALS
OBSERVED IN THE COUNTIES OF KERRY AND CORK.

BY H. WALLIS KEW.

The counties of Kerry and Cork, with their remarkable fauna and flora, had long exercised on me a sort of magnetic influence; and it was thus with indescribable delight that I found myself, on August 16th last, already at Kenmare; comfortably settled at the Southern Hotel—the headquarters of the Irish Field Clubs during their excursions of 1898—and face to face at once with such a plant as *Saxifraga umbrosa* on its native rocks. I had read, of course, of the advantages of this place from a naturalist's point of view, of the grandeur of the bay and of the mountains, of Geomalacus-inhabited rocks, and of the woods of Oak and Arbutus that were within easy reach;¹ and it seemed that here, if anywhere in these Islands, one might expect to make discoveries in the much neglected Arachnida-Pseudoscorpiones which were—and still are—the principal objects of my care.

The first two days were spent in the immediate neighbourhood of Kenmare, where it was good to see *Bartsia viscosa* enlivening the road-sides, and delightful to behold *Ceterach officinarum* and all its more numerous kindred in the natural ferneries by the bay; while in all directions, more in the open, the grand luxuriance of *Osmunda regalis* surpassed every expectation. Of molluscs, *Pupa anglica*, which I had never seen alive before, was in great abundance; but of false-scorpions it was somewhat disappointing to find only two, *Obisium muscorum* and *Chthonius Rayi*, both common and widely distributed species. It seemed likely, however, that *Obisium maritimum*—unrecorded for Ireland—might be awaiting discovery on the shores of the bay. If so, it would be living between tide-marks, and to find it one would have to split open narrow old-standing rock-fissures or overturn large stones lying more or less embedded in permanent resting-places; and much time was, in fact, devoted to this rather laborious pursuit. The first attempts were made at no great distance from the suspension bridge; but the fissures opened here were not quite of the required character, being wet and

¹ *Irish Nat.*, vii, (1898), 201-206.

silted up ; and they were often monopolised by a small crustacean, a very odd creature, of which the sexes were remarkably unlike, the male having a square head and large mandibles. This animal was, as Dr. W. T. Calman informs me, *Gnathia maxillaris*, or a species very near that ; it was living here in more or less definite channels in the silt with which the fissures were filled ; and one may inquire perhaps, since the use of the male's mandibles is said to be unknown, whether they are employed in the formation of the channels which seemed to be used by the creatures in common. No trace of *Obisium maritimum* was found at this place ; but perhaps it might occur, in more completely marine conditions, less near the head of the bay ?

Accordingly on August 18th I set out along the road which goes under Mucksna, by the townlands of Killaha, and so to Dawros Point, whence for two miles or more it runs close to the bay almost on the shore itself ; and hereabout, on the rather flat shore behind Brennel Island, *Obisium maritimum* was found at last.¹ It was living in some plenty, in half gregarious fashion, under large stones more or less embedded in moderately moist gritty mud—never under unstable ones or under those lying in a bed saturated with water—and on that part of the shore inhabited by *Littorina rudis* and *Paludetrina stagnalis*, that is to say between the region of densely seaweed-covered rocks and that of *Juncus* and *Thrift*. The stones themselves were with or without small growths of seaweed, and they would doubtless be submerged at every tide. On turning them over, one saw the *Obisium*, and often several, seated on the moist under-surface of the stones, where from their odd figure and from being deeply coloured and intensely glossy they were striking and conspicuous objects ; on the same surfaces one saw, in almost every case, vast herds of the small bluish Collembolan *Anurida maritima*, and generally also, slowly moving about, a few individuals of the white-shelled mollusc *Ovatella bidentata*, and, running about rather rapidly in all directions, good numbers of the little yellowish carabid-beetle *Aëpus Robinii*²; sometimes, moreover, small blackish staphylinid-beetles *Micralymma breviperne* and *Homalata halobrectha* were present ; and of other creatures there

¹ *Irish Nat.*, xviii. (1909), 249.

² For the name of this beetle, and of the others mentioned in these notes, I am indebted to Mr. J. N. Halbert.

were sundry small crabs, and, coiled up in hopeless fashion, long sticky nemertines. One saw too on these surfaces white objects recognisable as the moulting and brood-nests of the *Obisium*. The moulting-nests were in some cases empty or contained only the moult; but more often they were tenanted by an animal about to moult or just moulted; while the larger brood-nests, except some old torn ones, contained the imprisoned female, either with the brood-mass attached or surrounded by the brood of free young. The youngers at this age are of a beautiful olive-green colour; and being fully active they seemed ready at once to make their escape when the nests were opened.

Next day I arranged to be put down three miles further on the same road near the Cloonee Loughs, and went over to some of the islands; of these the Middle Lough has many, the smaller rocky ones being of great beauty, standing as they do with bare sides well out of the water, sometimes with *Osmunda* more than brow-high about flood-level, and about their tops with dense arboreal vegetation, including *Arbutus*,¹ which I here saw for the first time and with much delight. On one of the larger islands in this lough, the sifting of dead leaves brought to light *Obisium muscorum*; an animal already obtained, by the same method of collecting, in one of the woods at the foot of Mucksna. Afterwards, by the Kenmare Road, were seen some striking varieties of *Arion ater*, with the sides pale and the back reddish-brown or blackish, or in one case of a deep distinct olive. The like of this last I never saw before; but it appears that olivaceous varieties of this slug are by no means unknown near the shores and on the islands of the West of Ireland.²

The principal business of this excursion, however, was a further search for *Obisium maritimum* on the shores of the bay; and this animal was found eventually, behind the rather high island called Ormond's, on a rocky shore, and under conditions somewhat different from those of the previous day. On higher parts of the shore among *Juncus* and *Thrift*, but still within reach of high-tides, many immature individuals occurred in moulting-nests under stones; but the main colonies were lower down, and would no doubt be under rather deep water at every tide. The animal was living here, in fact, in narrow vertical fissures of slaty rocks which were densely

¹ *Irish Nat.*, vii. 1898, pls. iv. and xii.

² *Sci. Trans. Roy. Dub. Soc.* (n.s.), iv. (1891), 555.

seaweed-covered and studded over with *Patella* and sea-anemones. On breaking away the layers of rock so as to expose the inner surfaces of the fissures, one saw—as under the stones behind Brennel Island—not only the *Obisium* and its nests, but also *Anurida*, *Ovatella*, and *Aëpus*, the first named in vast assemblages; and there were here in addition scarlet mites, and larvae and pupae of a beetle, no doubt *Aëpus*.

Obisium maritimum was also found on the opposite shores of the Bay near the quay at Greenane; a single individual in the act of sucking the juices of *Anurida maritima*. Here also, and elsewhere, were some marine or half-marine centipedes; those I brought away were—as Mr. R. I. Pocock informs me—*Linotaenia maritima*; but these animals were never immediately associated with the *Obisium*, and they seemed to inhabit moister places. This was on the occasion of a rather long walk along the Sneem Road, through Templenoe, as far as Blackwater Bridge; where, in the small wood near the river, a fourth false-scorpion, *Chthonius tetrachelatus*, was found; and this animal was found also on two excursions undertaken from Kenmare on the old road to Killarney.

This road runs over the hills in a determined manner, taking a remarkably direct course, and crossing on its way a surprising number of rivers. At about four miles from Kenmare it reaches the crest at 1,063 feet, passing here between Peakeen Mountain and Knockanaguish; and hereabout I was much pleased to see a pair of Choughs feeding close to the roadway. Leaving the road at this place, and scrambling to the top of Knockanaguish and over towards the north-west, I came down at length to the shallow Cummienslaun Lake; and was rewarded by finding the greater part of it occupied in characteristic extended order by *Lobelia Dortmanna*; a plant I had long wished to see, and which, as I afterwards found, was already out of flower in lower waters. From Knockanaguish are seen towards the north, the famous wooded hill-sides about the Lakes of Killarney; and even if one keeps to the road, as was done on one of these occasions, this long desired country comes into view as soon as the crest is passed; and after a steep descent and much walking in the Ullauns valley one comes at last to Galway's Bridge—a place of much grandeur—where the united Galway's and Ullauns Rivers commence their fall over the rocks into the Upper Lake. All the rocky slopes hereabout are wooded, no doubt in the main naturally,

the rich green of *Arbutus* being conspicuous here and there among oak and holly. It was in these places that I had hoped to find some of the arboreal Chelifers (*e.g.* species of *Chernes*), but such search as I was able to make for them was unsuccessful; and it ought to be added perhaps that arboreal Cheliferidae, of which there are several in Britain, are as yet unknown in Ireland. By sifting dead leaves in these woods, however, I managed to see *Obisium muscorum* and *Chthonius tetrachelatus*; but it was impossible to continue this kind of collecting here on account of the minute biting flies which were present in extraordinary abundance.

The two false scorpions just mentioned live also under very different conditions on the bare mountains. On Knockanaguish, for instance, *Obisium muscorum* occurred at a good height; and *Chthonius tetrachelatus* was abundant even at the summit (1,645 feet). The *Chthonius* lived among accumulations of slabs of rock which were for the most part overgrown with ling; and in the peaty films between these slabs it had its nests; two of which I opened and found in each a female and brood of free young. The sifting of ling-débris and moss over a weighted sheet here brought to light beetles, including *Bradycellus cognatus* and *Ocyusa incrassata*, but no false-scorpions; and I suppose that in this exposed place these animals come little to the surface.

On August 23rd a departure was made from Kenmare by the coach which starts after mid-day on its long climb up the valley of the Sheen, over what remains here of the Cahal Mountains—except the final crest which is pierced by the well-known tunnel—whence we emerge into the county of Cork, and, with Bantry Bay ahead, slowly and laboriously get down to Glengariff. Here two days were devoted to the shores of Bantry Bay, and two to the wooded hill-sides of the glen. For the former purpose the Castletown road was followed round by the harbour and Shorne Hill, by the margins of the two Loughs Avaul, and under Gowlbeg Mountain to Derreenacarra. Near this road, close to Glengariff, the long-looked-for *Geomalacus maculosus* came to light; the dry weather had evidently driven this slug far into its hiding places, so that I had not seen it between Kenmare and the Cloonee Loughs where it is known to be plentiful¹, and the one now found was in secure hiding under a stone within the walls of a deserted cottage. The hard rocks of the bay were difficult to

¹ *Irish Nat.*, vii. (1898), 220.

search for *Obisium maritimum*; but the animal was found at last near the quay at Derreenacarrin living in vertical rock-fissures, which would be rather deeply submerged at every tide; and which were inhabited also by *Aëpus*, but whether *A. Robinii* or *A. marinus* was not ascertained; both are known on the shores of Co. Cork.¹

On the wooded hill-sides of the glen collecting was again difficult, because one had to contend not only with minute biting flies but also with armies of ticks which seem characteristic of this place.² It was necessary, however, in spite of these creatures, to spend a considerable time among the trees on these hill-sides, more especially on one—not far from the junction of the Glengariff and Canrooska Rivers—which was evidently in natural condition and seemed a place of much promise. This hill-side was beautifully wooded; and like the rest of the glen wonderfully warm and sheltered; it was moderately steep, rough with fallen rock, and at intervals with vertical rock-faces running in transverse fashion and forming small ravines. The covering of wood was of open character, for the most part of small oaks, holly and *Arbutus*, with undergrowth of ling and bracken; and with *Saxifraga umbrosa* showing itself here and there on barer rocks. The trees of *Arbutus* were numerous, particularly on the upper parts and about the walls of the ravines, and many were old, with big divided trunks and with characteristic ragged bark. An examination of these trunks did not disclose any trace of arboreal Chelifers; but some nests were found which were evidently the work of a false-scorpion of another kind. These nests differed from any I had seen under bark, and were, like those of *Obisium maritimum*, large of white silk and with little or no extraneous matter adhering; nor was this resemblance without significance, for the nests were found to belong to a large stout *Obisium*—a genus not usually arboreal—and the animal has proved to be of unusual interest. It probably lives for the most part on the ground; perhaps under or behind fallen or half-detached pieces of rock; and one individual—the only one not in a nest—was found in such a place. It is evident, however, that the creature is here in the habit of resorting to the *Arbutus*-trunks at least for moulting and reproduction, for nests were found on as many as five different

¹ *Proc. R. I. A.* (3), vi. (1902), 588.

² *Irish Nat.*, xi. (1902), 75.

trees of this kind ; and they were at times as much as four feet from the ground. They were of two sizes : moulting and brood-nests, the former abandoned or containing in several instances a newly moulted animal with the moult beside it ; and the latter old and empty or new and containing a female, in two cases with the brood-mass attached and in one case surrounded by the brood of free young. The discovery of this animal was a piece of great good fortune, for it is new to Ireland and unknown in Britain ; moreover it is the largest Irish false-scorpion and the largest but one of the twenty or more species which make up the false-scorpion-fauna of these Islands. As to its identity I am submitting to the *Irish Naturalist* a separate communication : the creature is already known to science but under circumstances making it necessary to give it a new name ; and the proposal is that it be called *Obisium Carpenteri*, in honour of Professor Geo. H. Carpenter to whom we are indebted for most of what we know of the Arachnids of Ireland and much besides.

While observing this creature I unexpectedly became aware of the presence just overhead of another animal of equal interest, and of remarkable accomplishments. Chancing to look up I saw between two large branches of *Arbutus* at a place where they were between two and three feet apart, a delicate and tightly stretched spider-snare of most unusual character. It was triangular, and consisted of four radii, overlaid by a limited number of cross-threads. Its trap line was horizontal and ran out from the object of support to the apex of the triangle, where three other threads diverged from it or from each other, and formed with the distal part of the first mentioned line the four radii just referred to ; finally another thread formed a more or less vertical base-line to which the radii were attached ; and thus the whole structure, apart from its cross-threads, was made up of but five lines ! Beneath the trap-line, close to the branch to which it was attached, the spider itself was clinging, back downwards, with the legs of the first and second pairs extended in front ; it had evidently hauled in the line so as to hold the snare on the stretch ; and one could well imagine that it was ready at any moment to release the snare with a snap for the better entanglement of prey. The whole thing was in fact exactly what is seen in the figures or descriptions of *e. g.* Thorell, Sordelli, Wilder,

McCook and Castlenau; and it was evident that we had here the famous Triangle Spider (*Hyptiotes* sp.) with its snap-net which is without doubt one of the most remarkable types of spider's snare as yet known. It was delightful thus to make the acquaintance of this extraordinary spider and its snare; and this in surroundings of such exceptional charm—I ought to have mentioned perhaps that *Geomalacus* was turned out of one of these *Arbutus*-trunks—and the discovery was noteworthy from the fact that the presence of this spider in Ireland had never been suspected. *Hyptiotes paradoxus* occurs in Britain but is there extremely rare; it was reported in 1864 from Cumberland, but nothing more was heard of it till 1894-5, when it was collected by Mr. Warburton and the Rev. O. Pickard-Cambridge in the New Forest—the snares there being between dead lichen-covered twigs of almost impenetrable bushes of blackthorn and whitethorn—and this appears to be all that is known of the creature in the British Isles. Glengariff, however, is now established as a third Britannic locality; for the writer is assured that the animal found here pertains to the species just mentioned, *i.e.* *Hyptiotes paradoxus*¹; and this name, it will have been gathered, must now be added to the already imposing list of Irish Spiders.² Altogether I saw, all on the same hill-side, about fifteen of these spiders; all with snares, most of which were spun about the trunks and large branches of *Arbutus*, but others were on holly, and still others on heath and ling. All the snares were alike in shape and construction, always with four radii; and the spider, an adult female in each case, was always in the same position under the trap-line and close to its attachment.

On one of these days at Glengariff I was able to take a walk as far as the county-boundary on the old road which ascends the slopes of Esk mountain, where *Chthonius tetrachelatus* occurred rather plentifully at about 900 feet under accumulations of fallen rock-fragments. On more than one occasion also it was possible to linger awhile about the Glengariff River, where many beautiful things were seen. Of birds, I will mention the Kingfisher; and of insects a dragon-fly—I suppose it was *Calopteryx virgo*—one sex of which, having wings of the richest blue, was a charming object as it fluttered over the vegetation by the water's edge; a word must be said

¹ The spider has been examined by the Rev. O. Pickard-Cambridge, Dr. Randell Jackson, and Mr. F. P. Smith.

² *Proc. R.I.A.* (3) v., (1898), 128-210; xxvii (1909), 87-118.

also for the Silver-washed Butterfly (*Argynnis paphia*), which seemed abundant, and came sailing into the sunlight of the glades with much grace. Finally on August 28th the all-day coach journey to Killarney was undertaken; but only for a stay of three days, two devoted to Mangerton Mountain and one to the lake-margins and woods between the Muckcross Hotels and Galway's Bridge.

For Mangerton on both occasions I took the well-known way to the Devil's Punch-bowl, and did not venture much beyond this lough on the first day because of the great cloud which clung to the mountain, drenching it with a heavy moisture and obscuring everything from view. There were, however, partial clearances; and it was interesting to see the slugs creeping out. At about 2,300 feet *Arion ater* was in characteristic mountain dress with the whole of the foot-sole as well as every other part of the body entirely black. At about the same height too, the small dark mountain form of *Limax arborum* appeared, creeping in numbers on the bare rocks; and some individuals, like those found by Dr. Scharff on Caher,¹ were quite unicolorous above and almost or quite black. Next day was beautifully fine, with no cloud and only a moderate wind; and going now over the Punch bowl and by a small part of the 1,000 feet precipices of the Horse's Glen—whence one looks down on the black Loughs Erhogh and Managh—I was able to spend some time on the top of Mangerton, where there is a considerable summit-plateau, with a heavy covering of peat in part washed away and leaving exposed vast quantities of small flattish rock-flakes. Under these flakes, that is to say at about 2,750 feet, good numbers of Arthropods were found: a centipede (*Lithobius*, probably *L. variegatus*); a big-bodied harvestman, *Oligolophus alpinus*; a staphylinid-beetle, *Quedius umbrinus*; and crowds of carabids; *Nebria Gyllenhalii*, *Nebria brevicollis*, *Leistus rufescens*, *Patrobis assimilis*, *Trechus obtusus*, and *Notiophilus aquaticus*. Spiders too were numerous in individuals; but I found only three species, named by Dr. Jackson as *Robertus lividus*, *Macrargus abnormis*, and *Hilaira montigena*—*Pedanostethus lividus*, *Tmeticus abnormis*, and *Tmeticus montigena* of familiar nomenclature—the last new to the Irish list. On may see from here, Carrantuohill rising out of the Reeks; and it may be noted that of the six animals found by Dr. Scharff and

¹ *Irish Nat.*, viii. (1899), 214.

Professor Carpenter on its summit (3,414 ft.) four, viz.: *Lithobius variegatus*, *Oligolophus alpinus*, *Nebria Gyllenhalii*, and *Pedanostethus lividus* figure also here, the remaining two from Carrantuohill being *Nemastoma lugubre* and a spring-tail.¹ I found also on Mangerton—some way from the summit—three spiders which Dr. Jackson has identified as *Leptyphantès* sp. (immature), *Styloctetor uncinus*, and *Centromerus rivalis*; of these the *Styloctetor* is of interest from being the animal of which the first known example was found by Mr. K. Welch on the summit of Slieve Donard, Co. Down²; moreover the *Centromerus*, like the *Hilaira* just mentioned, is an addition to the Irish list; and thus this expedition to Mangerton—enjoyable and memorable in many ways—was not altogether without success. With regard to the particular object for which it was undertaken, however, it entirely failed; for in spite of all my efforts I could not discover false-scorpions of any kind on the top of this mountain; and so again in descending the examination of moss and débris at about 2,300 feet produced the three spiders just mentioned as well as small beetles and spring-tails in plenty, but no false-scorpions; and the turning over of fallen pieces of rock was equally ineffective, at least down to 1,500 feet, whereabouts a single *Chthonius tetrachelatus* was found, which was the only false-scorpion seen on Mangerton.

One day only now remains; and opportunity must be taken to say something of *Chthonius Rayi*, an animal not seen on the mountains, but found in several places about Killarney as well as at Kenmare and Glengariff, always rather near the towns; it was found to-day, under somewhat different conditions, where the Kenmare road runs under Torc Mountain close by the Middle Lake of Killarney, the animal occurring here on the rocky naturally-wooded shore of the lake in some plenty. Some sifting of dead leaves in the woods near Torc New Bridge brought to light only *Obisium muscorum*; and some further sifting, this time of flood-refuse, on the shore of the Upper Lake was entirely unsuccessful; and thus there is little to record for this last day; which was nevertheless, with glorious weather, one of the most enjoyable of all.

12, Herndon Road, Wandsworth,
London, S.W.

¹ *Irish Nat.*, viii. (1899), 216.

² *Proc. R. I. A.* (3) v., (1898), 165; xxvii. (1909), 106.

ADVANCES IN IRISH MARINE ZOOLOGY.

(THIRD REPORT).

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

TWO previous articles on this subject have appeared in the *Irish Naturalist*.¹ Since the last date the praiseworthy activity of the zoologists attached to the Fisheries Branch of the Irish Department of Agriculture and Technical Instruction has resulted in the production of a large number of valuable reports. Other reports, mainly on the material collected by the Department's cruises, have been contributed by some of the staff of the Dublin Natural History Museum. A few of the many papers dealing with Irish Marine Zoology have already been alluded to in the *Irish Naturalist*, and are therefore omitted in this brief survey.

In my last article I commented principally on the investigations during the years 1905-1906. I now propose to deal with the reports of the Fisheries Branch of the Department, and other papers up to the end of last year.² The various notes and essays may be grouped with advantage under different headings, as has been done on previous occasions.

The reports on Eel fry and Salmonidae, though not altogether belonging to marine zoology, may as well be dealt with here, as they are mostly concerned with these partly marine and partly freshwater fishes.

GENERAL BIOLOGY.—Professor Milroy's paper³ on the occasional variations in the quantity of glycogen present in Oysters is not of apparent practical importance, but as glycogen is a chemical reserve material stored up in all animal tissues, the determination of the quantity of this valuable asset in the body of an oyster at any particular time will help us in estimating the nutriment value of this important food supply at different periods.

In order to extend our knowledge of the surface drift of the Irish sea, Mr. Cunningham,⁴ at Professor Gregg Wilson's suggestion, decided to carry out some very useful experiments with artificial floats containing post-cards. Over 1,200 such

¹ September, 1906, and July, 1907.

² [Including *Fisheries, Ireland, Sci. Invest.*, 1907. ix. 1909].

³ MILROY, J. A.—Seasonal variations in the quantity of glycogen present in samples of oysters. *Fisheries, Ireland, Sci. Invest.*, 1907, iv. [1909].

⁴ CUNNINGHAM, C. M.—Report on the drift of the Irish Sea. *Fisheries, Ireland, Sci. Invest.*, 1907, vii. [1909].

floats having been distributed on the surface of the sea, about one half of them were rediscovered, and the enclosed post-card returned to headquarters. Some of the floats drifted north of Trondjhem in Norway, others went to the coast of Holland and France. The great majority travelled to the British coast, showing that the surface currents are chiefly dependent on the prevailing winds.

A very useful index to the scientific literature, published by the Fisheries Branch of the Department, was written by Mr. C. Green.⁵

FISHES.—The reports on fishes are partly of a systematic nature, but most of them deal with economic problems. In the second report on the fishes of the Irish Atlantic slope, Messrs. Holt and Byrne⁶ supply us with very valuable illustrations of some of the rarer kinds which inhabit the deep water off our west coast. Some species are also figured and described which have not been taken in the Irish area, and it would have been better perhaps if this fact had been more clearly indicated by placing the name of the fish in less prominent type or within brackets.

The fishes figured belong to the Scorpaenidae and Alepocephalidae, but the authors state that 19 species new to the Irish deep sea area have been recognised since the first report was issued. Of these, four were new to science. They have been described and mostly figured in the *Annals and Magazine of Natural History*. The type specimens have presumably been deposited in the British Museum, although the authors do not make a statement to this effect.

So as to enable those who derive financial benefit from the capture of eels, to understand the life history of that valuable fish, Mr. Holt⁷ supplies us with a useful summary of the latest contributions elucidating this problem. Fresh-water eels

⁵ GREEN, CHARLES.—Index to the scientific publications of the Fisheries Branch of the Department of Agriculture and Technical Instruction for Ireland. *Fisheries, Ireland, Sci. Invest.*, 1906, vi. [1908].

⁶ HOLT, E. W. L. and L. W. BYRNE.—Second report on the fishes of the Irish Atlantic Slope. *Fisheries, Ireland, Sci. Invest.*, 1906, v. [1908].

On a species of *Lyconus* from the north-east Atlantic. *Ann. and Mag. Nat. Hist.* (7) Vol. xviii. [1906].

New deep sea fishes from the coast—south-west coast of Ireland. *Ann. and Mag. Nat. Hist.* (8), vol. i. [1908].

⁷ HOLT, E. W. L.—The fresh-water Eel. *Fisheries, Ireland, Sci. Invest.*, 1907, viii. [1909].

breed only once in their lifetime, and for that purpose they must migrate to the sea. The yellow and silver eels are not distinct forms, the former gradually assuming the silvery tinge before descending to the sea. The eggs and earliest stages of eels are still unknown; certain flat, ribbon-like, transparent creatures, however, appear towards spring in between 50 and 100 fathoms of water, and develop later on into young eels or "Logues," as they are called in Ireland. These ascend the rivers chiefly in the spring and summer. It has been definitely ascertained that eels do not breed in the Baltic. They have to go right out into the Atlantic to perform this important function.

Two reports⁸ from the Fisheries Branch deal entirely with the artificial propagation of the Salmon and Trout family, statistical information about Salmon fisheries and kindred matters.

A long report by Mr. Farran⁹ describes the Plaice-marking experiments on the east coast of Ireland during the years 1905 and 1906. Hitherto all we knew about the migration of such fish as plaice was founded on the opinion expressed by fishermen from time to time.

A very large number of plaice were carefully measured and weighed, and then marked by means of vulcanite studs and replaced in the sea. In this manner the size of many plaice and their position in the sea at a certain time of year could be ascertained. A careful watch was now kept for all fish caught, so that their migration and increase in size and weight could be recorded by means of the marks which had been attached to them. The results obtained so far indicate that nearly all the marked fish have been taken comparatively close to where they have been released. Yet a few specimens have wandered far away from their home. One plaice went from Dublin Bay to Ballycotton Bay, and took sixteen and a half months to accomplish this journey of 140 miles.

TUNICATA.—The Sea-squirts, or Ascidians, have been very little studied in Ireland. The report¹⁰ by Mr.

⁸ *Fisheries, Ireland, Sci. Invest.*, 1906, vii. [1907]; 1906, viii. [1908]; 1907, ix. [1909].

⁹ FARRAN, G. P.—Plaice-marking experiments on the east coast of Ireland in 1905 and 1906 *Fisheries, Ireland, Sci. Invest.*, 1907, iii. [1909].

¹⁰ BUCHANAN-WOLLASTON, H. J.—Preliminary report on the Simple Ascidians of the Larne district. *Fisheries, Ireland, Sci. Invest.*, 1902-03, iii. [1907].

Buchanan-Wollaston on these interesting creatures is therefore of considerable value. Twenty-one species were obtained in the Larne district, some of them being new to the Irish fauna, and one variety, viz.: *Polycarpa comata*, var. *nux*, new to science.

MOLLUSCA.—The sea-slugs (nudibranch molluscs) obtained on the eastern and southern trawling grounds of Ireland are described by Mr. Farran, among them two species, viz.—*Eolidiella Alderi* and *Amphorina glottensis* new to the Irish list.

Two groups of free-swimming Molluscs, the so-called "Pteropoda" and "Heteropoda," which largely form food for fishes, are the subject of a report by Miss Massy.¹² Strange to say, no pteropods had ever been recorded before from the east coast of Ireland. Miss Massy now gives us a list of seventeen species, including *Clione gracilis*, new to science, and seven others not hitherto recorded from the British and Irish marine area.

The same author also deals¹³ with another group of Molluscs, the Cuttle-fish, or Cephalopoda. Miss Massy does not specially allude to the fact that Mr. Nichols had embodied all Irish records previous to 1900 in his "List of Marine Mollusca of Ireland," and that his paper therefore forms the basis for future researches. She refers to the paper in the list of references, but it would have facilitated future Irish workers if an allusion to it had appeared in the introduction, and if the names he adopts had been placed under each species. Nine species, including one new to science, are apparently additions to Mr. Nichols' list. The preliminary notice on two new species had already been alluded to in the *Irish Naturalist*, vol. xvii., p. 24. All that need be added is that the name of *Polypus Normani* has had to be withdrawn in favour of *P. piscatorum*.

¹¹ FARRAN, G. P.—Nudibranchiat Mollusca of the trawling grounds of the east and south coasts of Ireland. *Fisheries, Ireland, Sci. Invest.* 1907, vi. [1909].

¹² MASSY, A. L.—The Pteropoda and Heteropoda of the coasts of Ireland. *Fisheries, Ireland, Sci. Invest.*, 1907, ii. [1909].

¹³ MASSY, A. L.—The Cephalopoda Dibranchiata of the coasts of Ireland. *Fisheries, Ireland, Sci. Invest.*, 1907, i. [1909].

CRUSTACEA.—As a contribution to the Crustacean Fauna, Mr. Farran publishes his second report¹⁴ on the Copepoda of the Irish Atlantic slope. Constituting one of the principal, if not the most important, part of the food of fishes, these minute marine organisms, and their distribution and migration, are of supreme economic importance. Mr. Farran deals now chiefly with the Copepods taken in 600 or 1,000 fathoms off the west coast of Ireland, and records 164 species. He thinks that nine of these may be regarded as of southern origin. Altogether no less than thirty species, three of which have been made types of new genera, are described as new, the types, we presume, having been deposited in the British Museum. It seems rather strange that Mr. Farran should have described¹⁵ about the same time when the Fisheries report was published a couple of new species of Copepods, viz. : *Oithona atlantica* and *O. pelagica*, neither of which is alluded to in his report, nor is the report referred to in the paper in which the description appears. Finally, Miss Stephens gives a valuable account of the corals occurring in the Irish Seas. Professor Hickson¹⁶ had already in 1905 drawn attention to the remarkable discovery off the west coast of Ireland of the precious coral, *Corallium Johnsoni*. Most of the corals described by Miss Stephens¹⁷ are new to the Irish marine area, among them *Funiculina quadrangularis*, *Callistephanus Korcui* and *Caligorgia flabellum*, which were previously known only from the Indian and Pacific Ocean. This paper also contains the description of a new Alcyonarian by Professor Hickson, viz. : *Stachyodes Versluysi*. A portion of the type specimen has been deposited in the Irish National Museum.

National Museum, Dublin.

¹⁴ FARRAN, G. P.—Second report on the Copepoda of the Irish Atlantic slope. *Fisheries, Ireland, Sci. Invest.*, 1906, ii. [1908].

¹⁵ FARRAN, G. P.—Note on the Copepod Genus *Oithona*. *Ann. and Mag. Nat. Hist.*, vol. ii. (8), 1909, pp. 498-503.

¹⁶ HICKSON, S. J.—Remarkable Coelenterata from the west coast of Ireland. *Fisheries, Ireland, Sci. Invest.*, 1905, v. [1906].

¹⁷ STEPHENS, JANE.—Alcyonarian and Madreporarian corals of the Irish coasts, with description of a new species of *Stachyodes* by Prof. S. J. Hickson. *Fisheries, Ireland, Sci. Invest.*, 1907, v. [1909]

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Green Monkey, from Mr. J. Miller; a Fox, from Miss M. Spedden; Badgers, from Dr. G. Scriven and Capt. W. Napier; a Double lop-eared Rabbit, from Mr. W. E. P. Phibbs; an Opossum, from Mr. J. M. Kingan; a Corn Bunting, a Song-Thrush, and a Pied Wag-tail, from Mr. W. J. Williams; a pair of Turkeys, from the Hon. A. S. G. Canning; a Turkey Vulture, from Mr. H. B. Rathborne; a Barn Owl, from Mr. W. W. Despard; and four Pigeons from Mr. and Miss Johnson. A fine male Llama from Peru, a Spider Monkey and a pair of Lion Marmosets from Brazil have been acquired. To the great regret of all frequenters of the Gardens, two of the Gibbons have died during the winter, as well as the male Chimpanzee, Barney; the latter had lived in the Anthropoid House for nearly four years.

Great improvements in the cooking and heating arrangements of the Haughton House have lately been made, and the increased facilities thus afforded will, doubtless, be appreciated by visitors during the coming season.

DUBLIN MICROSCOPICAL CLUB.

FEBRUARY, 9.—The Club met at Leinster House. Dr. G. H. PETHYBRIDGE (President), exhibited the parasitic fungus *Sclerotinia cinerea* (Bon.), Schroet. found attacking plums and causing their mummification. The disease produced is commonly known under the name of "Brown Rot" and as such is common to a number of fruits. Formerly only the conidial stage of the fungus was known and was described under the genus *Monilia*. Considerable doubt existed as to whether this Brown Rot of various fruits was due to one fungus, or to several closely allied species. It is now known that there are three fungi which are responsible for the rot, and that each of them is more or less restricted to certain kinds of fruit. Thus *Sclerotinia fructigena* Schroet. occurs on apples and pears, *S. laxa* Aderb et Ruhl. on apricots, and *S. cinerea* (Bon.) Schroet. on cherries, plums, and peaches. In the present instance the conidial form only was present. The plums were received from Co. Antrim, and the fungus has not been previously recorded for Ireland.

Prof. G. H. CARPENTER showed larvae of *Helodes*, a genus of dascillid beetles. The larva is onisciform with remarkably elongate feelers, and occurs beneath the submerged stones of rapid mountain streams. The primitive nature of this larva is shown by the presence of well-developed dentate maxillulæ, which in conjunction with teeth on the labrum appear to have a masticatory function. These structures were well figured by W. Rolf. (*Arch. f. Naturgesch.*, Jahrg. xl., Bd. i., 1874, taf. i., fig. 31), but their nature seems to have been hitherto unrecognised.

F. W. MOORE exhibited the winter stage of the Rose Mildew (*Sphaerotheca pannosa*, Lév.) The mycelium is perennial, and, at the end of the season, it forms dense masses of velvety appearance and grey white in colour. In this the small, dark, sub-globose perithecia are imbedded; one of these perithecia had been opened showing the solitary ascus with spores.

BELFAST NATURALISTS' FIELD CLUB.

AUGUST 14. RICHHILL.—In this excursion 102 members and friends participated, and under the guidance of Dr. Berry, inspected Castleraw and Kilmore church; afterwards visiting Mr. Lamb's jam factory. The party then drove to Richhill Castle where they were received and hospitably entertained by Mrs. Berry, in the unavoidable absence of Major Berry, M.R.I.A. Good natural history collections were obtained, the best find being a specimen of the rare woodlouse, *Porcellio laevis*, taken in the garden of Richhill Castle, this being the second recorded locality in Ulster for this species.

AUGUST 28. ORLOCK POINT.—This was the concluding excursion of the Club's Summer Session and was attended by 41 members and friends. Leaving Belfast the party travelled to Bangor by the 1.55 p.m. train and there mounted the brakes in waiting and drove to Orlock. Here the coast, composed of Ordovician and Silurian rocks, was examined, the walk being afterwards continued to Portavoe demesne, where a short time was spent in collecting previous to the return drive to Bangor.

OCTOBER 27. CONVERSAZIONE.—The winter Session was inaugurated by a *Conversazione* held in the Assembly Hall. Tea was served from 7 till 8 o'clock, during which time an organ recital was given by Mr. T. H. Crowe.

The following is a list of the exhibits:—F. BALFOUR-BROWNE—Living Water-beetles. J. COTTNEY—Examples of birds of nearly equal size, showing variation in size of eggs. C. M. CUNNINGHAM—Coloured plates illustrative of Hawaiian fishes. J. W. DAKIN—Development of Plaice, &c. N. H. FOSTER—Maps to illustrate the recorded distribution of Woodlice in Ireland. W. H. GALLWAY—Living Sea-anemones. W. A. GREEN—Marine Animals. J. MAXWELL—Exhibit of pond and marine life by aid of microscopes, including living specimens of *Melicerta*, *Stephanoceros*, *Limnias* and marine *Polyzoa* and *Hydrozoa*; J. N. MILNE—Irish non-marine mollusca. H. I. ORR—Nests of Irish wasps and bees, and maps showing geographical distribution of the various species. ROBERT PATTERSON—Case of newly-hatched Coots illustrative of "precocious young"; albino Rook; nest of Quaker Parrakeet, *Myiopsittacus monachus*. A. W. STELFOX—Some European examples of Mollusca of the Family *Zonitidae*. Living specimens of *Helix nemoralis* var. *roseozonata* from Co. Fermanagh, and *Helix hortensis* from Co. Derry, collected September, 1908. R. WELCH—Land-shells from Bundoran. Several species of the genus *Succinea*. PROF. GREGG WILSON—Annelids. JOSEPH WRIGHT—Pleistocene Foraminifera from Crete. N. CARROTHERS—Plants from Yorkshire; ferns from New Zealand. REV. CANON LETT—Freshly gathered and mounted specimens of Mosses. WM. W. MYDDLETON—Photo-micrographs of sections of stems of *Rosa canina* and *Crataegus Oxyacantha* to illustrate structural differences between prickles and thorns; sporangia of *Polypodium vulgare* attached to frond and others of germinating spores. W. H. PHILLIPS—British Ferns, showing the results of cross-fertilization. W. J. C. TOMLINSON—Some Connemara and other mounted plants. REV. C. H. WADDELL—Some interesting examples of Mosses. SYLVANUS WEAR—Microscopic exhibit illustrating

anatomy of a leaf. Miss M. K. ANDREWS—Microscopic sections of the orbicular granite of Mullaghderg, Co. Donegal, and of the orbicular diorite (Napoleonite) of Corsica. R. BELL—Beekite from local Cretaceous deposits. ARTHUR R. DWERRYHOUSE—Rock-sections to illustrate intergrowth of minerals. J. STRACHAN—Photo-micrographs of rock-sections, &c. including some local rocks. Agate cavities and agate andesites. Miss ELIZABETH ANDREWS—A deer's antler found in sandhill near Mullaghderg, Co. Donegal. C. BULLA—Old prints and some old books printed in Belfast. WM. CHRISTY—Prize collection of stone implements. FRAS. C. FORTH—Nature study, a set of pictures. WM. GRAY—Old newspapers. W. A. GREEN—Prehistoric implements from North America; scientific photographs. A. R. HOGG—Photographs taken on summer excursions. A cinematograph film entitled "Wild Nature's Ways" was shown by Mr. Hogg at the commencement of the lantern display. D. E. LOWRY—Tongue and palate of Whip Ray from the Bahamas. W. M'KINNEY—Primitive loom from Central Africa. A. B. MORRIS—Nature photographs. A. W. STELFOX—Map of "Ant Village," Flaamsdal, Norway. R. WELCH—Lantern-slides from photographs illustrating Summer Excursions, 1909.

Miscoscopic demonstrations were given by Miss M. K. Andrews, Messrs. Jos. Wright, W. J. Dakin, Gregg Wilson, Sylvanus Wear, J. Strachan, and others.

At 9 o'clock A. R. Hogg gave a lantern display during which an admirable series of cinematograph films, principally of birds at their nests, was exhibited followed by numerous slides from photographs taken by several members in the summer excursions of the Club.

NOVEMBER 16.—The President (N. H. FOSTER, M.B.O.U.) delivered his inaugural address on "The Birds of Hillsborough," before a large audience. He said that for some years past he had kept a careful record of all the birds observed within a radius of some 3 or 4 miles from the village of Hillsborough, Co. Down. He considered this area was rich in bird life to an extent quite above the average, possessing as it did a great variety of ideal haunts for birds of various habits. The elevation of the district varied from about 100 feet above the sea level on the north to 596 feet on the south. Since he had kept this record of the birds observed in the neighbourhood, he had noticed 93 species out of 231 recorded from the N. E. of Ireland. The yearly list yielded about 77 species with a monthly average of about 52, the summer months giving a large preponderance over those of winter. Of the 93 species observed he had proof of the nesting of 68 within the district, Mr. Foster then gave a detailed account of all the various species he had observed. The lecture was illustrated by 50 lantern slides, and at the close was discussed by R. Patterson, F.L.S., B. Hobson, J. N. Milne, and H. L. Orr. The election of 2 new members concluded the proceedings.

NOVEMBER 20. BOTANICAL SECTION.—An address was given by the Chairman of the Section, Rev. C. H. WADDELL, B.D., on the "The Ecology of Plants."

DECEMBER 8. ZOOLOGICAL SECTION.—"The toxic effect of fresh water on marine animals and of sea water on fresh water species" formed a subject on which W. J. DAKIN, M. Sc. read a valuable paper in which

he recounted many of his experiments on animal forms during researches in the North and Baltic Seas.

DECEMBER 18. BOTANICAL SECTION.—W. J. C. TOMLINSON exhibited mounted Connemara plants, and gave notes on their habitats.

DECEMBER 21.—“Some Origins of the Irish people” formed the subject of a lecture given by Major BERRY, M.R.I.A.

JANUARY 15. BOTANICAL SECTION.—R. LI. PRAEGER, M.R.I.A., addressed the Section on “The Study of Native Vegetation.”

JANUARY 18.—A lecture entitled “Dendrites and Picture-Stones” was delivered by J. STRACHAN, giving rise to an animated discussion in which R. Welch, A. R. Dwerryhouse, W. J. C. Tomlinson, Wm. Gray, and John Brown took part.

FEBRUARY 15.—A. R. DWERRYHOUSE, D.Sc., F.G.S., detailed his experiences “With the British Association in Canada, 1909,” and exhibited a large series of views illustrative of the scenery and geology of the region visited.

FEBRUARY 19. BOTANICAL SECTION.—A paper was read by W. H. PHILLIPS, on “The Ferns of Ulster; how to grow, and where to find them.”

FEBRUARY 23. GEOLOGICAL SECTION.—W. J. C. TOMLINSON read a paper entitled “The geology of Weymouth and the coast of Dorset.”

GEOLOGICAL SECTION. JANUARY 26.—W. J. C. TOMLINSON in the chair. JOSEPH MAXWELL lectured on the Diatomaceae, describing their formation and growth, and their movement and distribution. He also dealt with their collection and examination. W. J. DAKIN, M.Sc., discussing the paper, referred to the remarkable variation in quantity of marine diatomes at different times of year.

LIMERICK FIELD CLUB.

ANNUAL MEETING. JANUARY 11.—Rev. T. F. ABBOTT, B.D., Vice-President, occupied the chair.

The Chairman said he had to apologise for the absence of the President, Mr. Neale, whose letter explaining his absence the Secretary would read. Dr. G. Fogerty, Hon. Secretary, read Mr. Neale’s apology regretting his absence, and thanking the members for the honour conferred in electing him as President.

The Chairman said that in the absence of the President it was his duty to make a few brief remarks with regard to the work done during the year just passed. During the past year the Archæological Association had decided on a separate existence, which was only right, and the honorary secretary of the Club would tell them in his report that the history of this Club for the past twelve months was not an unsuccessful one. The majority of the Club members had remained with them, a few had joined the Archæological Society, and one or two members were now in both societies. The Club had still a very good roll of membership, and in the natural history society they had almost all their original members.

Dr. G. FOGERTY then read the Annual Report.

The Committee at the termination of another year, the 17th of the Club’s existence, has to report continued prosperity both as regards

membership and the financial position up to the end of December, 1909. Some of the members have gone over to the Archæological Society and others have joined both societies, but the greater number remain as members of the Field Club alone. The financial statement which the Treasurer read shows a credit balance of £1 17s. 11d. A communication was received last year from the editors of the *Irish Naturalist Journal*, which is the organ of the Irish Field Clubs, asking for a subscription in aid of the publishing fund, and the Committee decided to grant £1, and to endeavour to continue and increase it if funds permitted their doing so. Arrangements having been made early in the year with the Gilchrist Trust for the visit of these lectures to Limerick in September, October, and November, the Secretary decided to have no Field Club lectures during these months so as not to clash in any way with the Gilchrist lectures.

The Committee were glad to report that some few workers in the field of natural history still remain to the Club, who availed themselves of every opportunity to add to our knowledge and increase the local collections. Hearty thanks are due to Miss Knowles (National Museum, Dublin), who has ever taken a keen interest in the flora of the district, and who has been willing to assist on all occasions those of the members who sought her aid, and to Mr. R. A. Phillips, whose critical botanical and conchological knowledge is much appreciated by those who have had the pleasure of his company on many a natural history ramble both in Limerick and Clare. The Committee desire to bestow on them the only gift in their power to convey, and that is that they be made honorary members of our Club.

The Photographic Section, which has been for some time eclipsed by the Archæological, is showing signs of renewed activity.

The Committee regret having to notice the death of a valued member, Captain O'Brien, of Cratloe Woods, whose wooded hills and dales were open at all times to the naturalists. Nothing gave him greater pleasure than to hear that something new had been found in Cratloe Wood.

The Club has also to mourn the loss to botanical science of Miss Charlotte O'Brien. Her home at Foynes was the meeting place of naturalists working in her district, and in a recent visit of the Club to Foynes it was hospitably entertained at Ardenoir.

WINTER MEETINGS.—The 16th Annual Meeting was held on 15th December, Rev. T. F. Abbott, B.D., in the chair.

The 2nd evening meeting was held on February 11th, when Father Gill, S.J., delivered a lecture on "Metamorphoses in Insects."

The 3rd evening meeting was held on the 11th March, Mr. Bruce Murray giving a delightful lecture on the "Hot Springs of Ateoroa," being an account of a personal visit to the North Island of New Zealand.

The 4th evening meeting was held on the 23rd March, when Mr. Isaac Swain, B.A., Field Club Union Lecturer, lectured on "Some Geological Rambles in the County Dublin."

On Friday, 16th April, the prize lantern slides lent by the *Amateur Photographer* were exhibited in the Club room, and brought the winter session to a conclusion.

SUMMER EXCURSIONS.—The first excursion of the year was held on the 19th May to Brittas Castle and Longstone Quarry. Some 27 members and their friends availed themselves of the trip. Brittas Castle on the River Mulcair was first visited and its history and topography explained to the visitors. After lunching by the river the party proceeded to Longstone Quarry, three miles off where they were most courteously received by the managing director, Mr. Scanlan, who gave very interesting details regarding the working of this successful industry. All were highly pleased at the opportunity offered them of seeing the quarries and the excellent work turned out. The return was made to Limerick at 8 p.m.

The second summer excursion was made on the 1st July, and the locality chosen was Killaloe. The party, numbering some 23 members, went out by the 10.30 train, and arriving at their destination walked down the river bank and were taken across by boat to Friar's Island where they inspected the interesting ruins and studied the botany of the place. An ascent of the rocky mountain of Crag, from which a fine view of the surrounding counties may be obtained, was contemplated, but the day proving extremely hot the conductors of the party considered that it was not advisable to carry out this part of the programme. Accordingly cars were provided and the drive to O'Gonnoloe substituted. Returning to Killaloe tea was provided at the Lakeside Hotel, and the party returned to Limerick by the 6.25 train.

A third excursion was arranged for the end of July to Paradise, at the kind invitation of the owner, Mr. Henn, but owing to the floating pier at Kildysart having been removed for repairs it was found impossible to arrange it, as there was no means of landing.

DUBLIN NATURALISTS' FIELD CLUB.

SEPTEMBER 7.—EXCURSION TO LOUGH BRAY.—A small party of members and visitors left Terenure, on cars and bicycles, at 9 a.m., for Lough Bray. When about half way, heavy downpours of rain deterred the cyclists, who returned home. The rain continued through the day and quite prevented any collecting from being carried out. Though the party reached the road at the head of the glen, they were unable to get to the lough.

OCTOBER 16.—EXCURSION TO POWERSCOURT DEMESNE.—A large number of members travelled by the 10.15 train to Bray, whence they drove to Enniskerry. There one section alighted and studied, under the guidance of Dr. McWeeney, the mycology and general botany of the eastern section of the demesne. A smaller party under C. F. Ball, drove some four miles to the waterfall, where they examined the western end, returning to join the main body at Enniskerry. After tea, the conductors gave a demonstration of the esculent and poisonous fungi that had been collected. The members returned to town by the 6.17 train.

NOVEMBER 20.—A fairly large party of members and friends travelled to Kilakee Demesne, under the guidance of D. Houston. This district is very fruitful in fungi of various types, and many interesting specimens were obtained during the day.

NOVEMBER 23.—The first business meeting of the session was held. R. LLOYD PRAEGER delivered a preliminary report on the Clare Island Survey during the summer. Considerable progress had been made in many branches by members of the Dublin Field Club, Belfast Field Club, and others. The lecturer showed some very fine slides of the island and its environs.

J. Bayley Butler made a short communication, illustrated by lantern slides, on native and foreign trees.

Miss Seale, Miss Gordon, Miss M'Nab, G. E. Strahan, were elected members, and Paul Murphy elected an associate member.

DECEMBER 4.—The Club held an excursion to Carrickmines, under the conductorship of T. Hallissy, B.A., where they examined the geological structure and formation of the district. Specimens of galena were obtained at the Ballycorus lead mine.

DECEMBER 7.—Prof. G. H. CARPENTER, B.Sc. in the chair. J. MANGAN, M.A., F.R.C.Sc., delivered a lecture on the "Mouth parts of Insects and their allies." This lecture was of special interest, as it dealt with original work recently carried out by the lecturer. G. H. Carpenter, H. W. D. Dunlop and J. Bayley Butler discussed the paper.

Miss Nixon, Miss Pollock and J. W. Robb were elected members.

IRISH SOCIETY FOR THE PROTECTION OF BIRDS.

The Annual Meeting was held in the Royal Irish Academy House on January 21. The Annual Report which was read included the following:—Six new Bird Protection Orders were obtained during the year, namely for the Counties of Kerry, Antrim, Queen's, Wicklow, Roscommon, and Down; also renewal orders for Waterford and Dublin. Attempted raids on Choughs nests in Kerry were completely frustrated by the Knight of Kerry, assisted by watchers employed by the Society. In conjunction with Mr. Ussler, the Society has successfully protected the breeding-place of the Red-necked Phalarope during last season. A Society's watcher, acting under an order obtained from the Lord Lieutenant, stopped the wholesale catching of Goldfinches that had recently been going on in the Killarney district. In Dublin and Wicklow, and in Achill Island, the Society's watchers have also been active and successful.

In March, 1909, Mr. Richard Kearton lectured for the Society in the theatre of the Royal Dublin Society before a crowded audience.

After the formal business was concluded, Miss Constance Pim delivered an address on the subject of birds and their protection.

REVIEWS.

BIRD MIGRATION.

Report on the Immigrations of Summer Residents In the Spring of 1908. Also Notes on the Immigratory movements and Records received from Lighthouses and Lightvessels during the Autumn of 1907. By the Committee appointed by the British Ornithologist's Club. London, Witherby & Co., 1909, pp. 235, 29 Maps. Price 6s. net.

This Fourth Annual Report is of interest and value to English ornithologists, but owing to the absence of a summary of results, or a comparison with previous Reports it is of little use to an Irish ornithologist. When a little more work would have made all the difference in usefulness, it is a pity the Committee could not have arranged for the extra labour. Perhaps they intend doing this every *five* years, in which case we shall look forward with interest to the next Report. Sir Boyle Roche's celebrated remark about being in two places at once will now have to be slightly modified to. "Barrin I was a Ring-Ouzel"; this species being announced as "arriving *solely* in the western half of the south-coast," and also as "arriving on the south-east coast"; while to add to the typical Hibernian flavour "the earliest records of this species during the past four years have always come from Yorkshire." The migration reports from lighthouses and lightvessels contain many interesting observations.

R. P.

BRITISH AND IRISH PROTOZOA.

The British Freshwater Rhizopoda and Heliozoa. By the late JAMES CASH, assisted by JOHN HOPKINSON, F.L.S., F.Z.S., F.R.M.S. Vol. ii. Rhizopoda, Pt. 2. London: Ray Society, 1909, pp. xviii. and 166, with Frontispiece and Plates xvii.-xxxii.

It is refreshing in these days, when Protozoology is bidding fair to rival Bacteriology in its purely medical development, to turn aside to this work, dealing with the shelled Rhizopods of lake, pool, and ditch. The well-devised plan of vol. i. is continued here. Analytical tables show the classification, and direct the student to minor groups. The synoptical descriptions of genus and species are clear and concise, and the detailed descriptions are full of interest. The figures are of quite exceptional beauty, the execution being unapproached by anything of the kind that we have hitherto seen in English publications. Some of these have been contributed by Prof. G. W. West.

The present volume completes the shelled Lobose Rhizopoda; the Filosa and Heliozoa are left over for a third, concluding, volume.

The work is introduced by its history narrated by Mr. Hopkinson, the collaborator with the nominal author, though he modestly and reverently contents himself with the title of assistant. Mr. Cash must have been, like so many of the scientific amateurs who have distinguished English science, possessed of enormous patience and devotion

to his task. Mr. Hopkinson, from his proximity to the great libraries of London, has been able to supplement the author's expressed weakness in bibliography—especially in reference to foreign works. The full synonymy is invaluable.

We commend this book to all who delight in pond life, as well as to the serious student of the Protista, who would build on a solid foundation of faunistic knowledge.

MARCUS HARTOG.

NOTES.

BOTANY.

Helleborine atroviridis in Ireland.

At the end of June, 1902, Messrs. R. W. Scully, W. A. Shoolbred, and myself found an *Epipactis* (now called by Hill's older generic name) in good quantity, but of course only in bud, on limestone at Killarney, N. Kerry, which from its habit seemed referable to *E. media*, Bab. (Fr. *pro parte*?). Last summer, having occasion to look through my herbarium-set of the genus, I was at once struck by the close resemblance of my specimens to the figure and description of Linton's plant, published in his "Flora of Derbyshire" p. 270 (1903). I immediately wrote to Mr. Scully, who fortunately happened to be staying at Killarney, and was able to send me a good supply of fresh material, some of it still in full flower on August 27, though the bulk was in fruit. The flowers are sometimes deep rose-pink, but usually of a pretty pale pink, tinged with green. Labellum broader than long (in Babington, *E. media*, it is described as being longer than broad); tip subrecurved; basal hunches *plicate* (smooth in *E. latifolia*). Lowest leaves from orbicular to broadly ovate in strong examples, ovate to ovate-lanceolate in weaker ones; the rest *gradually* becoming narrower. Rev. E. F. Linton writes:—"The Killarney plant appears to agree well with *E. atroviridis*, W. R. L., by your description of the flowers, and by the gradually lessening size and narrowing of the leaves upwards. It also differs entirely in the latter (leaf-characters) from my Killarney specimens of 30.7.1885, which are typical *E. latifolia*." I believe, therefore, that the identification is fully established.

EDWARD S. MARSHALL.

Taunton.

Rhinanthus major in Ireland.

Rev. E. S. Marshall writes to me that a *Rhinanthus* I sent to the Exchange Club last year turns out to be *R. major* Ehrh., the Large Yellow Rattle, which has not been found hitherto in Ireland. It was collected in July, 1908. Formerly two sub-species were recognised in the British Flora, *R. Crista-galli* L., which is very common in Ireland, and *R. major* Ehrh., which occurs in Scotland, Wales, and England, but not in Ireland. This is the plant I wish to record, as it is an interesting extension of range. I give exact particulars of locality in hope that some one may look for it and trace out its distribution, which was not

done at the time as I did not know what it was. The plant was growing in fair abundance in a meadow by the River Deel, above Askeaton, Co. Limerick, on the west side of the river, about a quarter of a mile above the town and beyond the Carbide Works. The locality is in the barony of Shanid, and there is no question of the plant being native.

Rev. E. F. Linton has seen the plant, and agrees with Mr. Marshall, and the latter says the Irish plant is the form *platypterns* Fr., the rarest of the three forms which the species assumes, as given in the last edition of the "London Catalogue."

Saintfield.

C. H. WADDELL.

GEOLOGY.

The Cloyne Cave.

In the article on the above subject which lately appeared (*supra*, pp. 44-6), Dr. Hyde Maberly mentions that the only reference to the Cave which he has come across is contained in Smith's History of Cork. I may state that an article dealing with the exploration of portion of this cave as well as the neighbouring caverns of Carrigacrump, by Mr. E. C. Ronayne, B.L., and myself in October 1908, appeared in the June number, 1909, of the *Journal* of the Cork Historical and Archæological Society.

We entered the cave at the main opening, and emerged some hours afterwards through a swallow hole where a stream flowed rapidly into the cave. We travelled nearly 400 yards, first tramping through still water then crawling over banks of compact clay which are apparently above the flood level, as here and there stalagmite had formed. (In a couple of deposits we found cave pearls). We finally came out on all fours along the stream bed to a point about 150 yards from where we entered. We had not time to follow the stream and ascertain whether it could be traced out or whether it formed a syphon. As the roof was low where we first encountered it, there is a probability of the latter.

Carrigacrump Caves about $2\frac{1}{2}$ miles from Cloyne are of a totally different nature. There are several openings in the face of the cliff leading to caverns which consist mainly of lofty vertical fissures crossed by others at right angles. Crystalline stalagmite deposits abound. All these caves contain water at every season of the year. In some places it is 10 feet deep.

In the largest cave we came across a stalagmite boss 16 feet high, and 47 feet in circumference round the base. It tapered to a fine point at the top, near it was a pillar measuring 18 feet to the roof, and 24 feet around the base. Marking the entrance to a fissure was another boss shaped like a pepper canister of hard gritty brown stalagmite.

R. EVANS.

Carker House, Doneraile.



GALLERIES OF *Hylesinus crenatus*
on old Ash Trunk.

To face page 89.

THE ECONOMIC IMPORTANCE OF SCOLYTIDÆ
IN IRISH FORESTRY.

BY A. C. FORBES.

[PLATE 2.]

Although no particular group of insects can be regarded as strictly confined to forest trees in their use of feeding or breeding material, the family of the Scolytidae, perhaps, occupies such a position more nearly than any other. Of several hundred species enumerated by Eichhoff¹ as indigenous to Europe, only some half dozen feed on other than trees or woody plants, the remainder almost entirely confining their operations to the wood or bast layers of their hosts, and rarely being seen on the surface except at pairing time. For this reason they have probably escaped the notice of the ordinary collector to some extent, unless he may have made a special study of tree pests, or been brought into close contact with felled timber. In fact, a saw-miller of an entomological turn of mind would possibly see more of this family in a year than the professional entomologist in a life-time, and they are brought more prominently to the notice of the practical forester than hundreds of genera of greater importance from a cultural stand-point.

In economic entomology it is customary to regard this family as injurious. A close acquaintance with any typical species, however, must lead one to the conclusion that this adjective is scarcely correct when applied collectively to the whole of the genera comprised in it. With one or two exceptions they should rather be regarded as natural scavengers performing similar functions to those of saprophytes amongst fungi, and by hastening the decay of dead material assisting the economy of nature to a very great extent. The fact that they are often found in dying or dead trees may be partly responsible for the idea that they have brought about the destruction of their host; but so far as the writer's observations have gone, no healthy tree is ever attacked by any species, except in such of its parts or branches as have finished their work, or are more or less immaterial to the existence of the plant.

It is the purpose of this note to mention a few species of bark beetles which may, under certain exceptional circum-

¹ "Die Europäischen Borkenkäfer."

stances, prove troublesome to the forester or tree-grower in Ireland. It may be stated at the outset that the number of species in the country altogether probably does not exceed twenty at the most. In the list of Irish beetles compiled by Johnson and Halbert² twelve species only are given. In addition to these, two species have been found by the writer within the last year or two, and possibly a close search would disclose more. The most notable omission from the list is the Elm-bark Beetle (*Scolytus destructor*) probably the most common of all species throughout the Midlands and South of England and Wales, but too easily noticed to have escaped observation had it existed in Ireland. While this species is comparatively harmless, however, the same cannot be said of the Pine Beetle (*Hylurgus piniperda*) probably the only member of the family which can be regarded as really injurious. Scarcely a pine plantation in Ireland can be seen which has not suffered at one time or another from the borings of the mature beetle into the living shoots of the current or preceding year, while every felled log is quickly infested by it for breeding purposes. Two features in the life-history of this beetle are of interest: first, its habit of wintering in fallen shoots, and second, its occasional use of the Spruce for breeding purposes. In Ireland, the former is undoubtedly a common occurrence, although the generally accepted view on the Continent is that it hibernates in the thick bark of standing trees, and it is possible that climatic conditions may affect these habits. Two years ago it was found breeding on spruce logs in Wicklow, a rare occurrence in any part of Europe, and regarded by Eichhoff as a debateable point.

The extent of the damage done by the Pine Beetle is difficult to estimate, but in bad attacks in plantations less than fifty years of age a permanent decrease in height growth is inevitable, and a number of stems are certain to be more or less crooked. All species of pines are liable to injury in the shoots, but possibly *Pinus insignis* suffers more than any where it is exposed to attack. Trees repeatedly attacked by this insect are permanently ruined so far as timber production is concerned, and the crowns acquire a characteristic shape, somewhat as if they had been pruned or trimmed by shears, which has earned for the beetle the title of "Forest Gardener" in German forestry.

² *Proc. Royal Irish Academy* (3), vol. vi., 1902.

Compared with the Pine Beetle all other species of bark beetle are comparatively harmless. On recently transplanted trees, or such as are growing under unfavourable conditions, it sometimes happens that the following may be regarded as injurious:—*Pityogenes bidentatus*, a small black polygamous beetle, the male of which carries two teeth on its wing-cases; *Cryphalus abietis*, one of the smallest of the Scolytidae, and frequently found on Silver Fir, Douglas Fir, Spruce, &c.; and *Hylastes ater*, probably the largest species found on coniferous trees, and breeding on the roots and lower parts of the stem of sickly trees, or on felled stumps. The damage inflicted by any of these may prove fatal when assisted in their attacks by drought, unsuitable soils, and general debility due to recent transplanting. On perfectly healthy trees they are never the cause of serious injury, the principal reason being that an attempt to bore galleries in vigorous trees is at once checked by a flow of sap or resin, and the beetles must either retire or become drowned in the fluid. Of the above, *Pityogenes* is probably the most widely distributed, and may be found in any pine plantation in the tops or branches of felled trees. *Cryphalus abietis* is plentiful in Wicklow, but is not recorded in the list referred to above. Other species commonly met with are—*Hylastes palliatus* in Spruce, Larch, and other logs of couifers; *Hylesium fraxini* in Ash in a dying condition or recently felled timber; *Phlacophthorus rhododactylus* in Gorse; none of which can be considered injurious to healthy plants.

Of the rarer Scolytidae, the writer has found *Pityophthorus pubescens* in Scots Pine near Oughterard, in Galway; and *Hylesinus crenatus*, the largest of all bark beetles, in Ash trunks in Tipperary. The latter was identified by its mother and pupal galleries (Plate 2) and, although hitherto unrecorded for Ireland, there can be no doubt that it exists.

From the complete list of bark beetles recorded in Ireland, it would appear that several species common in England are absent, although the Elm-bark Beetle is perhaps the only remarkable omission. A careful search might, however, lead to the discovery of several which have so far been unobserved, as the difficulty attending observations of this family generally are much greater than in the case of insects spending their entire existence as imago in the open air.

METOPONORTHUS MELANURUS,
A SPECIES OF WOODLOUSE NEW TO IRELAND.

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

In October last Mr. J. N. Halbert discovered under stones close to high water mark in KNOX'S Bay, Howth, Co. Dublin, an active little brightly-coloured woodlouse, which seemed to him different from any he was familiar with. He submitted it to Mr. D. R. Pack-Beresford and myself for identification. We both were of opinion that it was new to the Britannic fauna, and that it agreed to some extent with Mr. Budde-Lund's description of *Metoponorthus melanurus*, B.L. Not being quite certain, we sent it to the original describer of the species, Mr. Budde-Lund, for verification, and he kindly confirmed our identification.

Only two kinds of *Metoponorthus* were hitherto known from the British Islands, viz., *M. cingendus* and *M. pruinus*.¹ The new species grows to about the same size as *Metoponorthus cingendus*, but the ground colour is darker, while it has a longitudinal series of light yellow spots. On the upper surface of every body segment there is a transverse row of minute white tubercles, the head being dark brown. Thus, by the colour alone, the new species is easily distinguishable from the other Britannic species of the genus. But Mr. Budde-Lund attaches more importance to the fact that in this species the first pair of pleopods, which are only visible with a good lens, are small in the female and somewhat apart from one another.²

According to Mr. Budde-Lund, *Metoponorthus melanurus* has been collected on the shores of the Mediterranean, in the south of France, Italy, Corsica, and Algeria. It is probable, therefore, that this species also occurs on the Atlantic coasts of France and possibly in the south-west of England. At any rate, it is an important and interesting addition to the number of species which Ireland has in common with the Mediterranean Region.

National Museum, Dublin.

¹ SCHARFF, R. F.—The Irish Woodlice. *Irish Naturalist*, vol. iii., pp. 4-7 and 25-29, 1894.

² BUDDE-LUND, G.—Crustacea Isopoda Terrestria, p. 181, 1885.

SOME COLEOPTERA FROM CO. MEATH,

BY G. W. NICHOLSON, M.A., M.D., F.E.S.

Last August I did a fortnight's collecting of beetles at Balrath, near Kells, Co. Meath. Although I had, unfortunately, hit upon the very worst time of the year, and insects were extraordinarily scarce, as well in species as in actual numbers, yet was I able to make some interesting captures, among which there are, I believe, two additions to the Irish list.

The first of these is *Hydroporus oblongus*, Steph., of which I took a single specimen at the roots of reeds in what, at most seasons, is a swamp of an area of about an acre, but which, at that particular time, was quite dried out. Owing to this circumstance diligent search produced no more specimens, nor was I successful in finding any in the other suitable places I visited.

The second is *Quedius nigriceps*, Kr. I took a single specimen in the "Bog Wood" at Balrath, from under a decayed pine branch, which was lying on the ground.

As Meath seems to have been but little, if at all, worked for beetles, I append a list of my more important captures. I shall only record such species as, from Messrs. Johnson and Halbert's list, appear to be local in Ireland. I may add that most of my collecting was confined to the Geodephaga and Staphylinidae, as I could find little else.

Carabus catenulatus, Scop., two specimens. *Notiophilus aquaticus*, L., a beautiful steel-blue variety. *Leistus rufescens*, F., a few in damp places, though always singly. *Bradycellus distinctus*, Dej., one. *Pterostichus versicolor*, Sturm, a male, which was shining black, with the first joint of the antennae and claws orange-yellow. *Amara plebeia*, Gyll., one. *Taphria nivalis*, Panz., not uncommon under stones. *Pristonychus terricola*, Herbst, one very much damaged specimen in the cellar. *Anchomenus gracilis*, Gyll.; *A. piceus*, L., a few of both these species. *A. puellus*, Dej.; I had the good fortune to take a colony of seven specimens of this rare insect.

Bembidium v.-striatum, Gyll., common in an old stone wall. *B. doris*, Panz.; several small colonies. *B. bruxellense*, Germ., common. *Trechus minutus*, F., common under stones, but always singly. *T. obtusus*, Er., one. *Colambus confluentis*, F.; *Hydroporus planus*, F.; *H. lituratus*, F., a few. *Agabus nebulosus*, Forst.; *Rhantus cvoletus*, Forst., one. *Tachinus subterraneus*, L., one under bark. *Quedius fumatus*, Steph.; *Q. maurorufus*, Grav., one. *Q. rufipes*, Grav.; *Q. attenuatus*, Gyll., *Q. boops*, Grav., an occasional specimen. *Creophilus maxillosus*, L., a dwarf female of about the size of a *Philonthus splendens*. This species was very common in carrion, and about 30-40 per cent belonged to the var. *ciliaris*, Steph. Although so numerous, most of the specimens were so hopelessly rubbed, that I only killed six individuals of the variety. I observed, however, several specimens in which the pubescence of the hind-body only was yellow, that of the elytra being entirely grey. *Philonthus splendens*, F., common in dung. *P. aeneus*, Rossi; *P. proximus*, Kr.; *P. addendus*, Sharp, common in carrion. Of the latter species, which, to the English collector is a great rarity, I took a fine series; I was able to distinguish them from *P. aeneus* in the field by their more shining head and thorax. *P. albipes*, Grav., three specimens in dung. *P. umbratilis*, Grav.; *P. cephalotes*, Grav.; a few in stable refuse. *P. sordidus*, Grav., two specimens. *P. longicornis*, Steph., in dung. *P. puella*, Nord., very common in horse dung, though far less common in cow dung. *Othius myrmecophilus*, Kies., one under a stone. *Stilicus orbiculatus*, Er., one. *Stenus crassus*, Steph., one under a fungus in a dry ditch. *S. palposus*, Zett., I took a single specimen of this insect in a small reed-bed. *S. bifoveolatus*, Gyll., one in reeds. *Necrophorus ruspator*, Er., var. *microcephalus*, Thoms., one. *Necrodes littoralis*, L., I saw about 50 specimens of this insect in a dead sheep. I was surprised at the absence of Histers, &c., from the carrion, of which beetles I did not secure a single specimen. *Anthrophagus nigricornis*, F., one on an umbellifer. *Chrysomela hyperici*, Forst., common on Ragweed. *Prasocuris junci*, Brahm., a few. *Adimonia tanaceti*, L., one walking across the avenue.

A visit to Virginia, Co. Cavan, produced *Cychnus rostratus*, L., *Melanotus rufipes*, Herbst., *Athous niger*, L., and a long series of *Phyllobrotica v.-maculata*, L., on Common Skullcap.

NOTE ON IRISH ANNELIDS IN THE NATIONAL MUSEUM, DUBLIN.

(NO. II.)

BY PROF. W. C. M'INTOSH, M.D., PH.D., F.R.S.

In the year 1896 a list¹ of the Irish Annelids, kindly forwarded for examination by the late Prof. Perceval Wright, Prof. Haddon, and Dr. Scharff, and by the late Mr. A. G. More, from the Aphroditidæ to the Acœtidæ was given, and in the following note the species are entered as far as the Ariciidæ. This list is the more necessary as in a few instances, by an accident, the Irish localities were omitted in the last part of the Monograph of the British Annelids published by the Ray Society.² In the following list it has been thought desirable to enter all the Irish specimens examined, though these were not in every case sent from the National Museum in Dublin. Those species entered in the former paper are not included unless the locality differs. Much remains to be done in regard to the distribution of known forms, and not a few new species may yet be obtained in Irish waters. This is apparent from the recent interesting paper by Mr. R. Southern, B.Sc., on the pelagic Phyllodocidæ of the coasts of Ireland.³

In the groups included in the following list a complete blank, for instance, occurs in the Amphinomidæ. Paramphionome should be found on the southern and western shores of Ireland, and the list of the Polynoidæ is capable of further increase. *Sigalion Mathildæ* Aud. and Éd. may also be found along with representatives of the Phyllodocidæ not entered in the list. Both Syllids and Nereids are also sure to reward a diligent search of the rich waters and shores of Ireland, and the same may be said of the Glyceridæ and Ariciidæ.

FAM. EUPHROSYNIDÆ.

Spinther mlniaceus, Grube.—Belfast Lough, 7-10 fathoms; a female loaded with ova, in October (Prof. Gregg Wilson).

Euphrosyne foliosa, Audouin and Edwards.—Birtirbuy Bay, Connemara, 15 fathoms (Dr. J. Gwyn Jeffreys and Prof. A. C. Haddon); Aran Isles and Bay of Galway (Prof. E. P. Wright).

Euphrosyne armadillo, Sars.—In 170 fathoms, 'Porcupine' Exped., 1869, amidst sandy mud and corals off the west coast of Ireland.

¹ *Sci. Proc. R. D. S.*, vol. viii., n.s., part v., No. 50.

² Vol. ii., part i.

³ *Fisheries, Ireland, Sci. Invest.*, 1909, No. iii.

FAM. APHRODITIDÆ.

Aphrodite aculeata, L.—A small example, $1\frac{1}{2}$ inches in length, found at No. 147, Roy, Irish Acad. Exped. (A. C. Haddon) is distended with ova. Young also found in Dingle Bay, 45-50 fathoms (Dr. J. G. Jeffreys).

Lætmatonice filicornis, Kinberg.—Off Valentia Island, west coast of Ireland (J. G. J.)

Lætmatonice producta, var. **britannica**, M'I.—In 500 fathoms, on a bottom of sand and gravel, 54 miles off Achill Head (A. C. H.) recognised by Miss Florence Buchanan.

Hermione hystrix, Savigny.—Coast of Ireland.

FAM. POLYNOIDÆ.

Lepidonotus clava, Montagu.—Beginnis Island, Valentia Harbour.

Lagisca floccosa, Savigny.—Coast of Ireland. No locality.

Lagisca extenuata, Grube.—Procured on the tube of a Eunice in 173 fathoms off the west coast of Ireland, and also in a free condition on the same ground.

Evarne Johnstoni, M'Intosh.—S. W. Ireland, 52-60 fathoms, 20.8.90, Roy, Irish Acad. Exped.

Evarne atlantica, M'Intosh.—Dredged at Rockall (station 3A) R. I. Acad. Exped. 1896.

Antinœ Sarsii (Kinberg), Malmgren.—Dredged in the 'Porcupine' Exped. of 1869 at station 28, north-west of the Irish coast.

Antinœ finmarchica, Malmgren.—'Porcupine' Exped. of 1869 off Donegal in 20-420 fathoms; W. Ireland, log 56, in 93 fathoms, 1886, R. I. Acad. Exped.

Antinœ mollis, G. O. Sars.—In muddy sand in 20 fathoms off Donegal, and in 370 and 420 fathoms at various points of the Irish coast in the 'Porcupine' Exped., 1869.

Scalisetosus assmilis, M'Intosh.—Dredged 18 miles off Skelligs in 80 fathoms (J. G. J.)

Halosydna gelatinosa, Sars.—Aran Island, Bay of Galway (E. P. Wright).

Achloe astericola, Delle Chiaja.—Bay of Galway (E. P. W.)

FAM. SIGALIONIDÆ.

Sthenelais boa, Johnston.—Bay of Galway (E. P. W.)

Sthenelais Jeffreysii, M'Intosh.—Off the coast of Galway, lat. $53^{\circ} 16' N.$, and long. $12^{\circ} 42' W.$ in 165 fathoms in the 'Porcupine' Exped. 1869.

Sthenelais *sp.*—South-west of Ireland, log 45, at 328 fathoms, R. I. Acad. Exped., 1886. An imperfect form without a head.

Eusthenelais hibernica, M'Intosh.—Dredged in the 'Porcupine' Exped. of 1869 at station 8, off Galway, in 106 fathoms.

Leanira hystrix, Ehlers.—Dredged in the 'Porcupine' Exped. of 1869, at station 2, off the south coast of Ireland, in 808 fathoms, on a bottom of soft, sticky mud.

FAM. **NEPHTHYDIDÆ.**

- Nephtys cœca**, O. F. M.—Bay of Galway (E. P. W.); Salthill, co. Dublin (A. C. H.); Malahide, R. I. Acad. Exped., 9.9.85.
- Nephtys Hombergli**, Lamarck.—'Porcupine' Exped. 1869, S. W. Ireland, log. 19, 79 fathoms; log. 63, 1886, R.I.A. Exped., 23-38 fathoms; and No. 122, Royal Irish Acad. Exped., Berehaven, 1885. S.W. Ireland, 44-98 fathoms, 1885.
- Nephtys hystricis**, M'Intosh.—Malahide, 1885, R. I. Acad. Exped.; Berehaven, 1885; S.W. Ireland, 44-98 fathoms, 1886.
- Nephtys Johnstoni**, Ehlers.—Porcupine Bank, 85 fathoms, 'Porcupine' Expedition, 1869.
- Nephtys cirrosa**, Ehlers.—In sand under stones at Galway; Berehaven, 1885, R. I. Acad., Exped.
- Nephtys longisetosa**, Crsted.—Nymph Bank, 52½ fathoms, R. I. Acad. Exped., 1886.
- Nephtys incisa**, Malmgren.—6-80 fathoms in the 'Porcupine' Expedition of 1869; Connemara, Galway (A. G. More).
- Nephtys pansa**, Ehlers.—426-458 fathoms, in the 'Porcupine' Exped. of 1869, 51° 1' N., 11° 21' W.

FAM. **PHYLLODOCIDÆ.**

- Notophyllum foliosum**, Sars.—Birtirbuy Bay, 10.6.90, Bay of Galway (E. P. W.)
- Eulalia nebulosa**, Montagu.—Bantry Harbour, 1885, R. I. Acad. Exped.
- Eulalia viridis**, O. F. M.—Bay of Galway (Prof. E. P. Wright); Roundstone Bay (Dr. Scharff); Salthill, co. Dublin (A. C. H.), 1881; Berehaven, R. I. Acad. Exped., 1885.
- Eulalia imbricata**, Ehlers.—Procured in 664 fathoms, 'Porcupine' Exped., 1869, Stat. 23, 56° 9' N., 14° 10' W.
- Eumida sanguinea**, Crsted.—Roundstone Bay, R. I. Acad. Exped., 16.9.90; Salthill, co. Dublin (A. C. H.); Berehaven, R.I.A. Exped., 1885.
- Anaitis kosteriensis**, Malmgren.—Off Bundoran, Donegal Bay, in 20-35 fathoms, 'Porcupine' Expedition, 1869.
- Anaitis Jeffreysii**, M'Intosh.—Off Valencia Harbour, west coast of Ireland (J. G. J.)
- Phyllodoce lamelligera**, Gmelin.—18 inches long, in Roundstone Bay, Connemara; Mouth of Bantry Bay, 23, 1885; Berehaven, 1885.
- Phyllodoce grœnlandica**, Crsted.—Connemara, Galway (A. G. More); Dunmanus Bay, Roy. I. Acad. Exped., 1.2.92.
- Phyllodoce maculata**, Linnæus.—Berehaven, 5 fathoms, R. I. Acad. Exped., 1885.
- Genetyllis hibernica**, M'Intosh.—Coast of Galway (Prof. E. P. Wright).
- Eteone picta**, De Quatrefages.—Roundstone Bay, Connemara, R. I. Acad. Exped., 16.9.90; Mouth of Bantry Bay, 1885, R.I.A. Exped.
- Mystides Lizziae**, M'Intosh.—Berehaven, R. I. Acad. Exped., 1885.

FAM. HESIONIDÆ.

- Ophiodromus flexuosus**, Delle Chiaje.—Stat. V., J. Whitland, 1885, 80-100 fathoms, off coast of Ireland; 'Porcupine' Exped., 1869, on a bottom of muddy sand and pebbles in Bay of Galway; 90-125 fathoms, about 50 miles off Valentia (J. G. J.)
- Castalia punctata**, O. F. Müller.—Bay of Galway (E. P. W.); Berehaven, R.I.A. Exped. 1886; north of Bantry Bay, 23, 1885; S W. Ireland, in 36-37 fathoms, 1885, R. I. Acad. Exped.
- Castalia arctica**, Malmgren.—90-125 fathoms, 50 miles W. of Valentia. (J. G. J.)
- Castalia fusca**, Johnston.—Off Valentia (J. G. J.)

FAM. SYLLIDÆ.

- Exogone gemmifera**, var. **Scharffii**, M'Intosh.—Amongst bristles and hairs of *Aphrodite aculeata*, log 55, R. I. Acad. Exped., 1886.
- Xenosyllis Kinbergi**, M'Intosh.—Along with *Syllis conuta*, H. Rathke, Berehaven, R. I. Acad. Exped., 1885.
- Sphærosyllis hystrix**, Claparède.—In tow-net off Co. Down (Prof. G. S. Brady).
- Eusyllis Blomstrandii**, Malmgren.—S. W. Ireland, log 8, 20 fathoms, R. I. Acad. Exped. 1885.
- Odontosyllis gibba**, Claparède.—Kingstown Harbour (A. C. H.)
- Syllis armillaris**, O. F. M.—S. W. Ireland, 93 fathoms, R. I. Acad. Exped. 1886.
- Syllis cornuta**, H. Rathke.—Dredged in the 'Porcupine' Expedition, 1869, at Station 18, off the Irish Coast in 20-25 fathoms; Berehaven, R. I. Acad. Exped. 1885.
- Syllis abyssicola**, Ehlers.—Dredged at Station 30, north-west of Ireland, 56° 24' N. 11° 37' W., in the 'Porcupine' Expedition, 1869.

FAM. NEREIDÆ.

- Nereis pelagica**, L.—Valentia Harbour (J. G. J.); Bay of Galway (E. P. W.); Berehaven. R. I. Acad. Exped. 1886.
- Nereis cultrifera**, Grube.—At low water, Beginnis Island, Valentia Harbour (J.G.J.).
- Nereis Dumerilli**, Aud. and Ed.—Valentia Harbour and in 4 fathoms beyond (J.G.J.); Aran Islands (E. P. W.); Lough Slyne, Co. Cork, R.I.A. Exped. 1886.
- Nereis diversicolor**, O. F. Müller.—Coast of Ireland (W. Thompson).
- Nereis longissima**, Johnston.—Ireland (W. Thompson ?)
- Nereis (Nereilepas) fucata**, Savigny.—In 80 fathoms, 18 miles west of Skelligs (J.G.J.).

FAM. EUNICIDÆ.

- Lumbriconereis fragilis**, O. F. Müller.—30-50 miles west of Valentia, in 90-125 fathoms (J.G.J.); 18 miles west of Skellig, in 80 fathoms; and in 45 to 50 fathoms, Dingle Bay (J.G.J.); Aran Islands and Bay of Galway (E.P.W.).

- Lumbriconereis Latreillii**, Audouin and Edwards.—Lough Slyne, Co. Cork, 1886, R.I.A. Exped.
- Lumbriconereis Impatiens**, Claparède.—Nymph Bank, S.W. Ireland, 52½ fathoms, R.I.A. Exped. 1886; Berehaven, R.I.A. Exped. 1885; and log 17, S.W. Ireland, in 110 fathoms, 1885; Kenmare; S.W. Ireland, log 55, 110 fathoms. R.I.A. Exped. 1885.
- Lumbriconereis hibernica**, M'Intosh.—Dredged in 90 fathoms, 25 miles W. of the Blaskets, S.W. Ireland (J.G.J.); log 55, 23-38 fathoms. R.I.A. Exped. 1886.
- Lumbriconereis gracilis**, Ehlers.—Bantry Bay, 5½ fathoms; S.W. Ireland, 35-37 fathoms, R.I.A. Exped. 1885; Coast of Kerry (A. G. More); Loch Slyne, Co. Cork, 1886; in 90 fathoms, 25 miles west of the Blaskets, S.W. Ireland (J.G.J.); 'Porcupine' Expedition, 1869, in 370 fathoms off Ireland.
- Drilonereis longa**, Webster.—Log 29, in 40 fathoms, R.I.A. Exped., 1885.
- Arabella iricolor**, Montagu.—Off Galway, in 15-20 fathoms, 'Porcupine' Expedition, 1869; Bantry Harbour, R.I. Acad. Exped., 1885.
- Onuphis britannica**, M'Intosh.—Bay of Galway, (E. P. W.); S.W. Ireland, Stat. I., log. 3, 45 fathoms and 80 fathoms, R. I. Acad. Exped., 1885; Stat. 7, S.W. Ireland, 22 fathoms, 1890; 35-50 miles west of Valentia in 90-125 fathoms.
- Onuphis brevibrachiata**, Ehlers.—Dredged in the 'Porcupine' Exped., 1869, Stat. 36, 48° 50' N., 11° 7' W., in 72 fathoms, in sandy mud.
- Onuphis fragosa**, Ehlers.—Dredged in the 'Porcupine' Exped., 1869, in 370 fathoms on sticky mud, off the coast of Ireland.
- Hyalinæcia sicula**, De Quatrefages.—Connemara, Galway (A. G. M.); 'Porcupine' Expedition, 1869, in 370 fathoms, on sticky mud, off Ireland; Nymph Bank, S.W. Ireland, in 52½ fathoms, R. I. Acad. Exped., 1886.
- Hyalinæcia tubicola**, O. F. Müller.—Dredged in 90-125 fathoms, 20-50 miles west of Valentia; in 80 fathoms, 18 miles west of Skellig; 70 fathoms in Dingle Bay; 25 fathoms off Valentia; 90-100 fathoms 30 miles west of the Blaskets, S. W. Ireland (J. G. J.)
- Eunice Harassii**, Aud. and Edw.—Log.-56, R.I.A. Exped., 1886.
- Eunice fasciata**, Risso.—Dredged in 160 fathoms 55 miles west of Valentia, Ireland (J. G. J.); in 75 fathoms on mud with stones and mussel shells, and in 80 fathoms on muddy sand with pebbles, in the 'Porcupine' Exped., 1869; S.W. Ireland, log 56, R. I. Acad. Exped.
- Eunice norvegica**, Linn. (*pennata*, O. F. Müller).—Dredged 55 miles west of Valentia in 160 fathoms.
- Eunice floridana**, Pourtales.—Amongst colonies of *Lophophebia prolifera* in 200 fathoms, 50 miles off Bolus Head, Kerry (F. Buchanan); 'Porcupine' Exped., 1869, in 173 fathoms off Ireland.
- Lysidice punctata**, Risso (*L. ninetta*, Audouin and Edwards).—Bay of Galway (E. P. W.); Connemara (A. G. M.).

FAM. **GONIADIÆ.**

Gonlada maculata, (Ersted.—25 miles west of Valentia, in 75-80 fathoms; S.W. Ireland, 110 fathoms, off the Blaskets; Valentia Harbour (J. G. J.); S.W. Ireland, log. 55, and Bantry Bay, 35 fathoms, R. I. Acad. Exped., 1886; Dingle Bay, 20-40 fathoms, 'Porcupine' Exped., 1869)

Glycinde Normanni, Malmgren.—Bay of Galway (E. P. W.); 110 fathoms, off the Blaskets (J. G. J.); 'Porcupine' Exped., 1869, Dingle Bay, in 30-40 fathoms, and at Stat. 36, in 725 fathoms on a sandy bottom.

FAM. **GLYCERIDÆ.**

Glycera lapidum, De Quatrefages.—30-50 miles off Valentia, in 90-125 fathoms; 18 miles west of Skelligs, in 80 fathoms; in Dingle Bay, in 50 fathoms; and in Valentia Harbour (J. G. J.); 50 fathoms, in Dingle Bay, and off Bundoran, Donegal Bay, in 20-35 fathoms, 'Porcupine' Exped., 1869.

Glycera siphonostoma, Delle Chiaje.—Connemara (A. G. M); 110 fathoms, 30 miles west of the Blaskets (J. G. J.)

Glycera alba, H. Rathke—Kenmare River, R.I.A. Exped., 188.90; 30-40 fathoms, Dingle Bay, and off Bundoran, 'Porcupine' Exped., 1869.

Glycera Goesi, Malmgren.—In 160 fathoms, 55 miles west of Valentia; 110 fathoms, 30 miles west of the Blaskets; Bay of Galway, 15-20 fathoms (J. G. J.)

FAM. **ARICIIDÆ.**

Aricia Cuvieri, Aud. & Edwards.—R.I.A. Exped., No. 122.

Aricia Buskii, N. S.—Dredged at Station 6, in 358 fathoms, and at Station 8, in 257 fathoms, 'Porcupine' Exped., 1869,

Scoloplos armiger, O. F. Müller.—Fragment from Malahide, 1885 (A. C. H.)

Gatty Marine Laboratory, St. Andrews.

IRISH SOCIETIES.**ROYAL ZOOLOGICAL SOCIETY.**

Recent gifts include an Easog or Irish Stoat from Mr. W. W. Despard; three Cavies from Mrs. Forsythe; Peafowl from Mr. E. R. Dumford, and Mr. G. W. Marsh; two Canary-Goldfinch Hybrids from Mr. R. Carley; a Swan from Lieut-Col. Poe; a Heron from Mr. G. Clifton; a Chinese Goose, and a Blue and Yellow Macaw from Mrs. Cullinan; a Sparrow-Hawk from Mr. H. B. Rathborne; and two Yokohama Fowls from Miss G. S. F. Wilson. A Black-headed Lemur has been born in the Monkey House. Great improvements to the Gardens have been made during the winter, a new path and bridge having opened up the whole western side of the lake to visitors, affording a beautiful promenade from which the water-fowl that frequent the lake can be readily observed.

DUBLIN MICROSCOPICAL CLUB.

MARCH 9.—The Club met at Leinster House. DR. G. H. PETHYBRIDGE (President) in the chair.

C. F. BALL showed some preparations of *Curcubitaria Piceae*, a new species of fungus found last year in Scotland, and described by Dr. Borthwick of Edinburgh. It has been found in two gardens in Co. Dublin growing upon *Picea pungens*. The glaucous variety of this tree is one of the hardiest and most ornamental of conifers, so it would be a serious loss to parks and gardens if the fungus became widespread. An affected tree is entirely disfigured by a bad attack, the lower branches seem to be always injured before the upper ones. The buds of the tree are killed by the fungus, and the leaves also turn brown, and drop off.

In the winter stage the fungus appears on the buds, and to the eye is like a black stroma dotted with round papillæ. These papillæ are the fructifications of the fungus, which is a pyrenocarpon ascomycete; the mycelium is found in the cortex. The pyrenocarp contains the hymenium of paraphyses, and asci, each ascus having 4 to 6 spores. The spores are liberated gradually by an apical pore, and are very distinct; they are brown, and torpedo-shaped, and become multicellular by the formation of transverse and longitudinal septa.

Prof. G. H. CARPENTER showed a wing-bud dissected out of a caterpillar of *Odontoptera bidentata*, and explained the method of wing-development in the Lepidoptera and other metabolic insects.

F. W. MOORE exhibited a section of a diseased Vine-root on which a parasitic fungus was present. The root had patches of diseased tissue of varying size. In some parts the cortex and portions of the woody cylinder of the roots had decayed away. It was not possible to identify the fungus in its existing condition.

REVIEW.

BLUE BUTTERFLIES.

A Natural History of the British Lepidoptera: their World-wide Variation and Geographical Distribution. By J. W. TUTT, F.E.S. Vol. x. London: Swan Sonnenschein & Co., 1908-9, pp. 410, plates i.-liii. Price 20s. net.

This volume of Mr. Tutt's great work is the third devoted to the Butterflies (the second was reviewed in our pages two years ago, vol. xvii., p. 142). It is characterized by the same thoroughness of treatment as its predecessors, and by even greater wealth of detail. Only five species are described in the systematic portion of the volume, occupying 350 pages, so that each insect has on the average 70 pages devoted to its consideration. The five butterflies dealt with in this volume are all "Blues" belonging to the sub-family *Lycæninæ*, and Mr. Tutt refers each species to a distinct genus. In this action he is in agreement with the best modern continental and American authorities, and British students of the Lepidoptera will probably come to recognise that the innovation is justifiable. In our commonly used catalogues all these five insects

are included in the comprehensive genus known as *Lycæna* or *Polyommatus*. According to Mr. Tutt's nomenclature the five species are *Everes argiades*, *Cupido minimus*, *Plebeius argus*, *Cyaniris semiargus* and *Agriades thetis*.

The first of these, *Everes argiades*, can be claimed as British merely on the strength of a few specimens, captured in the southern counties of England, some of which are of very doubtful authenticity. The genuine records are doubtless due to sporadic immigrations from France, and though the butterfly has an immense continental range it seems unlikely ever to establish itself in our islands. *Cupido minimus*, the "Little Blue" is widespread both in the British Islands and on the Continent, it ranges from the Mediterranean to 67° N. lat.; from Co. Galway to Kamchatka. *Cupido* and *Everes* are referred by Mr. Tutt to a tribe *Everidi*, distinguished by definite structural characters—notably the genital armature of males—from the *Plebeiidi*, in which are included the remaining three species dealt with in the volume. None of these are known as Irish insects. Mr. Tutt quotes Birchall's unauthenticated records of *Plebeius argus (aezon)* from Co. Wicklow and Rostrevor, but despite its wide range in England and abroad, the butterfly is apparently not a member of our Hibernian fauna. *Cyaniris semiargus (acis)* is now thought to be extinct in Great Britain, where it was once widespread, while *Agriades thetis*, the lovely "Adonis Butterfly," is confined to the south and east of England, and it is, by its Continental range, a typical member of Scharff's "Siberian fauna."

A valuable feature in this volume is the number and beauty of the plates. The variation of the butterflies is well illustrated by "process" figures, and the structural details, on which Mr. Tutt rightly lays so much stress, are made clear by the admirable photomicrographs due to Messrs. A. E. Tonge and F. N. Clark. The figures of the genital armatures and larval cuticles are especially noteworthy; the latter by the way ought not to be labelled "skin." In an introductory section, Mr. Tutt describes the larval habits of "Coppers," "Skippers," and "Swallow tails," by no means confining himself to British examples of those interesting sections.

G. H. C.

NOTES.

BOTANY.

Plants of Antrim and Down.

The occurrences of *Sisymbrium Thalianum*, in Co. Down, have been so few as to merit the record of a fresh locality. On Easter Monday last year (1909). Mr. N. Carrothers and I met with a fine colony growing on old walls on the Ballykinler sand-dunes facing Dundrum. The more robust plants were already in flower. The only previous county records are Movilla Abbey, Newtownards, and on railway ballast between Lenaderg and Scarva,

It was my good fortune to come across a fine clump of *Carex Pseudocyperus* in August last, in a deep wide drain situated to the south of Portmore lake. The occurrence of this Sedge in this new locality for Co. Antrim is welcome, as the plant is likely to be exterminated soon from the Bog Meadows station, near Belfast, owing to drainage and building operations.

I have pleasure in recording the finding last summer of *Orchis pyramidalis*, Linn., and *Saxifraga tridactylites*, Linn., by Mr. Sylvanus Wear, in the vicinity of the golf course between Portrush and the White Rocks. Neither of them has hitherto been recorded save from the southern end of the county. Another scarce Antrim plant which he gathered at the same locality was *Vicia lathyroides*, Linn., not hitherto noted from the district.

W. J. C. TOMLINSON.

Belfast.

ZOOLOGY.

The Well-Shrimp in Co. Westmeath.

A specimen of the Well-Shrimp (*Niphargus kochianus*, Sp. Bate) was recently sent to the Museum by Dr. M'Weeney, who had found it in water from a deep well near Mullingar, Co. Westmeath. Two specimens of this interesting blind amphipod from a well in Co. Clare had previously been sent to the Museum for identification by Dr. M'Weeney, and are recorded in *Irish Naturalist*, vol. xvi., 1907, p. 208; it has also been recorded from wells in Co. Dublin, and is probably to be found in several of the limestone wells in the central districts of Ireland.

A. R. NICHOLS.

National Museum, Dublin.

Greenland Falcons in Co. Donegal.

I think the exceptionally severe weather which we have had this winter must also have prevailed in the higher latitudes. † We had very large flocks of wild geese coming to us in the autumn, and also much more striking visitors in the shape of Greenland Falcons (*Falco candicans*). In the past I have only been able to record the occurrence of this species, may be once in three or four years. This winter I can report probably eight occurrences.

On 20th November, Dr. Eardley shot a fine female at Burtonport, and a gamekeeper shot another near Killybegs. Then about same date Mr. J. H. Deegan shot a specimen on Tory Island, and again at the new year he shot another. Both frequented the island for some days. They frequently alighted upon the gable of the chapel, which is the highest point in the island.

On 30th December, a male was shot at Dunfanaghy by Mr. Kelso, and sent to Derry for preservation.

Then in the first week of January my friend, Mr. Asshur Bond and others saw a Greenland Falcon at Inch, Lough Swilly. (This is an addition to the Inch list.) Mr. Lawrence Nash, of Derry, reported to

me that he saw a male bird at the Oaks, seven miles inland from Derry, at the new year, and a female at Glenties Co. Donegal, in middle of December.

An examination of these dates points, I think, to the probability of *two* southward flights of these falcons, one about second or third week of November, and another about same time in December.

D. C. CAMPBELL.

Londonderry.

Bird Records from Irish Lighthouses.

I desire to record following occurrences:—

MARCH 25TH.—Four Black Redstarts were found dead on Fastnet Rock by the light-keeper—two were old males. MARCH 26TH.—A Hoopoe was caught alive, Tuskar Rock Light Station. MARCH 28TH.—A Hoopoe was caught alive on Small Saltee Island.

All the above birds were received by me in the flesh. Both the Hoopoes died—probably from exhaustion—and to this cause may also be attributed the death of the four Black Redstarts.

RICHD. M. BARRINGTON.

Fassaroe, Bray.

Measurements of Martens.

As the Marten is annually becoming scarcer in Ireland—and as statistics of its weights and measurements are scarce—the following particulars of six Martens killed near Rathdrum, Co. Wicklow, in 1890, may be worth recording. I am indebted to Dr. R. R. Leeper, late of Rathdrum, and now of St. Patrick's Hospital, Dublin, for the details.

Date.	Sex.	Length from tip of nose to tip of tail.		Girth of body.	Girth of forearm below joint.
		Ft.	Ins.	Inches,	Inches.
Aug. 26, .	♂	2	3	8½	3½
„ 28, .	♀	2	1	7	3
Sept. 1, .	♀	2	2½	8	3
„ 5, .	♂	2	3	9	3½
„ 6, .	♂	2	4	6	3½
„ 7, .	♀	2	0½	7½	3

I would urge all naturalists to avoid killing or purchasing this interesting wild animal, unless absolutely necessary for scientific purposes.

RICHD. M. BARRINGTON.

Fassaroe, Bray.

LUMINOUS WORMS IN IRELAND.

BY REV. HILDERIC FRIEND.

ARE there luminous worms in Ireland? I believe there are; and am therefore placing some facts before the readers of the *Irish Naturalist* in the hope that they will direct their attention to the subject, and do what they can to prove that my impressions are well founded. In "A Catalogue of British Worms" published in 1865 by order of the Trustees of the British Museum, I find the following entry:—

'Of the following I have seen no specimens, *L. phosphoreus*, spinets mostly single throughout, tetrastichous; vulvæ on the fifteenth segment; clitellus with four segments commencing with the 13th; body somewhat flattened behind. Length 15'''.

Lumbricus phosphoreus, Dugès in *Ann. des sc. nat.*, ser. 2, viii., 17 and 24. *Grube*.

Hab. Boggy ground.

Obs. The information on which this species is introduced is unsatisfactory. At the Meeting of the British Association at Cork, in 1843, Dr. Allman exhibited "specimens of an annelid which he discovered some years ago in the bogs of the south of Ireland, and which was the cause of a luminous appearance. It was closely allied to the earthworm; when irritated it gave out a phosphorescent light, which was also much increased when the animal was exposed to the vapour of alcohol. The light was of the peculiar green colour so usual in the phosphorescence of living animals. The Rev. F. B. Clarke had also found these annelids in the bogs of Connaught." (*Trans. Brit. Assoc.*, 1843, p. 76.) At a meeting of the Lit. and Phil. Society of Liverpool, Nov. 14, 1853, Mr. Henry Cox exhibited an earthworm which was phosphorescent (*Proceedings*, No. viii., p. 57).'

Thus far, then, we have the testimony of Dr. Allman, and the Rev. F. B. Clarke, that luminous worms have been found in the bogs of Connaught, and the bogs of the south of Ireland. Can any light be thrown on these statements?

First let us examine the definition given above of *L. phosphoreus*. A single glance suffices to show (1) that it is inaccurate, and (2) that it is not a *Lumbricus*. The 'clitellus with four segments commencing with the 13th' shows that it cannot be placed among the *Lumbricidae*, and makes it impossible to look for the 'vulvæ on the 15th segment,' while no genuine *Lumbricus* has 'spinets mostly single throughout.'

The position of the girdle or clitellus, however, supplies a clue, and we turn from *Lumbricus* to *Microscolex*. Here we

find some suggestive facts. In September, 1897, specimens of a phosphorescent worm were discovered in the garden and lawn of Mr. T. G. Caink (City Engineer), at Fort Royal, Worcester, England. They emitted a luminous light, similar to that of a glow-worm, but fainter. This luminosity appeared to be existent in every part of the body, also in the evacuated grass or passed earth and slime left by the worm. Specimens were examined by Mr. F. E. Beddard, F.R.S., who replied thus:—

‘The small earthworm you sent me proves not to belong to any genus that is known to be indigenous to this country. It is, so far as I can make out from external characters only, a species of *Microscolex*. That genus has been found in Italy, but is characteristically New Zealand and South American in range. I cannot, of course, be absolutely positive about the genus without dissecting it, but I can be positive that it is at least very near to that genus. It is a new fact that *Microscolex* is phosphorescent.’

Here then we have taken a step forward. In 1843, luminous worms were reported as occurring in Ireland. In 1853, a similar report was made at Liverpool, and in 1897, again at Worcester. Either these luminous worms were indigenous, or they had been introduced from abroad. But it does not seem likely that foreign worms would be found in Irish bogs, or on a lawn in the heart of England. And the argument is in favour of their being indigenous.

But now arises the question—If they are luminous can they belong to the genus *Microscolex*? ‘It is a new fact,’ says Beddard in 1897, ‘that *Microscolex* is phosphorescent.’ But the new fact was in reality an old one, as the same writer was shortly afterwards to show in his splendid “*Monograph of the Oligochaeta.*” To go into the whole question of luminosity among annelids would be to write a very long chapter. I have accumulated a vast amount of material on the subject, which will in due course see the light elsewhere. It is sufficient here to say that *Microscolex* is now known to contain at least one species which is luminous; and there are strong reasons for believing that others are so. Our knowledge of the genus is, however, at present far from being complete, and it is to be hoped that we shall now soon obtain information from Ireland which will help us in our researches.

To further this end I am glad to be able to say that *Microcolex* or an allied genus is indigenous to Great Britain, and that there is reason to believe that we have more than one species in these Islands. This curious annelid is not easy to find, and I have reasons for thinking that it has often been mistaken for the young of certain species of *Allolobophora*. May I appeal to my Irish fellow-workers to seek for and send me specimens? For their guidance I may say one word respecting the appearance of the worm and its probable habitats.

Microcolex is a worm of slender build, but of considerable length; say 2 mm. in diameter, and two to four inches long. It is of a fleshy colour, with rich supplies of blood, and vessels which can be easily seen. The girdle may be absent, but is found usually between the 12th and 20th segments, *i.e.*, very much nearer the head than in any of our ordinary earthworms.

It is said to have been found in the garden and on the lawn of a house in Worcester; but it is possible that the worm was then away from its usual haunts. I have always found it in, under, or near water. It may be taken along with *Allurus*, from which it may be instantly distinguished by the fact that *Allurus* is short, stout, and quadrangular. If the runnels which feed the lakes and bogs are examined, the worms may be found among the gritty detritus which is being washed down from the higher levels. I have found the worm in considerable numbers in little streamlets on hill-sides, as well as in the loamy soil by the sides of ponds and pools.¹ I should be exceedingly grateful for specimens of worms taken in such localities, as well as for a few samples of *Lumbricus papillosus*, Fr. (*L. Friendi*, Cognetti), which has never yet been taken in England.

St. Asaph, Great Malvern.

¹ Since this article was written three months ago a second species of worm, of the kind here described, has been found in streamlets and pools in Cornwall. Its girdle extends from the fourteenth to the twenty-third segment, or thereabouts, but the worm is several inches in length. This shows that we have not yet by any means exhausted our fauna. It may be added that Hoffmeister's *Helodrilus*, described in 1845, appears to be related to these worms, and was not a true Lumbricid. Much, clearly, remains to be done before the monograph which I am preparing for the Ray Society can be completed.

ON THE IRISH SPECIES OF OBISIUM ;
WITH SPECIAL REFERENCE TO ONE FROM GLENGARIFF
NEW TO THE BRITANNIC FAUNA.

BY H. WALLIS KEW.

Obisium muscorum, Leach, is well known in Ireland (1-5) and two other species have recently been discovered: *Obisium maritimum*, Leach, on the shores of the Bays of Kenmare and Bantry (5); and another species—the one with which we are more especially concerned—on a rocky wooded hillside at Glengariff.

Leach's types of *O. muscorum* and *O. maritimum*, the former Scottish and the latter English, are preserved in the British Museum, where they have been examined by Cambridge (4) and by the writer; and thus, with these species, no difficulties of identification arise. The remaining species, however, is in different case; for it is unknown in Britain—and thus new to the Britannic fauna—and the task of determining it was beset with serious difficulties.

The genus has many species in Europe; and is, moreover, badly in want of thorough revision. We have a good account of one species by Hansen, and able re-descriptions of several by Ellingsen, but for the rest we have to rely almost entirely on L. Koch (6) and Simon (7), the former without figures and the latter insufficiently illustrated—and both published at a time when the extent of the genus and the critical character of it had not become apparent. It does not seem to have been realised at that time that the species were liable to differences of sex, to individual variation, and to differentiation into geographical races; moreover, the characters relied on, e.g. the development of the hand and relative length of hand and fingers, are now known to be unstable; and other features which have been found to be of value, such as the character of the teeth of the fingers, are not mentioned at all. In these circumstances, the Glengariff specimens could not be identified from the literature; but the writer was fortunately permitted to submit them to Mr. Ellingsen and afterwards to M. Simon; and was at length favoured by the latter distinguished arachnologist with certain specimens from his collection for comparison.

It had been anticipated that our species might be the one described by Simon as *O. muscorum*; and specimens so named received from him—and agreeing fairly well with his description (7)—were found to agree in every respect with ours; so that it was at last established that our third Irish species is the *O. muscorum* (Leach) Simon. That this is not Leach's *O. muscorum* has already been made clear by Cambridge (4), who long ago pointed out that Simon's species must have its name changed; and I propose now, after consultation with Mr. Ellingsen, that it be named—in honour of Professor Geo. H. Carpenter—*Obisium Carpenteri*.

Our three species, by no means critical among themselves, are readily separated by good sharp characters. Some particulars of them are given below; but in this connection it must be remarked that size and coloration can only be approximately indicated—one has to remember also that the colours are quickly altered in spirit—and as regards sex it must be noted that the male is usually a little smaller than the female, with the tubercle of the movable finger of the chelicerae less fully developed, the palps somewhat less stout, with the tibia less broad and slightly longer, the hand less voluminous, and the fingers in proportion to the hand a little longer. All three species are 4-eyed and without galea; and they thus belong to the sub-genus *Obisium s.s.*

1. *Obisium muscorum*, Leach.

O. muscorum, Leach (8).

O. simile (L. Koch) Simon (7); in part.¹

Palps clear reddish-horny, cephalothorax and abdominal tergites deep olive, the former with reddish tinge, legs horny. Cephalothorax with median process obsolete; chelicerae with tubercle of movable finger (in female) high, almost semicircular, teeth of fixed finger small; palps

¹ *O. muscorum* Leach is confused by Simon with *O. simile* L. Koch. The latter was based on types collected by Simon; and, according to specimens with which he has favoured me, it resembles *O. muscorum* in general figure as well as in having the fingers much longer than the hand and tarsus² (leg iv.) much longer than tarsus¹; but it is larger, and though somewhat elongated and thus differing in build from the rather stout *O. Carpenteri*, it seems more related to that species, for the median process of the cephalothorax is prominent and the teeth of the fixed finger are of uniform character.

with femur almost equally broad near base and near extremity, towards middle distinctly concave behind with corresponding convexity in front, tibia scarcely or not broader than femur, membranous opening about $\frac{1}{2}$ front margin (stalk excluded), hand variable more or less tumid and of only moderate length (in female more voluminous than in male), fingers much longer than hand, teeth of fixed finger tapering and rounded at tip with broader higher sharply pointed ones at intervals, teeth of movable finger distinct; legs iv. with tarsus² much longer than tarsus¹ (at least 1.3). L. 2.8 mm.

In woods, and in open country, from sea-level to near the tops of mountains; common and widely distributed. ULSTER.—Lough Gilly, Co. Armagh (Johnson); Poyntzpass, Co. Armagh (Johnson); Kinbane, Co. Antrim (Welch); Ballycastle, Co. Antrim (Welch). CONNAUGHT.—Leenane, Co. Galway (Halbert); Delphi, Co. Mayo (Halbert). LEINSTER.—Lucan, Co. Dublin (Scharff); Ovoca, Co. Wicklow; Bray, Co. Wicklow (Scharff); Fenagh, Co. Carlow (Pack-Beresford). MUNSTER.—Glandore, Co. Cork (Halbert); Killarney and Kenmare, Co. Kerry (Halbert); Cloonee Loughs, Co. Kerry (H.W.K.).

2. *Oblisium Carpenteri*, nom. nov.

O. muscorum (Leach) Simon (7); by mistake.

Palps reddish-horny, perhaps tinged with olive, cephalothorax and abdominal tergites deep olive the former with reddish tinge, legs horny. Cephalothorax with median process prominent; chelicerae with tubercle of movable finger moderately high convex, teeth of fixed finger rather small; palps with femur increasing slightly from near base to near extremity, towards middle slightly concave behind with corresponding slight convexity in front, tibia distinctly but not greatly broader than distal part of femur, membranous opening about $\frac{1}{2}$ front margin (stalk excluded), hand rather long and broad (in female distinctly voluminous), fingers longer than hand, teeth of fixed finger abruptly pointed uniform (without larger ones at intervals), teeth of movable finger in most part almost obsolete; legs iv. with tarsus² scarcely longer than tarsus¹. L. 3.3 mm.

On a rocky wooded hillside; under a fragment of rock (one), in moulting and brood nests under outer bark of *Arbutus* trees (seven). MUNSTER.—Glengarriff, Co. Cork (H.W.K.).

3. *Oblisium maritimum*, Leach.

O. maritimum, Leach (8).

O. littorale, Moniez (9).

Palps rich horny-brown (not reddish), cephalothorax and abdominal tergites deep olive-horny, legs greenish. Cephalothorax with median process prominent; chelicerae with tubercle of movable finger long rather low subangular, teeth of fixed finger large; palps with femur gradually increasing from near base to near extremity, in front and behind nearly straight, tibia distinctly but not greatly wider than distal part of femur, membranous opening about $\frac{1}{3}$ of front (stalk excluded),

hand rather long and relatively narrow, fingers scarcely as long as hand, teeth of fixed finger like those of last species but smaller, teeth of movable finger distinct; legs iv. with tarsus¹ and tarsus² about equal. L. 3·2 mm.

On the sea-shore between tide-marks; plentiful where it occurs. MUNSTER.—Kenmare Bay, Co. Kerry; Bantry Bay, Co. Cork (H.W.K.).

With regard to extra-Irish distribution, our knowledge is too fragmentary for definite pronouncements; but it may be useful to give the facts as far as they go. *O. muscorum* (generally distributed in Britain) is evidently a species of wide range; according to Ellingsen (10) it has been found from north of the Polar Circle in Norway to the Mediterranean. *O. maritimum* occurs in the Isle of Man at Port Erin; in Britain on the western and south-western shores, *i.e.* in Ross, Argyll, Cornwall, and Devon; beyond, it has been found in Jersey, and in France near Boulogne (9) and near St. Malo (11); but whether it goes round the west of Europe to the Mediterranean is not certainly known, an old record by Risso (12) being, I suppose, doubtful. Of *O. Carpenteri*, finally, confusions of nomenclature leave us little that is certain; in Ireland it may be restricted to the south-west; and in this connection—in view of facts known to everyone—it is significant to find that the animal is in France, according to Simon, a southern species; it is rare, he says, in the environs of Paris, and on the contrary commonest of all in Corsica and in Algeria.

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12, Herndon-road, Wandsworth, London, S.W.

REVIEWS.

POPULAR BEE-KEEPING.

Bees for Profit and Pleasure. BY H. GEARY, Expert to the Leicestershire Beekeepers' Association. Edited by T. W. SANDERS, F.Z.S. London: W. H. & L. Collingridge. Pp. 114. Price 1s. net.

Mr. Geary intends this little book to be a practical guide to those commencing beekeeping, and it successfully fulfils this purpose. The cardinal facts connected with the life-history and practical management of bees are presented in a concise and readable manner, and in language sufficiently simple for the beginner to clearly understand what is meant. The binding and printing of the book are good considering the price at which it is published, but one or two of the illustrations, notably those showing "Stimulative Feeding" and "Uncapping" are not clear.

In the paragraph describing the selection of a stock, some very useful hints are given as to the points to be looked to in buying a stock in spring. The hives described by the author would be improved if the parts directly overlapped or telescoped into one another instead of having slips of wood nailed to the outside of the hive to protect the junctions of the various parts from the weather. Our Irish Congested Districts Board hive is superior in this respect. Referring to a hive he states that "the frames should run at right angles to the entrance, this being for several reasons better than having them parallel with the entrance." He does not give the reasons, but I should like to hear them, as the vast majority of hives in Ireland are used with the frames parallel to the entrance, and apparently without any ill effects. The information supplied in the book is sound and practical ; it includes a calendar of bee-keeping operations, and hints on the uses of honey.

G. O. S

AN IRISH PLANT LIST.

National Museum of Science and Art, Dublin: Hand List of Irish Flowering Plants and Ferns. Dublin, 1910. Pp. 26, iv. Price 1d.

Irish field botanists are to be congratulated on the issue of this valuable little Hand List at the "ridiculously small" price of one penny. A sufficient guarantee of its accuracy is to be found in the statement made at the close of Professor Johnson's brief preface that the preparation of the work is due to his assistant, Miss M. C. Knowles. Her familiarity with the Irish flora, no less in literature than in the field and in the herbarium, is well-known to all students of Irish plant distribution, and they certainly owe her a debt of gratitude for the production of a *vade mecum* which is destined to travel far and wide with them on their plant-hunting forays.

The title of the work is misleadingly modest. If it were published, as it well might be, under the style, *The Dublin Catalogue of Irish Plants*, its scope would be immediately apparent; for the Hand List does for Ireland precisely what the well-known *London Catalogue* does for Great Britain. With students of Irish plant distribution this Hand List of ours is bound to supersede the *London Catalogue*, since it gives us in one view the Irish flora and its county distribution unhampered by the addition of those numerous species of Great Britain which we need never hope to find in our remoter and more ancient island. No disparagement is here suggested of the familiar *London Catalogue*, which has done us Irish botanists such good service in the past. Irish botany has simply forged ahead, so that we have at last, what we long desired to have, and what the peculiar geological history and geographical position of our island demands, a succinct statement of the Irish flora as a separate botanical entity of European interest.

In spite of many changes of name necessitated by a strict adherence to the law of priority, it is pleasant to find that at least the generic names of the List differ but little from those adopted in the second edition of *Cybele Hibernica* (1898) and the later *Irish Topographical Botany* of Mr. Præger (1901), which follows the nomenclature of *Cybele*. After long discussion of this perplexing question of nomenclature some twelve years ago, the editors of *Cybele*, convinced that a revolt against the strict application of the priority law was bound to come sooner or later, decided to retain such well established generic names as *Spergularia*, *Capsella*, *Corydalis*, *Calystegia*, *Mertensia*, and *Daboecia*, while rejecting their equal and newly resurrected rivals, *Buda*, *Bursa*, *Neckera*, *Volvulus*, and *Boretta*. This forecast of the drift of opinion has been justified; for the last International Botanical Congress held at Vienna in 1905 has, as is well known, adopted a rule (20), and in accordance therewith a list of generic names (*Index nominum genericorum utique conservandarum*) which are henceforth to be taboo to the nomenclature reformer. In this list or Index of "permissible illegalities," as we venture to call it, appear the

six genera just referred to as retained in *Cybele* in defiance of the law of priority. The result of this wholesome reaction is to bring the nomenclature of the Hand List, which adheres to the Vienna Rules, into much closer conformity with Irish distributional text-books than might have been expected from the trend of nomenclature reform a few years ago. The changes which appear in the list in the specific or trivial names are rather numerous, but the addition in parentheses of the *Cybele* names precludes all confusion from this source.

If these nomenclature changes in the Hand List are not such as to cause any serious obstacle to its use in conjunction with *Topographical Botany* or *Cybele Hibernica*, it is otherwise with the sequence of orders which it adopts. The familiar Benthamic arrangement, in a descending series from Ranunculaceae to Filices, is discarded in favour of Engler's sequence, an ascending series from the Ferns upwards to the Composites (*Syllabus der Pflanzen-familien*, 5th Ed.). As is obvious from the position he assigns to the Composites, Engler's sequence is not a mere reversal of Bentham and Hooker's. There is much internal re-arrangement of the orders. The Ranunculaceae are relegated to the middle, the Milk-worts are placed alongside the Spurges, the Potamogetons precede the Grasses, and the Heaths come close to the Umbellifers. Such a re-arrangement may prove to be fully justified as an expression of botanical affinities, and Professor Johnson may be a true prophet when he asserts in his preface that Engler's system "must sooner or later be used by field botanists everywhere." Yet, for all that, the adoption of the new system in the Hand List cannot fail to prove a hindrance to its use in conjunction with our Irish distributional text books.

As a guide to the comparative rarity of our Irish species the List leaves nothing to be desired. The numbers following each species truly represent their county distributions as known at the opening of this year, and present to the field worker a compendious summary of the results recorded in *Topographical Botany* and in the supplements to that work. But the list does something more than this. It places on record, in their proper systematic positions and distinguished by italic type, the numerous casuals hitherto observed in Ireland, including many for the first time detected by Miss Knowles, who has given special attention to this unstable element in our flora. A rather wide interpretation has been given to the term Casual, so that a few species are found italicised which some of us would prefer to see simply starred as established aliens, such, for instance, as *Erinus alpinus* and *Mentha Requieni*, which appear to be fully domiciled in Cork. But this sceptical attitude towards aliens, if fault it be, is surely a "blessed fault."

In conclusion it should be said that the Hand List is carefully printed, and the proofs so well revised that errors are singularly few and unimportant. When a reprint is called for, it might be well to produce along with it a few copies of an *edition de luxe* on better paper and at a correspondingly higher price, say two pence, or even three pence.

THE NON-MARINE MOLLUSCA OF INISHMORE.

BY R. A. PHILLIPS.

IN August, 1908, I spent four days on Inishmore, the largest of the Aran Islands, Galway Bay, and devoted some of the time to working out the distribution of its land and freshwater mollusca. These islands, which, for biological purposes, are included with County Clare, have always had great attraction for naturalists, and Inishmore has been visited by conchologists on several previous occasions, the results of their collecting being summarized in the *Irish Naturalist*, 1907 (p. 353) by Mr. A. W. Stelfox, who gives a list of thirty-two species found on the island.

The species found by me on this occasion, for which I can find no previous record, number fifteen, the most interesting being *Succinea oblonga* and *Pupa anglica*, two species not previously recorded for any island off the Irish coast.

Of the shells included in Mr. Stelfox's list I did not see *Hyalinia Draparnaudi*, *H. nitida*, *H. fulva*, *Pupa muscorum*, or *Vertigo antivertigo*, and a careful search in several likely spots failed to reveal the presence of *Vertigo moulinsiana* or *V. Lilljeborgi*.

The weather was very dry and hot, consequently it was difficult to find some of the land-shells and slugs, and it was only during a slight mist, which fell on the last morning of my visit and just before leaving the island, that I was able to procure a few specimens of the large *Helix nemoralis*, which secrete themselves during dry weather in the fissures of the limestone pavements.

Four small freshwater lakes occur on the island, one in a little valley between the rocks about a mile south-west of Kilronan, and one each near Oghil, Kilmurvy, and Bungowla; and in these I found *Limnæa peregra*, var. *Boissyi*, *L. truncatula*, *Planorbis spirorbis*, var. *leucostoma*, and various *Pisidia*.

The following list comprises all the species seen by me or for which I can find any records. Additions to Mr. Stelfox's list are preceded by an asterisk. And here I desire to express my thanks to Mr. B. B. Woodward, who kindly named the *Pisidia*; and to Messrs. J. W. Taylor, F.L.S., and A. S. Kennard, F.G.S., for notes on various other species.

- Vitrina pellucida**, Müll.—Near Kilronan, Kilmurvy, and The Seven Churches.
- Hyallnia cellaria**, Müll.—Plentiful throughout the island. All my specimens have been referred by Mr. Kennard to his *Vitrea hibernica*. Some very large shells (one measuring 14 mm. in diameter) at first seemed to me to be *Hy. Draparnaudi*, but subsequent examination showed them to be the large Irish form (*Vitrea hibernica*, Kennard) so frequently mistaken for that species, and I feel certain that all previous records for *Hy. Draparnaudi* on Inishmore should be transferred to the same form.
- Hy. allaria**, Miller.—Under stones and among moss in several places, and on trees near Kilmurvy.
- ***Hy. nitidula**, Drap.—Sparingly by the lake near Kilronan.
- Hy. radiatula**, Alder.—A few specimens by the lake near Kilronan.
- Hy. crystallina**, Müll.—Frequent in damp places.
- Hy. fulva**, Müll. } Both recorded by Mr. Stelfox (*I. N.*, 1907, p.
Hy. nitida, Müll. } —357.)
- Arlon ater**, L.—Abundant everywhere.
- ***A. subfuscus**, Drap.—Near Kilronan and The Seven Churches.
- A. hortensis**, Fér.—Plentiful near Kilronan, Kilmurvy, and The Seven Churches.
- ***A. intermedius**, Normand.—One specimen by a small stream near Oghil.
- ***Limax marginatus**, Müll.—Recorded by Dr. Scharff (*I. N.*, vol. i., page 89.)
- Agriolimax agrestis**, L.—Abundant everywhere.
- ***A. lævis**, Müll.—Two specimens by a stream near Oghil.
- Amalia Sowerbyi**, Fér. } —Under stones near Kilronan and at The
A. gagates, Drap. } Seven Churches.
- Helix rupestris**, Drap.—Common throughout the island. The var. *viridescens-alba* plentiful in the locality near Kilronan noted by Mr. Stelfox, also near Kilmurvy.
- H. rotundata**, Müll.—Common throughout.
- H. pulchella**, Müll.—In rejectamenta from the lake near Kilronan, also in the extreme west of the island.
- H. hispida**, L.—Frequent throughout.
- H. rufescens**, Penn.—Abundant by walls and buildings in all parts of the island.
- H. virgata**, Da Costa.—Common, the prevailing forms being *albicans*, *lutescens* and the type. The var. *alba* also occurred, and some very large examples were found on grassy slopes at the extreme west.
- H. intersecta**, Poir.—A few examples only seen near Kilronan.
- H. ericetorum**, Müll.—Very abundant and variable, the small high-spired form (var. *instabilis*) prevailing, though some specimens from the extreme west of the island are large and rather flat. Among my specimens the vars. *leucozona*, *hyalozonata*, *lentiginosa*, *lutescens*, and *alba* occur, and a few are of a dull opaque pink colour.
- H. acuta**, Müll.—Abundant, but of a rather small form, the type prevailing, and var. *strigata* not uncommon in the west.

- H. nemoralis**, L.—The dry weather prevented my seeing as much of this species as I expected. I obtained a few specimens of the characteristic large form high up on the elevated limestone between Kilronan and Killeany; at lower levels and along the coast the specimens are not remarkable for size. Var. *libellula*, with and without bands, is the commonest colour form, a large proportion of them being white-lipped. The var. *rubella*, all bandless and some having pink lips, also occurred in fair quantity, as well as a few specimens of var. *olivacea*. On the mountain limestone of the mainland between Black Head and Lisdoonvarna, just opposite the Aran Islands, the same large race is widely distributed, its variation in colour and banding being much greater there than on the island.
- H. aspersa**, Müll.—Common throughout, but mostly hidden for want of moisture. I did not see var. *exalbida* in a living state, but in the little hotel my attention was attracted by a home-made picture frame, the corners of which were ornamented with sixteen fine specimens of this handsome shell. I was informed that the frame was made by a local policeman.
- Cochlicopa lubrica**, Müll.—Occurred in nearly all the damp places examined. Var. *viridula* was found near Bungowla.
- ***Pupa anglica**, Fér.—In moss on rocks by the lake near Kilronan, and with *Succinea oblonga* by a spring at the extreme west of the island.
- P. cylindracea**, Da Costa.—Common and sometimes very large. Vars. *curta* and *albina* were collected.
- P. muscorum**, L.—Recorded by Mr. Stauden (*Jour. Conch.*, vol. viii., p. 182.)
- Vertigo pygmæa**, Drap.—Frequent throughout, and variable in size.
- V. antivertigo**, Drap.—Found sparingly by Mr. Stelfox (*J. N.* 1907, p. 360.)
- [*v. moulinsiana*, Dupuy.—Recorded by Dr. Scharff (*J. N.*, vol. i.), but subsequently withdrawn (*J. N.*, vol. xii., 1903, p. 14.)]
- ***Balea perversa**, L.—On a rock between Kilmurvy and The Seven Churches I found a small portion of this shell, just sufficient to show that the species exists on the island.
- Clausilia bidentata**, Ström.—Common on rocks and stones everywhere, and on trees at Kilmurvy.
- ***Succinea oblonga**, Drap.—I had almost given up hope of finding this genus represented on the island, when, to my surprise, this rare species turned up by a small elevated spring at the extreme west. The spot was bare and exposed, but the mollusks found shelter in a small fringe of Creeping Willow (*Salix repens*) growing on the edges of the spring. I got about fifty adult shells, all dead but in good condition, and saw numerous juvenile living specimens.
- ***Carychium minimum**, Müll.—Common in all damp places.
- ***Limnaea peregra**, Müll.—Plentiful in each of the four little lakes. Var. *Boissyi* was the prevailing form, but some specimens from near Kilmurvy have been referred by Mr. J. W. Taylor to var. *acuminata*.
- ***L. truncatula**, Müll.—In all the lakes and in the spring near which *Succinea oblonga* occurred. The specimens are nearly all var. *elegans*.

**Pianorbis splrorbis*, L.—Abundant in the lakes, and all var. *leucostoma*.

Hydrobia ventrosa, Mont. }
H. Jenkinsi, Smith. } Both occurred in a little brackish lake near Kilronan, the habitat recorded by Mr. Stelfox.

**Pisidium obtusale*, C. Pfr.

**P. nitidum*, Jenyns.

**P. gassiessianum*, Dupuy.

**P. pusillum*, Gmel.

**P. personatum*, Malen.

{ This genus is well represented on the island, and occurred in all the freshwater lakes. I did not keep the gatherings from each locality separate, but all were submitted to Mr. B. B. Woodward, of the British Museum, who kindly examined and found these five species among them. *P. milium*, Held. (= *P. gassiessianum*, Dupuy) has been recorded also by Mr. R. Standen in the *Journal of Conchology*, 1896, page 180.

Cork.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a large Rhesus Monkey from Mrs. Topping, two young Ring-tailed Capuchins from Mr. R. Casement, C.M.G.; a Ring-tailed Lemur from the Marchioness of Waterford, two Hedgehogs from Mr. W. R. Dalton, a Cane Rat from Captain Corsallis, a Collared Peccary from Mr. J. B. Lendrum, a Kestrel from Mr. S. J. Rawson, a Barn Owl from Miss E. Fitchener, a Grass Parrakeet from Colonel J. G. Adamson, a Ring-Ouzel from Mr. R. M. Barrington, eleven Lesser Red-polls from Mr. W. W. Despard, and a Curlew from Dr. G. B. Crawford.

Many animals have been acquired by purchase or exchange, the most noteworthy being a young male Chimpanzee, three Barbary Apes, a Pine-Marten, a Reindeer, a pair of Golden Eagles, and two pairs of Alpine Choughs.

The male Chimpanzee, who replaces the lamented "Barney," is an exceptionally handsome specimen rejoicing in the name of "Mr. James." Neither Barbary Apes, Peccaries, nor Reindeer have been on view in the Gardens for several years past, so that the new arrivals will doubtless prove a great attraction to visitors.

BELFAST NATURALISTS' FIELD CLUB.

MARCH 2.—ZOOLOGICAL SECTION.—R. WELCH, M.R.I.A., read a paper on "Variation due to Environment, illustrated mainly by the Mollusca." Mr. WELCH, introducing this subject for discussion, first referred to the special susceptibility of plants to variation due to their environment, giving examples of very marked cases due to differences in soil. He exhibited specimens of *Pyrola*, *Sisymbrium*, *Orchis*, &c., from Mr. N. Carrothers' herbarium. Passing to the Mollusca, he gave instances of restricted areas where white-shelled forms of species, usually found with dark shells, are common. Altitude seems at times to affect the size and colour of shells very much, and specimens were exhibited to illustrate these points. The question of variation in size, texture,

and shape of certain fresh-water species living in varying volumes of water, also the effects of life in running and still water were discussed.

Examples were shown of *Limnæa stagnaiis* and *Anodonta cygnea*, including the very large form, 9 inches long, found in a small pond near Preston. The smaller sizes of shells on islands as compared with those on the mainland were referred to, some very marked exceptions, such as the very large *Helix nemoralis* from the Aran Islands and Inishmurry on the west coast of Ireland being mentioned. The large proportion of white-lipped forms of the lest species that live in the N.W. Donegal coast, and the heavy forms that occur on bare areas of the sandhills where the only feast is *Psamma arenaria* with an occasional *Senecis Jacobæa*, were exhibited.

An exceptionally varied series of the common Dog Whelk, *Purpura lapillus*, was shown. These were sent by Mr. R. Standen to show how much the conditions on exposed or sheltered rocks, and a varying good supply affected the size, form and colour of the shell.

In the discussion which followed A. W. Stelfox exhibited *Helicella itala*, showing marked variation from four different environments—(a) Chalk downs, (b) Central Plain of Ireland, (c) Sheltered and (d) Windswept sand-dunes.

MARCH 15.—F. BALFOUR-BROWNE, M.A., F.R.S.E., F.Z.S., read his Report as Delegate to the British Association, 1909.

Afterwards Miss MARGARET E. DOBBS gave a lecture on "The Archæological Evidence of the Truth of Irish Records." Miss Dobbs gave many instances in which archæological evidence confirmed ancient history and tradition. No other country in North Europe can claim to have preserved a fact from the Bronze Age. Yet, if archæology is to be believed, this can be said of Ireland, and testifies to the accuracy and marvellous memories of the literary class who preserved these traditions.

MARCH 19.—BOTANICAL SECTION.—Rev. C. H. WADDELL, M.A., B.D., read a paper entitled, "Plant Life in a Bog." The object of the lecturer was to describe the peculiarities of bog plants and point out how they were fitted for life on a peat soil. Peat is poor in bacteria; is not well ærated and the humous acids which it contains prevent the absorption of water by the plant roots. This environment has evolved plants in which transpiration is restricted, the leaves of xerophytes being narrow, and the leaf-pores often situated in grooves so as to prevent too great transpiration. The formation of peat was described and the growth of bog-mosses or Sphagnum.

The lecture was illustrated by a very fine set of specimens of bog-plants. It was noted that many of our most interesting bog-plants, such as *Andromeda*, are becoming scarce with the disappearance of bogs.

MARCH 23.—GEOLOGICAL SECTION.—Lecture by JAMES STRACHAN on "The Chalcedony of Ballyboland, County Antrim." A deposit of chalcedony found in the large quarry at Ballyboland, near Ballymoney, was described in detail. The rock in which the chalcedony occurs is typically basaltic, being composed of a plagioclase felspar, augite, olivine and magnetite. As the veins of chalcedony are approached the rock varies in composition, passing from blue basalt to purple basalt. In the latter the olivine is replaced by chloritic and serpentinous minerals, and

the percentage of iron is largely increased. In the blue basalt a fluxional structure predominates, but in the purple portions there is a strong tendency to ophitic structure. In the veins three layers occur; I., composed of a chloritic mineral; II., composed of carbonates of calcium and magnesium; III., composed of the chalcedony. A striking feature is the intergrowth of II. and III. to form a white jasper. The lecturer gave reasons for supposing that the vein-stuffs and the purple rock were magmatic separations rather than solfataric alteration products. The lecture was illustrated by specimens and microscopic sections.

APRIL 9.—BOTANICAL SECTION.—A paper entitled, "Short Notes on the Plants of the Cave Hill and Neighbourhood," was read by N. CARROTHERS, Secretary of the Botanical Section. The paper which was illustrated by a particularly fine collection of plants from the vicinity of Cave Hill, contained much useful information regarding the economic and medicinal value of many of the plants, and many quaint allusions to old-world beliefs in their magical properties.

A description of the types of vegetation, found at varying elevations on the hill, contained many valuable hints as to local opportunities for ecological studies.

Among the more interesting plants mentioned were:—*Lathræa Squamaria*, *Petastities fragrans*, *Allium ursinum*, *Habenaria albida*, *H. viridis*, *Pyrola minor*, *P. media*, *Geranium pratense*, *G. perenne*, *Orobanche rubra*, *Sisymbrium Thalianum*, *Lithospermum officinale*, *Orchis pyramidalis*, *Botrychium Lunaria* *Hymenophyllum peltatum* and *Saxifraga umbrosa*.

APRIL 12.—W. H. PHILLIPS read a paper on the "Crossing of Ferns," giving an interesting account of his own work in fern-culture and hybridizing, illustrated by specimens of his best results.

APRIL 19.—ANNUAL MEETING.—The following office-bearers were elected:—President, R. WELCH, M.R.I.A.; Vice-President, W. J. C. TOMLINSON; Treasurer, W. H. PHILLIPS; Librarian, SYLVANUS WEAR; Secretaries, JEAN AGNEW and A. W. STELFOX; Committee, Miss M. K. ANDREWS, ROBERT BELL, F. BALFOUR-BROWNE, M.A.; F.R.S.E.; N. CARROTHERS, A. R. DWERRYHOUSE, D.Sc.; W. J. FENNEL, N. H. FOSTER, M.B.O.U.; W. A. GREEN, H. L. ORR, R. PATTERSON, F.L.S.

DUBLIN MICROSCOPICAL CLUB.

APRIL 13.—The Club met at Leinster House. Dr. G. H. PETHYBRIDGE (President), exhibited the parasitic fungus *Phoma oleracea*, Sacc., growing on a swede turnip from Kilkeel, Co. Down. Some half dozen or more species of this genus have been recorded as attacking members of the genus *Brassica*, and the one mentioned has been shown by Ritzema Bos to be the cause of serious trouble in Holland on cabbage. The Irish specimens were kindly examined by Dr. Bos, and pronounced to be identical with the *Phoma oleracea*, Sacc., found on cabbages. This fungus has not been previously recorded for Ireland. It appears to cause a somewhat slow rot of the "bulb" of the swede, but in the specimens examined the rot had not gone deeper than the rind.

Prof. G. H. CARPENTER, showed maxillae of the rare lepidosporid bristle-tail *Lepidospora Braueri*, from the Seychelles, pointing out the beautiful "comb" of flattened spines on the inner edge of the lacinia.

THE AUTUMNAL MORTALITY AMONG SHREWS.

BY C. B. MOFFAT.

ON the vexed question of the cause of the autumnal mortality so prevalent in the Common and Lesser Shrews (*Sorex araneus* and *S. minutus*), Mr. Lionel E. Adams has brought forward a most interesting and original hypothesis in a paper¹ which he recently read to the Manchester Literary and Philosophical Society. The question is highly deserving of the notice of Irish naturalists, because it opens up a new field for inquiry as regards the life-history of one of the few mammals found in Ireland. It is well known that the Common Shrew of Great Britain is absent from our fauna; but the Lesser Shrew is, in all probability, a more common animal in Ireland than in England.

Putting aside for plain and (I think) sufficient reasons most of the theories that have been hitherto broached as to the cause of the so-called "epidemic" which leads to so many shrews being seen dead on roads and footpaths in autumn, Mr. Adams adduces the simple and novel suggestion that the animals have died of old age! And his suggestion, which is supported by a strong though not perhaps conclusive argument, embraces as a necessary part of itself the still more remarkable theory that a shrew can only live for about a year and two months. So brief a span of life as this seems scarcely credible, but the facts which Mr. Adams adduces in favour of his hypothesis deserve to be looked at closely.

Mr. Adams has for many years been in the habit of trapping small mammals, and has taken many specimens of the Common Shrew—with a considerable though much smaller number of *S. minutus*—at all seasons of the year. In dealing with this subject he incidentally refers to the old belief that shrews hibernate, and it is only fair in behalf of Irish zoologists to point out an error into which he falls in stating that Mr. J. G. Millais—in his work on the "Mammals of Great

¹A Hypothesis as to the cause of the Autumnal Epidemic of the Common and the Lesser Shrew, with some Notes on their Habits, by Lionel E. Adams, B.A., *Proc. Manchester Lit. and Phil. Society*, 1909-'10, vol. 54, Pt. ii.

Britain and Ireland," published in 1904—"was the first to draw attention to the ancient error, perpetuated through all the text books, that the shrews opened the winter months in profound torpor." Nearly ten years before the appearance of Mr. Millais's work Mr. Barrett-Hamilton, in a review of Lydekker's "British Mammals" in this journal,¹ had pointed out that such an opinion was no longer tenable, and that the Lesser Shrew was active during the coldest spells of an Irish winter. The point, however, on which Mr. Adams desires to lay stress is that while he has trapped shrews in some numbers during every month of the year (with the apparent exception of March) all those captured by him after November, and *nearly* all those captured after the end of August, have been immature individuals. What becomes of the adults, which thus cease to be taken in the traps from about the time when the "autumnal epidemic" has run its course? The coincidence is, at any rate, very suggestive. Mr. Adams believes that they cease to be trapped for the simple reason that they are all dead. The "autumnal epidemic," he suggests, "*is due to nothing more than old age; old age in the case of the Common and the Lesser Shrew being reached in, roughly, thirteen or fourteen months.*"

Statistics as to the animals captured and measured are given by Mr. Adams in the form of a table, from which it appears that the period during which adult shrews have been taken in his traps extends from June to November in the case of the Common Shrew, and from May to September in the case of the Lesser. He has taken altogether 204 specimens of the former and 40 of the latter species, and the general conclusions borne out by both sets of statistics are identical.

Mr. Adams's theory has thus the important merit that it makes two sets of facts—otherwise both in need of explanation—mutually explain one another. If we reject it we are as far as ever from understanding the autumnal mortality, while on the other hand we find ourselves in need of some alternative explanation of the fresh fact brought forward by Mr. Adams—the disappearance of adult shrews in winter, while immature members of both species continue to be taken in the traps.

¹ *Irish Naturalist*, vol. iv., 1895, p. 70.

The only alternative explanation on the latter point—and it is a purely conjectural one—which occurs to me is that, after all, there may be something in the old opinion that shrews hibernate to some extent in the winter months, when insect food is undoubtedly much less easy to obtain than in summer. The adult shrews may be better hibernators than the young, or they may be more successful in securing winter quarters of such a character as to favour undisturbed repose. Though I have no very pertinent facts on which to rest this conjecture, we have the curious case of another insectivorous native mammal, the Hedgehog, which, though a regular hibernant, is, as I have shown elsewhere,¹ liable to waken up and be seen abroad on very cold frosty nights, when it cannot but be a grave inconvenience to the animal to be under the necessity of seeking insect or molluscosous food. Bats, on the other hand, enjoy winter sleep of an accommodating kind, that interrupts itself when the weather is mild and food is sure to be fairly plentiful. If the shrews hibernate at all, their sleep must be more analogous to that of the Hedgehog than to that of the Bats, since shrews have frequently been found abroad in hard frost and snow. In such a view it must, one would think, be the less successful individuals that are most waked, and it seems to me possible that owing to some imperfection in the faculties of the immature shrews they get less sleep than their seniors.

Naturalists ought, in studying this question, to pay attention to any local variation in the extent to which the autumnal mortality prevails. If Mr. Adams is right, it ought to be uniform everywhere—that is to say, it should present everywhere a constant ratio to the shrew population of the neighbourhood. Is this “epidemic,” then, equally noticeable in all parts of the country where shrews are equally common? It ought not to be difficult, by a systematic inquiry, to collect, on this point, statistics that should be fairly convincing one way or the other. If, in any district in which shrews are not rare, we find very little evidence of their seasonal mortality, while in another district where they are not proportionally more abundant we find that their corpses are frequently seen along the roads, it will seem to follow that some other cause

¹ *Irish Naturalist*, vol. xiii., 1904, pp 81-87.

than old age must have been in operation to raise the death-rate.

Would Ireland be a favourable field for such an inquiry? I think it would, because shrews are so much less abundant in this country than in England that if the death-rate varies locally here there must be districts where it is scarcely noticeable at all. In England shrews are so common that considerable local differences might exist and escape detection. The taking of a census of the dead shrews would probably be found quite too laborious an undertaking.

In Ireland the reverse is the case. The absence of the Common Shrew from this country does not seem to have had the effect—which might on some grounds have been expected—of facilitating the multiplication of Lesser Shrews so as to enable the smaller species to fill the place occupied in Great Britain by its larger relatives. In England *Sorex araneus* is so abundant as apparently to form 32 per cent. of the mammalian food of the Barn Owl; the analysis of pellets collected in many parts of Cheshire—as recorded in Mr. T. A. Coward's newly-published "Vertebrate Fauna of Cheshire and Liverpool Bay"—being as follows:—

Common Shrew,	110
Lesser Shrew,	3
Water Shrew,	7
Rat,	9
House Mouse,	32
Wood Mouse,	55
Field Vole,	114
Bank Vole,	7
Water Vole,	1

338

From these figures it will be seen that exactly two-thirds of the food (exclusive of birds) consumed by the Barn Owl in Cheshire is made up of two small mammals, the Common Shrew and the Field Vole, which are absent from Ireland. On the other hand, the four mammals in Mr. Coward's list that extend to Ireland—the Lesser Shrew, House Mouse, Wood Mouse, and Rat—furnish between them only 99 specimens, being all outnumbered by the Common Shrew alone; and the Lesser Shrew yields only a bare 1 per cent. to the quota.

It is to be wished that we had equally exhaustive figures from some Irish county. But it may be taken as certain that the Lesser Shrew would nowhere come near to heading the list of the Owl's victims, as the Common Shrew does in England. An analysis made by Mr. Adams in 1897 in an Antrim locality—Ballycastle—of pellets of the Long-eared Owl gave, as regards mammals, the following result:—¹

Lesser Shrew,	. . . . .	10
Rat,	. . . . .	22
House Mouse,	. . . . .	5
Wood Mouse,	. . . . .	357
Bats,	. . . . .	3
		397

Thus, while the Wood Mouse, from a mere 16 per cent. in Cheshire, has swollen in proportion to as much as 90 per cent. in Antrim—in consequence, no doubt, of the total absence of Voles in the latter locality—we do not find in the case of the Lesser Shrew any greater increase than from 1 per cent. on the English side to 2½ per cent. on the Irish side of the Channel. It would, of course, be more satisfactory if the census in each case had consisted of pellets of the same species of owl. But there is, at any rate, very strong presumptive evidence that *Sorex minutus* has in this country quite failed to fill the room which was left for its multiplication by the absence of the more powerful *S. araneus*. And it should not, therefore, be difficult to collect such notes on the prevalence of the autumnal mortality in different districts as to yield a good idea as to whether it is uniformly distributed or not.

Mr. Adams is, I think, quite right in regarding as unsatisfactory most of the familiar explanations that have hitherto been put forward as accounting for the supposed epidemic. The most familiar of all is that the corpses are those of animals killed and left uneaten; but, as Mr. Adams says, if this were the case, the killing would not take place in autumn more than at any other time, and it has not been proved that any of our native wild animals—though the domestic cat does

¹ *Irish Naturalist*, Vol. vi., 1897, p. 175.

so—will refuse to eat a shrew after killing it. Owls, Kestrels, and, as Mr. Adams adds, Magpies eat shrews readily; and both Hedgehogs and Moles would, in his opinion, eat them if they could catch them. In any case, the fact of the mortality occurring in Ireland, where there are no Moles, would suffice to acquit the latter animal, while the Hedgehog is equally absolved of being, at any rate, the sole cause of the death-rate by the extension of the epidemic to islands outside that creature's range. For example, Mr. Millais records having seen the dead bodies of many Lesser Shrews in autumn in West North Uist, so that the mortality is probably quite as great in the Outer Hebrides, where there are no Hedgehogs, as it is in any part of Ireland.

Mr. Adams does not notice another suggestion put forward by Mr. Millais, that shrews make seasonal migrations, and that the less robust possibly die from fatigue on the way. There is, however, no direct evidence that these migrations take place. Want of food can hardly be the cause of death, as the bodies found are often plump—I think Mr. Barrington once jokingly suggested to me that they might have died of repletion—and the mortality begins to be noticeable quite early in August, when insect food must be still almost at its maximum. In short, Mr. Adams' explanation, whether we accept it or not, seems to me the most plausible that has yet been advanced on this very perplexing question; but careful inquiry will need to be made in many directions before it can claim to have been established.

Shrews are, unfortunately, so difficult to keep in captivity that there is little hope of light being thrown on the subject of their ages by the records of the various zoological societies. Dr. Scharff kindly informs me, however, that he has made inquiries as to any records of the kind kept by the Zoological Society of London, and that he learns that no shrews have lived long enough in the Gardens to disprove in any way the suggestion under review.

Dublin.

NOTES ON THE ADAPTABILITY OF CERTAIN
LITTORAL MOLLUSCA.

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

THERE is perhaps hardly any fact in the economy of our marine mollusca more trite and obvious even to the unscientific observer than the capacity possessed by many of our common littoral species of enduring long periods of exposure to the air. Yet, so far as I am aware, no attempt has been made to determine the comparative capacity in this respect of the various species, much less to ascertain whether in any given species the capacity is equally shared amongst all its members. The field of research in this direction is, in fact, so imperfectly explored that the results here given of some simple experiments and observations recently carried out by the writer of these notes are not unlikely to offer something new.

The material dealt with was all collected on the shores of Co. Dublin during the three months from the middle of October of last year to the middle of January of this year, and was made up of 7 operculate univalves, *Hydrobia ulvae*, *Littorina neritoides*, *L. rudis*, *L. littorea*, *L. obtusata*, *Purpura lapillus* and *Trochus umbilicatus*, with one bivalve, *Lasaea rubra*, or a total of 8 distinctly littoral species. The inquiry was directed to the following points:—(a) the length of time which each species was capable of living when removed from the water and exposed to the air in a dry room; whether, and if so, for how long, any of them could survive immersion (b) in perfectly fresh (non-saline) water, or (c) in water of abnormal salinity—*i.e.*, a salinity three times that of ordinary sea water. In the case of two of the species, *Purpura lapillus* and *Littorina rudis*, an attempt was also made to determine whether there was any marked difference in the vitality or adaptability shown by individuals taken from stations at or above high-water mark, as compared with others of the same species taken at low water or between tide marks.

A very few words only are necessary to describe the method adopted in the experiments and observations here summarized. With the exception of *Lasaea rubra*, the only bivalve dealt with, the same tests of vitality were applied to all the species, whether after exposure to the air in a dry room or after immersion in fresh water or in water of abnormal salinity. These tests were immersion in ordinary sea water and observation under a low-power dissecting microscope of the first motion of the opening operculum, or observation of the number of individuals out of batches of 5, 10, 15 or 20 found resuscitated after a definite period of immersion in sea water.

The results obtained in the first branch of the inquiry are set out below in the form of a table shewing the maxima of vitality or adaptability to changed conditions observed for the several species dealt with. In this table the periods given for the survival in air of *Hydrobia*, *Purpura*, *Lasaea*, and *Trochus* are probably close to, and the fresh-water survival periods for *Hydrobia* and *Littorina neritoides* are probably much under the real maxima.

MAXIMUM PERIODS OF SURVIVAL OF LITTORAL MOLLUSCA on (a) exposure to dry air (b) immersion in fresh water and (c) immersion in water of treble the salinity of sea water.

—	On exposure to dry air.	On immersion in fresh water.	On immersion in water of treble salinity.
<i>Littorina neritoides</i> , ..	42 days	11 days	6 days
<i>L. rudis</i> ,	31 "	7 "	7 "
<i>L. littorea</i> ,	23 "	7 "	8 "
<i>Hydrobia ulvae</i> , ..	20 "	18 "	9½ "
<i>Purpura lapillus</i> , .	9½ "	4 "	3 "
<i>Lasaea rubra</i> ,	9 "	—	—
<i>Trochus umbilicatus</i> , ..	7 "	4 days	3 days
<i>Littorina obtusata</i> . ..	6 "	2 "	3 "

In the case of the two species, *Lasaea rubra* and *Hydrobia ulvae*, the results above shown are quite unexpected. From its usual habitat, on rocks above high water, where it is frequently exposed to dew and rain, *Lasaea* might have been expected to show a large tolerance of fresh water. In no

instance, however, did any of the many specimens tested survive even a twenty-four hours' immersion. As for *Hydrobia*, there is nothing in its habits to render probable the capacity which a long series of observations proved it to possess of enduring protracted exposure in dry air and immersion in strong brine.

Coming to the second branch of the inquiry, it would seem *a priori* that taking each species by itself those individuals collected from stations at or above high-water mark should shew a greater tolerance of exposure to air than the individuals of the same species collected from lower levels where they are daily submerged in sea water for lengthened periods. And *a priori* one might expect, too, that in each species the high-level individuals, accustomed as they are to exposure to dew and rainfall, would show a greater tolerance of fresh water and a less tolerance of water of high salinity than the low-level individuals which pass the greater part of their lives immersed in sea water.

A series of observations made in January last showed conclusively that these expectations were fully justified. Two species were selected for this purpose, *Purpura lapillus* and *Littorina rudis*, both very common, both occurring freely at and above high-water mark, and both ranging to a greater or less degree below it. The first of these species is best of all adapted to supply the necessary material, since its range extends from above high-water mark to extreme low-water mark. The second species, though abundant at and above high water, has, at all events on the Dublin Bay shores at Bullock and Sandycove, where the specimens were gathered, but a small downward range. The observations as to exposure in air were accordingly chiefly made on *Purpura*.

A couple of hours search amongst the high granite rocks along the shore at Bullock yielded some 250 well-grown specimens, all from high-water mark, or well above it; the same number, equally well grown, were taken from low-water mark. All were exposed in air, mouth upward, in a dry room, and after four days, when the animals of all the individuals, both high and low water, had well withdrawn into their shells, they were tested in batches or groups of 10 or 15 or 20 from

each gathering, high and low water, care being taken to pit against the high-level groups, low-level groups as closely as possible in the same stage of maturity. The results as set out in the following table place beyond doubt the greater vitality or adaptability of the high-level individuals at all stages from the fourth to the eighth day of exposure.

TABLE shewing the comparative vitality on exposure to air in a dry room of *Parpura lapillus* gathered (a) at or above high-water mark and (b) at low-water mark.

Exposure in days.	4	5	6	6½	7	7½	8
Per-centage survival of high water groups. . .	100	100	100	70	63	15	23
Per-centage survival of low water groups, . .	100	80	70	40	13	5	3

The figures in the last column of this table are much too high, as by inadvertence the 8-days groups were allowed for revival in sea water twice as long a period, *i.e.* 24 hours, as the preceding groups. The effect was necessarily to yield a disproportionate number of survivals or resuscitations, so that the fairly regular decline of vitality was interrupted by a sudden jump upwards. The results above tabulated might also have been exhibited in descending and diverging curves or slopes passing from full vitality to total extinction, but in that form would have been less easily grasped.

With the second species, *L. rudis*, no such detailed observations were made, but such as were carried out gave similar results. On two occasions small groups of high-water and half-tide specimens of this species were pitted against each other. On the first occasion all the individuals had been exposed in air for 21½ days, on the second for 22½ days. A 12 hours' immersion in sea water of each of the four groups or batches restored to full vitality 80 per cent. of the high-water groups to but 40 per cent. of the half-tide groups. In comparative tolerance of fresh water and water of treble the salinity of sea water both species yielded results in full accordance with expectation, as will appear from the following table:—

PERCENTAGE SURVIVAL of *Purpura lapillus* from high-water and from low-water mark and of *Littorina rudis* from high-water and from half-tide mark after immersion for equal periods in fresh-water and in water of treble the salinity of sea-water.

—		Survival in fresh water.	Survival in water of treble salinity.
<i>Purpura lapillus</i> :—			
high-water,	..	70 p. c.	75 p. c.
low-water	..	10 p. c.	100 p. c.
<i>Littorina rudis</i> :—			
high-water,	..	90 p. c.	20 p. c.
low-water,	..	30 p. c.	60 p. c.

To sum up, the net result of these observations and experiments is to show that the high-water individuals of these littoral species have a greater power of enduring exposure to air and immersion in fresh water than the low-water or half-tide individuals, while they have a lesser power of enduring immersion in water of abnormal salinity. There is every reason to suppose that in the case of *Purpura lapillus*, at least a fuller course of experiment would demonstrate for a half-tide group a stage of adaptability intermediate between those of the high and low-level groups. This species is to a great extent sedentary. The high-level individuals are, no doubt, hatched a little below high-water mark, and pass their lives in this upper zone, as the half-tide and low-tide individuals are born and pass their lives in the middle and lower tidal zones; and the grades of adaptability shown by the inhabitants of each zone probably point to the progress of a slow evolution from a marine to a terrestrial existence.

Two questions are suggested by the results set out in the preceding pages. First, are the tests to which the littoral species were subjected during the course of these experiments of greater or less severity than the species are required to withstand in a state of nature? Second, what are the peculiarities of structure which in each species may be held to favour or to stand in the way of its attaining to a high degree of adaptability to abnormal conditions.

Taking the second of these questions first, it would appear that the conditions favouring a high degree of adaptability are

(a) the possession of a well-developed operculum, capable, when fully withdrawn, of accurately fitting the orifice of the shell, and, in a lesser degree, (b) the amplitude of the shell-cavity as compared with the size of its inhabiting animal. Both of these conditions are contributory to the one effect, the retention in and around the animal of the moisture indispensable to the exercise of its vital functions. Thus the comparatively small capacity of enduring exposure to air in a dry room which distinguishes *Purpura lapillus* is probably due to the imperfection of its operculum and the smallness of the inner dimensions of its large and heavy shell. Of 170 full-grown specimens of this species collected on granite rocks above high-water mark in January last, 2, or $1\frac{1}{5}$ per cent., were found to be altogether destitute of operculum, while the same percentage had very imperfect opercula, covering only half the animal's foot when fully withdrawn. Of 147 specimens collected at the same time at low water, while not one was found to be wholly destitute of operculum, 4 individuals, or $2\frac{3}{4}$ per cent., had this appendage very imperfectly developed. Speaking generally, the operculum in this species is more or less imperfect, so that it does not completely close up the shell orifice when the foot is withdrawn. It may be that this incipient degradation of the operculum in *Purpura* is a first step on the long road towards total extinction of that appendage, as has been suggested in the case of the allied genus *Concholepas*.

Coming now to the first question, whether the artificial tests employed in the experiments here recorded are more or less severe than the natural tests to which the littoral mollusca may be submitted, it is clear that the question has no reference to one of the tests, immersion in water of treble salinity, since that condition does not occur in nature. As for the other tests, exposure to dry air and immersion in perfectly fresh water, the question is by no means easy to answer. All of the littoral Gastropods here dealt with attach themselves by their partially extended foot to the rocks or seaweeds they inhabit. While so attached they are obviously deprived of the protection of the operculum, and a considerable portion of the animal's body is necessarily exposed to the air. But the more rapid dissipation of the moisture in and around the animal's

body which, other things being equal, would result from this exposure, is probably more than counterbalanced by access of moisture from dew and mist and rain. And moisture of any kind, whether fresh or saline, is probably in their case effective in sustaining vitality. On the other hand, while the individuals submitted to the artificial test of exposure to dry air in a warm room take full advantage of the operculum as a retainer of moisture, they have throughout their exposure no access to fresh supplies of moisture, whether fresh or saline.

Again, the artificial fresh-water test may or may not be more severe than any similar test occurring under natural conditions. In nature, it is more than probable that heavy rains again and again saturate with fresh water the animals of such individuals of *Purpura* and *Littorina rudis* as dwell above high-water mark, while in artificial immersion the operculum undoubtedly serves as an efficient barrier against any considerable access to the animal of this fresh water. It is, however, by no means certain that the operculum acts, as Gosse believes it to act, by perfect exclusion of the fresh water. The fact that individuals of many littoral species exposed for many days to dry air or immersed for long periods in fresh or abnormally saline water, return to activity almost immediately when placed in sea water, is against this assumption. In all these cases the operculum, just before resuscitation, is found to be far withdrawn and closely fitting the shell-opening; and unless we assume that the far-retired animal is sensitive to the very slight variations of temperature which may occur on transfer from one element to the other, we must conclude that the sea water, which appears to exercise an almost instantaneous reviving power, gains access in some way to the animal. It is probably round the edge of the operculum rather than through it that this access is had, for there is no reason to suppose that its close-grained horny substance is rapidly permeable by water.

Sandy Cove, Co. Dublin.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Badger from Mr. E. M. Archdale; a Squirrel, a Porcupine and an Owl from Dr. Langley; a Sparrow-Hawk from Mr. G. P. Keating; a Blue-fronted Amazon from Mrs. Hoffe; a pair of Jacobin Pigeons from Mr. W. Lane-Joynt; three Swans from Mrs. Cullinan; a Long-eared Owl from Mr. W. T. Potts; and two Black Fantail Pigeons from Mr. E. T. Quirke. Two Ravens, six Flamingoes, and a male Rhea have been acquired by purchase or exchange.

The Council have decided to erect a hospital for sick animals and specimens that require isolation. This will be a great convenience in working the Gardens. It is also proposed to build a new aviary for the larger birds of prey—eagles, falcons, and owls, whose present quarters are somewhat confined.

DUBLIN MICROSCOPICAL CLUB.

MAY 11.—The Club met at Leinster House, Dr. G. H. PETHYBRIDGE (President) in the chair.

Prof. SCOTT demonstrated Burri's method for the demonstration of micro-organisms. This consists of mixing the infected fluid with a suitable specimen of liquid Indian ink diluted with water. When dry the organisms stand out as white lines on a dark ground; a close imitation of the new dark-ground illuminators. The method has proved of great value in the recognition of some pathological organisms which are rather difficult to stain.

D. MCARDLE exhibited the burst capsule, spores and bi-trispiral elaters of *Conocephalus conicus* L.; also spirit material of the male plant, showing the white antheridia, the species being dioicous. This is one of the largest of the frondose Hepaticæ, remarkable for its aromatic smell; the reticulated venation of the thallus and large stomata, which can be seen by the naked eye, separate it from all others of the group. It enjoys a wide distribution, being found in Europe, Asia, Japan, and North America.

F. W. MOORE exhibited a seedling of *Drosera pygmaea*, a very minute species from Australia. In the adult the leaves are rotund on long slender stalks. In the seeding state the leaves are spatulate, with a few scattered tentacles. The structure of the tentacles and glands could be seen very clearly.

BELFAST NATURALISTS' FIELD CLUB.

APRIL 23.—GEOLOGICAL SECTION.—SCRABO HILL. This was the first excursion of the season. The remarkable sections showing sills and dykes of dolerite, laid open in the quarries of Triassic sandstone, were examined.

Fine specimens of sandstone, showing ripple-marks, moulds of sun-cracks, current bedding, and brecciation were obtained, also one specimen showing pits of rain-drops.

MAY 7.—GEOLOGICAL SECTION.—TARDREE and SANDY BRAES. The quarries at Tardree Mountain, and the excavations in the plateau lavas around it, were examined.

The members took train to Ballyclare, where they were met by J. Strachan, who acted as conductor. Thence they drove to Sandy Braes where specimens were obtained of banded and fluidal pitch-stones, and of small spherulitic nodules of silicified rhyolite filled with opal. Continuing the drive to the north quarry on Tardree, the conductor pointed out a red, stony rhyolite worked at present, and in the disused main part of the quarry, drew attention to the apparently massive columnar structure. Driving a short way up an adjacent cross-road, a quarry showing a beautifully banded lithoidal rhyolite was examined and photographed. The south quarry on Tardree was then visited, and specimens of the typical lithoidal rhyolite secured.

MAY 21.—CASTLEROCK.—The party, numbering 85, was conducted, by N. H. Foster and W. J. C. Tomlinson. During the day the botanists of the party were busy, and reported the following:—*Ranunculus trichophyllus*, *Erophila vulgaris*, *Sisymbrium Thalianum*, *Cerastium semidecandrum*, *Saxifraga tridactylites*, *Antennaria dioica*, *Myosotis collina*, *Scilla verna*, *Asplenium marinum*, *Draba muralis*, *Arenaria trinervia* and *Arabis hirsuta*.

The deep-wooded ravines at Downhill were found excellent collecting grounds for land mollusca. That member of the northern fauna, *Helix hortensis*, so rare in Ireland, especially in the south and west, was found to be plentiful under ivy along the top of an old wall. *Pupa anglica* occurred at the base of the cliffs, and a rather local xerophile, *Helix caperata*, on the sandhills near Magilligan. In the pond in Downhill demesne, *Planorbis contortus* was common. Some of the conchologists who were collecting on the strand at Downhill cliffs were delighted to find a tidal fringe of a rare pelagic Atlantic shell, *Limacina retroversa*, which occasionally comes ashore in immense numbers on the west coast. It was the first time any of the party had ever been fortunate enough to find it though looked for for many years; its only previous record for the district rests on dredgings by the late Dr. Chaster in Rathlin Sound in 1896. On the Downhill strand numbers of *Cyprina islandica*, *Lutraria elliptica*, *Arca tetragona*, *Venus fasciata*, *Solen siliqua*, *Donax vittatus*, *Capulus hungaricus*, *Cypræa europæa*, *Nassa incrassata*, *Turritella communis*, and *Scalaria communis* were found. The ornithologists handed in a list of forty-three species noted during the day, chiefly in the demesne, showing that birds are not molested there. It was noted that the Siskin has increased there as a nesting species. At five o'clock the various groups of workers met by arrangement at the Golf Hotel, Castlerock, where they were entertained to tea by Miss Kidd.

A short business meeting was held on the hotel grounds after tea—the president, R. Welch, M.R.I.A., in the chair. Three new members—Miss M. Stewart, Miss L. Lowry, and Mr. Frank Johnston, J.P.—were elected. Shortly afterwards the party took train at 6.57, arriving in Belfast shortly after nine.

DUBLIN NATURALISTS' FIELD CLUB.

MARCH 5.—HOWTH.—The Club journeyed to Howth Head under the conductorship of David M'Ardle. Mosses were collected from the north side of the head. As no full account of the mosses of Howth has been published, these specimens collected were retained for naming, and any species new to the peninsula will be published later in the *Irish Naturalist*.

MARCH 8.—W. F. GUNN (Vice-President) in the chair. NEVIN H. FOSTER, M.B.O.U., read a paper entitled "The Feathered World." After describing the different types of birds found in various countries, the lecturer threw on the curtain numerous lantern slides of the most interesting birds dealt with during the evening. R. M. Barrington, W. F. de V. Kane, C. B. Moffat, and W. F. Gunn spoke in the subsequent discussion.

Miss Tuckey, B.A., and Geo. R. Humphreys were elected members.

APRIL 19.—G. H. CARPENTER, B.Sc., in the chair. The Chairman drew attention to the great loss the Club had sustained since the last meeting through the death of Dr. Edward Perceval Wright, its first President. In doing so he alluded to the brilliant qualities of the late Dr. Wright as a scientist, and of the esteem with which he was held in scientific circles throughout Europe. The Chairman also mentioned several instances of his work in connection with Irish natural history, particularly his collaboration with the late Prof. Huxley in the examination of the fossil Amphibia of the Kilkenny coalfields. A vote of condolence was passed unanimously.

W. J. LYONS read a paper on "Rain," in which the general conditions governing rainfall were described, and the characteristics of the local rainfall were dealt with.

APRIL 16.—GLENASMOLE.—Under the care of J. Bayley Butler, M.A., M.B., a party visited Glenasmole Waterworks, where the spring vegetation and protective adaptations for winter buds were examined. Rain interfered considerably with this excursion, which was otherwise successful.

MAY 21.—JOBSTOWN.—A number of members and visitors travelled to the Embankment by the 2.40 train from Terenure. The vegetation about Jobstown was then examined. Miss M. C. Knowles, who conducted this excursion, demonstrated the more interesting plants found between Jobstown and Tallaght. At the latter place tea was obtained, after which the party returned to town.

OBITUARY.

G. W. CHASTER, M.D.

It is with great regret that we have to record the sudden and unexpected death, at the early age of 47, of the distinguished conchologist, Dr. Chaster. He was not an Irishman, but his frequent visits to Ireland and the deep interest he evinced in Irish natural history, endeared him to many readers of the *Irish Naturalist*. Dr. Chaster was not only an enthusiastic collector, he identified his captures with the most painstaking industry and perseverance. Difficulties of identification gave a special zest to efforts on his part, and he took particular interest in those genera of Mollusca which required minute study and careful scrutiny. As long ago as 1897 he contributed to the *Irish Naturalist* (vol. vi., pp. 120-125) a noteworthy article entitled "A Day's Dredging off Ballycastle." During his trip he discovered one species new to science (*Adeorbis unisulcatus*), and made several valuable additions to the Irish list. In the same volume of the *Irish Naturalist* (pp. 184-185) appeared also his "Notes on the Marine Mollusca of Rathlin Island" as part of a report on the fauna of the island issued by a party of English zoologists who had explored it under the guidance of our friend Robert Welch of Belfast.

In 1898 Dr. Chaster communicated to the Royal Irish Academy his valuable and instructive report on the Mollusca obtained during the various cruises off the West Coast of Ireland. It was printed in the *Proceedings* (vol. v, 3), 1898-1900, pp. 1-33. Subsequently Dr. Chaster made several successful collecting trips to Ireland. He joined the Kenmare Field Club Conference in 1898, and subsequently he visited Enniskillen, Sligo, Galway, North-East Donegal, and finally Achill and Clare Islands. During these excursions his interests gradually widened, and instead of confining his attention to the Mollusca he began to make collections of Foraminifera, Coleoptera, and even of prehistoric implements which formed the substance of important discourses delivered to several English scientific societies. He became President of the Conchological Society of Great Britain and Ireland in 1904, and retained this distinguished post for two years.

NOTES.

BOTANY.

Corydalis claviculata in Co. Derry.

In the *Journal of Botany*, in 1874, I recorded the occurrence of *Corydalis claviculata* at Culmore, Co. Derry. For a good many years past it seemed to have disappeared from the locality. I am glad to be able now to note its re-discovery, but without giving particulars, trusting that it may be able to re-establish itself.

W. E. HART.

Kilderry, Co. Donegal.

Irish Plants.

In the *Journal of Botany* for April Rev. E. S. Marshall has a note on *Helleborine atroviridis* from Killarney. In the same Journal for June H. N. Dixon writes on a new Fissidens (*F. exsul*) found by D. M'Arde on pots and tubs in the palm-house at Glasnevin. and on a remarkable variety of *F. rufulus* obtained by the same collector at Finglas.

A New Irish Fungus.

On the 15th of May, 1908, I found a specimen of *Veronica Beccabunga* near Bohernabreena, Co. Dublin, attacked by a parasitic fungus, but time did not permit of its full investigation just then. On the 27th of May of this year I came across a specimen of *Veronica serpyllifolia* in Howth demesne similarly attacked. On examination both species were found to be infected by the parasitic fungus, *Peronospora grisea*, Ung. This species has not hitherto been recorded from Ireland.

J. ADAMS.

Royal College of Science, Dublin.

ZOOLOGY.

Additional record of *Chelifer cancroides*.

I may mention Rathmines in addition to Limerick (*I. Nat.*, vol. xviii. page 249), as a locality for this species. On October 7, 1908, I took two specimens from the legs of a house-fly (*Musca domestica*) in this neighbourhood. Is this a common species in Ireland?

NORMAN E. STEPHENS.

79, Rathmines Road, Dublin.

Zoropsis maculosus introduced at Limerick.

On March 23rd last I received from Dr. George Fogerty, of Limerick, a handsome adult female specimen of a large spider, which he tells me was given him by Mr. Woodhouse, who found it in a bunch of bananas which had been sent to his firm by a Liverpool broker and imported by him direct from the Canary Islands. The Rev. O. P. Cambridge, to whom I sent the specimen, has kindly identified it for me as *Zoropsis maculosus*, Camb., which was first found in this country in 1907, and was described by him in the *Proceedings of the Zoological Society of London*, 1907, p. 822. Mr. Cambridge described the species there from two specimens sent him by Mr. H. Speyer—an immature male and a female, probably not quite mature, which were also taken amongst bananas imported direct from the Canary Islands. Other species of this genus inhabit the Mediterranean region. This specimen will be lodged in the National Museum in Dublin.

DENIS R. PACK-BERESFORD.

Fenagh House, Baginbstown.

Grain Beetles at Belfast.

On April 25 Mr. W. H. Patterson, M.R.I.A., sent me a number of small beetles which he informed me had been taken in a shed at the docks, Belfast. There was in the shed a great pile of sacks of maize, and on the outside of these sacks were thousands of these little insects, most of them either dead or in a torpid state. On examination the beetles sent proved to belong to three species. One was the heteromeron, *Tribolium ferrugineum*, F.; the other two were weevils, *Calandra granaria*, L., and *C. oryzae*, L. The first-named was the least abundant and the last named the most so in the specimens sent to me. All these species are more or less cosmopolitan, but curiously enough we have very few records in our Irish List. The records are as follows:—*Tribolium ferrugineum*—Dublin, taken by Mr. Tardy and recorded by Mr. Hogan in the *Zoologist*, 1854. *Calandria granaria*—Dublin, in corn stores, recorded by Mr. Hogan in the *Zoologist* 1854; Down, near Belfast, recorded by Mr. Haliday in MS. list published by the Belfast Naturalists' Field Club in the *Proceedings*, 1885. *C. oryzae*—Dublin, in corn stores, Mr. Hogan, *Zoologist*, 1854; Custom-house Wall, Haliday MS. That there are not other more recent records is simply because no one has looked for the beetles in their usual haunts. It is probable that a search among the merchandise which comes to the port of Belfast from so many different countries would reveal the presence of many interesting insects.

W. F. JOHNSON.

Poyntzpass.

Dasypolia templi in Dublin.

I caught a female of this moth at a lamp in Kingsbridge station on October 1st, 1906. I believe this to be an unrecorded locality for this scarce species.

NORMAN F. STEPHENS.

Rathmines.

Irish Birds.

In the *Zoologist* for March, R. Warren writes on Black-tailed Godwits in Cork Harbour, and in *British Birds* for March J. W. H. Seppings has a note on the same subject. In the same number of *British Birds* W. J. Williams records a Snowy Owl shot at Belmullet on January 4, two Greenland Falcons shot on Tory Island in December, one shot and another seen on Achill in November, one shot at Belmullet in January one at Greystones in January, and one at Tralee in February; a Spoon-bill shot at Dingle in December; a hybrid Mallard \times Gadwall shot at Kells in February; a Corncrake shot at Malahide in January and several Little Auks picked up exhausted in Queen's County, Sligo, Tipperary, Mayo, and Galway. In the same issue R. Hamilton Hunter writes on the breeding-habits of the Siskin in Ireland. In the April number of *British Birds*, Major B. R. Horsbrugh records two Crossbills from Newbridge.

Marten in Co. Galway.

As the Marten appears to be very rarely met with in the western portion of Co. Galway it might be well to record the following occurrence of one of these animals in that district:— On the 17th April, 1908, while in Connemara, I was shewn the fresh skin of a Marten which had been killed the day previous. The particular spot where this specimen was taken is well wooded, but the surrounding country, especially on the eastern side, is practically devoid of trees, and for miles consists principally of bare mountains and peat bogs characteristic of that part of Ireland. It is quite evident that this Marten, or its predecessors, must have crossed, not only bare, but also very wet country before reaching the wooded part where it was killed.

GEO. R. HUMPHREYS.

Dublin.

REVIEW.**NATURE STUDY.**

The Aims and Methods of Nature Study: A Guide for Teachers.

By JOHN RENNIE, D.Sc., F.R.S.E. With an Introduction by Prof. J. Arthur Thomson. London: W. B. Clive, 1910. Pp. xvi.+352. 178 figures. Price 3s. 6d.

One result of the present praiseworthy movement in support of what is called "Nature-Study," has been to flood the market with books—mostly compilations, and by no means praiseworthy, except for their photographic illustrations. The volume before us is a delightful contrast to books of such a type. It is illustrated by line-drawings, often diagrammatic and sometimes rough, but usually workmanlike and stimulating, to agree with the letterpress. Dr. Rennie is a keen observer, directing attention to important features in the bionomics of animals and plants; he is also a trained naturalist, who introduces enough of structural fact to explain what is learned through observation in the field. The book is addressed to teachers—a class of readers who will surely be attracted by the marshalling of the facts, and the fine literary setting in which they are presented.

The subjects chosen by Dr. Rennie for lessons cover a wide range. The erosion of river-valleys, snow-crystals, common flowering plants, insect transformations, snails, frogs and tadpoles, birds and mammals, all furnish material for the teacher, who is guided how to make the best use of the objects for the benefit of his scholars. In an opening chapter the author holds up high "ideals of nature study," and Prof. Thomson in his too-short Introduction, emphasises what these ideals should be. The wise teacher will select from the wide choice of subjects offered to him, what will best suit his own class, and if he catches Dr. Rennie's spirit, he will not present the lesson to his class exactly as he gets it by help of the printed page. He will become, in his own measure, one who has gone direct to Nature, and who can lead his pupils to the same great source.

G. H. C.

ON SOME RARE IRISH SPIDERS OBTAINED IN 1909
WITH NOTES ON THE GENUS ERIGONE.

BY A. RANDELL JACKSON, M.B., D.SC.

(PLATE 3.)

AMONGST a considerable number of spiders sent to me by Mr. D. R. Pack-Beresford since the publication of his "Supplementary List of the Spiders of Ireland"¹ were two especially interesting forms. These were *Erigone capra*, Sim., a spider previously unknown in Britain and Ireland, and *Lophocarenum stramineum*, Menge. Of the latter spider Mr. Pack-Beresford had already obtained males on the island of Lambay,² and near Bagenalstown, but the female is new to the Irish fauna and neither sex has yet been recorded from Britain. The present record is based on two females, lately obtained near Bagenalstown in a locality in which males had previously been found. My identification was confirmed by the Rev. O. Pickard-Cambridge. This little species possesses the ordinary Lophocarenum characters, viz. : the sternum with the wide truncated posterior termination, the back row of eyes with the strong curve of which the convexity is directed backwards, the four deep impressions arranged in pairs towards the anterior end of the coriaceous dorsal surface of the abdomen, and the short rather thick legs.

From the other British species of *Lophocarenum* the structure of the vulva separates the present spider. In *L. parallelum*, Bl., and *L. Mengii*, Sim., this is very different, but in *L. nemorale*, Bl., the differences are minute, and the two might easily be confused. I therefore give figures of the epigyne in both species which I hope will facilitate the recognition and separation of these two interesting little animals.

Mr. Beresford has lately informed me that the male has occurred in yet a third Irish locality, viz. :—Carrickmacross, in County Monaghan.

Professor Kulczynski³ states that in his opinion the true *L. stramineum* of Menge is not the present species, and he has

¹*Proc. Royal Irish Academy*, Vol. xxvii., Section B, No. 7, pp. 87-118. Dublin, 1909.

²*Irish Naturalist* (Contrib. to the Nat. Hist. of Lambay, Co. Dublin). p. 63, Jan. and Feb., 1907.

³"*Araeneae Opera*, Rev. Schmitz collect. in Ins. Maderianis," p. 61.

therefore renamed our spider *L. mediocre*, Kulcz. Menge's original figures¹ are, however, rather vague and uncertain, and I personally should not like to say that they represented, or did not represent, one spider which is the *L. stramineum*, Menge-Simon. M. Simon² describes both sexes, but only figures the male. He states that the species occurs in the South of France, in Prussia, and in Denmark.

To these European localities Dr. de Lessert³ adds Switzerland, as he there found this species on the mossy and lichen-covered trunks of lime trees near Lavigny.

Bösenberg⁴ describes the female, and gives a figure of the vulva. I do not think this figure refers to the present species, and indeed Bösenberg states that his knowledge of the species was obtained from Menge and Bertkau. The Rev. O. Pickard-Cambridge⁵ has already figured one of the Lambay males.

Even more interesting than the above species was the capture of *Erigone capra*, Sim. These specimens, which Mr. Pack-Beresford sent to me at the beginning of the present year, consisted of four males and a female, which had been found by Mr. R. Welch on the banks of the Ulster Canal, near Monaghan, on October 12th, 1909. The structure of the palpi seemed to me extremely like that of *E. capra*, Sim., as given by Professor Kulczynski in his excellent monograph,⁶ and on sending a specimen to him he at once recognized it as belonging to that species. This was confirmed by Mr. Cambridge. The species is for all that very close to several others, so I here venture to give some figures which will help arachnologists to diagnose it when found. First, as to the *female*, I must confess I can find nothing at all striking about it. The vulva would do very well for that of several other species. I have, however, figured it, and also given drawings of extreme examples of the vulvae of its two nearest allies. In sketching these

¹"Preussische Spinnen," II., p. 199, Pl. xxxviii., fig. 96.

²"Les Arachnides de France," V., pp. 678, 679.

³"Observations sur les Araignées du bassin du Léman," p. 314. Genève, 1904.

⁴"Die Spinnen Deutschlands," p. 197, plate xvii., fig. 271.

⁵"On new and rare British Spiders." *Proc. Dorset Field Club, &c.*, vol. xxviii., p. 131, 1907.

⁶"*Erigonae Europaeae addenda ad descriptiones.*" *Bulletin de l'Académie des Sciences de Cracovie*, 1902.

vulvae everything depends on the *exact* position of the specimen. A very slight tilting either one way or the other produces what appear to be wonderful specific differences. Again, in the same species, there is a wide range of variation, and even amongst specimens taken in the same locality it is sometimes difficult to find two exactly alike. The same remarks apply to the other species of the genus, and I do not think a good case has yet been made out for the female of the much commoner *E. promiscua*, Camb.

In *E. arctica*, White, the posterior border of the epigyne is nearly always rather deeply embayed by a median flexure. This is usually vestigial or absent in *E. longipalpis*, Sund.

The vulvae of *E. atra*, Bl., and *E. dentipalpis*, Wid., have been figured at least three times ¹, ², ³, and I think correctly, only it must be remembered that in each case extreme specimens have been selected. In some cases, I think, it is impossible to be certain of the species, even when the vulvae are very carefully examined.

Turning to the males, a much more satisfactory state of things is seen, all the species being recognizable by means of a careful examination of the palpi. The structure of the tibiae of those limbs divides the six species into two groups.

In the first, which includes *E. dentipalpis*, Wid., and *E. promiscua*, Camb., the tibia, viewed from the outer side, shows three processes or apophyses, a superior, an external or intermediate (viewed in profile), and an inferior. The superior process is expanded in the horizontal direction, and forms a more or less broad plate on the dorsum of the article, whilst the intermediate one is placed almost on the same level and just on its outer aspect. The inferior process is much more removed from the intermediate one than the latter is from its superior fellow, and is always provided with a strong tooth on its inferior surface.

In the second group the superior process is not expanded; the intermediate process is much separated from it, the distance between the two being not very different from the distance between the intermediate and inferior processes.

¹Chyzer and Kulczynski, "Araneae Hungariae," vol. ii., plate iii., figs 38, 39.

²Bösenberg, "Die Spinnen Deutschlands," plate xv., figs. 237, 238.

³Pickard-Cambridge, "On New and Rare British Arachnida," *Proc. Dorset Field Club*, 1905, plate B, figs. 3-8.

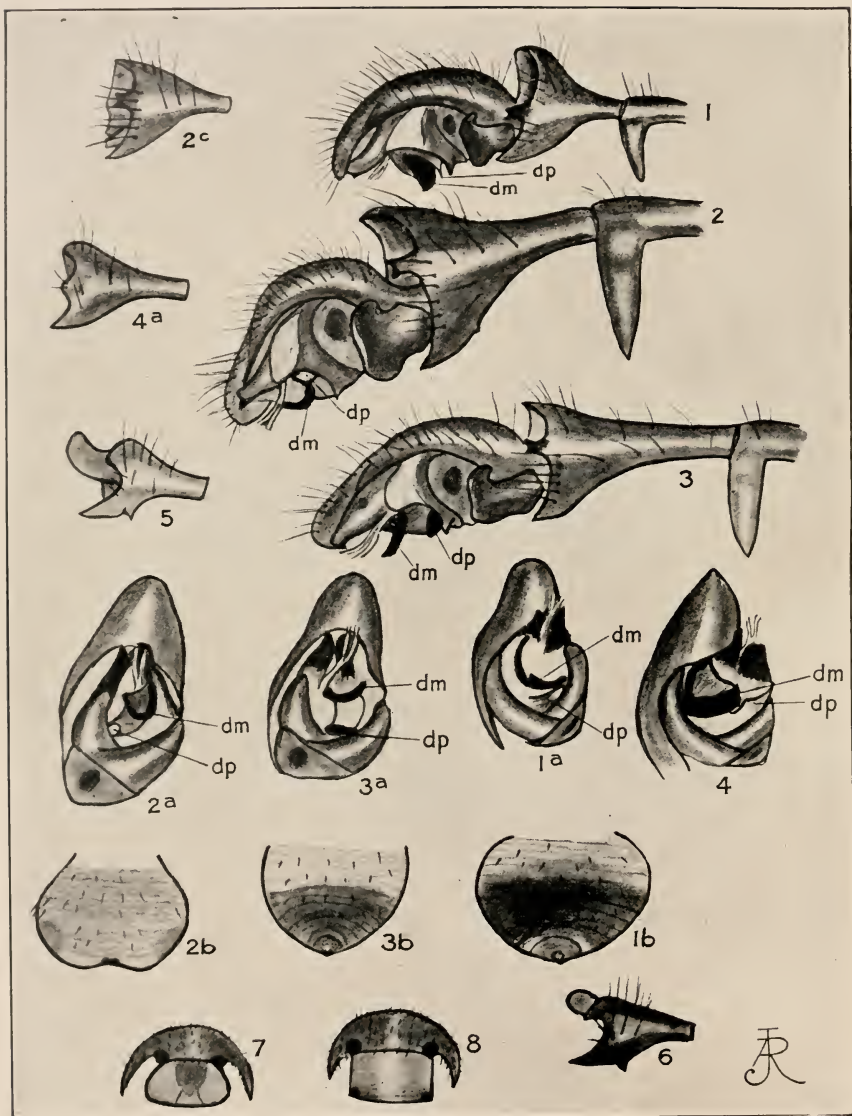
The inferior process never bears a strong tooth on its lower surface; this is generally quite unarmed, but a small vestigial tooth may occur in *E. arctica*, White, *E. capra*, Sim., and *E. atra*, Bl. I have never noticed it in *E. longipalpis*, Sund.

Of these four species, *E. atra* is easily separated by the shape of the intermediate process, which is rounded evenly. In the other three it is narrow, springs abruptly from the external surface of the tibia, and shows a bifid extremity. The lower point of the fork springs, however, from the internal surface of the process, whilst the upper one is the true continuation of the process as seen from the external aspect. In *E. arctica* and *E. longipalpis* the intermediate process is slightly nearer the tip of the superior process than of the inferior one. In *E. capra* the reverse is the case. In the males I examined one shows a vestigial tooth on the inferior process, and the other three do not. These three species are, however, very easily distinguished by the structure of the palpal organs, and especially by those processes which Professor Kulczynski called the *dens medius* and the *dens posticus*. In the figures I have endeavoured to show these in the same position in all three species.

Erigone capra, Sim., is recorded from the Department of Isère in France, and from Hungary. The latter examples were described by Professor Kulczynski as the var. *oblita*. They differed from the French examples sent to him by M. Simon in the stronger angle of the *dens medius*, and in several dimensions. As regards the former, I can express no opinion, as I have never seen French examples. The dimensions of the Irish specimens are, however, practically identical with those of the typical French form. The total length of a male specimen measured was about 2.25 mm.

E. atra and *E. arctica*, var. *maritima*, seem to average about 2.15—2.2 mm. *E. arctica* in typical forms is larger, an average specimen I measured being 2.6 mm. *E. longipalpis*, Sund., is larger yet. I managed to find a huge specimen measuring 3 mm. This is, of course, above the average, which is a little larger than that of typical *E. arctica*.

E. arctica, White, is a spider common in many British and Irish localities, most of them maritime. It likes a muddy, clayey, grass-grown, salt-marsh such as is found on the Lancashire and Cheshire coasts, but also occurs on rocky and stony localities. I here figure the palpus of the typical form



STRUCTURAL DETAILS OF IRISH SPIDERS.

- | | | |
|-------------------------------------|----------------------------|----------------------------|
| 1. <i>Erigone capra</i> . | 2. <i>E. arctica</i> . | 3. <i>F. longipalpis</i> . |
| 4. <i>E. atra</i> . | 5. <i>E. dentipalpis</i> . | 6. <i>E. promiscua</i> . |
| 7. <i>Lophocarenum stramineum</i> . | 8. <i>L. nemorale</i> . | |

from specimens taken by Mr. Pack-Beresford at Portmarnock. This form has not previously been recorded from Britain.

The usual British form is the var. *maritima* of Kulczynski, of which I also figure the palpal tibia. Intermediate forms occur freely, the two being merely the extremes of a very variable species. *E. longipalpis*, Sund., is found in similar situations, but seems to occur more freely in marshy inland localities. *E. atra*, Bl., and *E. dentipalpis*, Wid., are ubiquitous little spiders, and abound everywhere, being accomplished aëronauts, whilst *E. promiscua*, Camb., although widely distributed, seems nowhere very common. So far it has occurred most freely in the Hastings district.

There are two other British species included in this genus. One of them, *E. graminicola*, Sund., has just been removed by the Rev. J. E. Huli¹ into the genus *Tmeticus*. Previously a new genus, *Erigonidium*, F. P. Smith,² had been created for it. It is certainly not very closely related to the spiders now under discussion. The other, *Erigone spinosa*, Camb., differs markedly from its present congeners in the sexual organs of both sexes. It has recently been discovered as a British spider on the shores of the Humber.³

EXPLANATION OF PLATE 3.

- | | | | |
|-----|--|-------|---------------------------------------|
| 1. | <i>Erigone capra</i> , Sim., | . . . | Left palpus from outer side. |
| 1a. | " | . . . | Left palpus from below. |
| 1b. | " | . . . | Vulva of female from below |
| 2. | <i>Erigone arctica</i> , White (typical) | . . . | Left palpus from outer side. |
| 2a. | " | . . . | Right palpus from below. |
| 2b. | " | . . . | Vulva of female from below. |
| 2c. | " var. <i>maritima</i> , Kulcz. | . . . | Tibia of left palpus from outer side. |
| 3. | <i>Erigone longipalpis</i> , Sund. | . . . | Left palpus from outer side. |
| 3a. | " | . . . | Right palpus from below. |
| 3b. | " | . . . | Vulva of female from below. |
| 4. | <i>Erigone atra</i> , Bl., | . . . | Left palpus from below. |
| 4a. | " | . . . | Tibia of left palpus from outer side. |
| 5. | <i>Erigone dentipalpis</i> , Wid., | . . . | Tibia of left palpus from outer side. |
| 6. | <i>Erigone promiscua</i> , Camb., | . . . | Tibia of left palpus from outer side. |
| 7. | <i>Lophocarenum stramineum</i> , Menge | . . . | Vulva of female from below. |
| 8. | <i>Lophocarenum nemorale</i> , Bl., | . . . | Vulva of female from below. |

d. m., dens medius; *d. p.*, dens posticus.

Chester.

¹"The Genus *Tmeticus*." *Transact. of Nat. Hist. Soc. of Northumberland, Durham, and Newcastle-upon-Tyne*. New series, vol. iii., part 3, 1910.

²*Journal of the Quekett Microscopical Club*, Ser. 2, vol. ix., p. 115.

³Pickard-Cambridge. "On New and Rare British Arachnida." *Proc. Dorset Field Club*, vol. xxix., p. 75, 1908.

SOME NOTES ON A BLACKWATER CAVERN.

BY H. J. MOLONEY, B.A.; E. C. RONAYNE, B.A.; R. W. EVANS,
LL.B., and JAMES COMYN, B.L.

THE picturesque escarpment of Gortmore, overlooking the Blackwater between Mallow and Kanturk, contains several orifices on its face. The largest are at the western extremity of the cliffs, which extend for a quarter of a mile, with beds dipping south at steep angles. Several of these openings have been penetrated by local people, but contain nothing of note.

Mr. F. W. Claire, of Lissa, Doneraile, having related to one of the writers of these notes his experience in a cavern which he reached after penetrating through one of the narrow clefts near the extremity of the escarpment, and in which he found stalactites 10 feet long, a party was organized to explore the caves on the 14th June last. This party subsequently penetrated a cavern which contained stalactites which for luxuriance in growth, and delicacy and eccentricity of form, are unequalled in Ireland. It also possesses features which present a nice problem for the expert in subterranean hydrology.

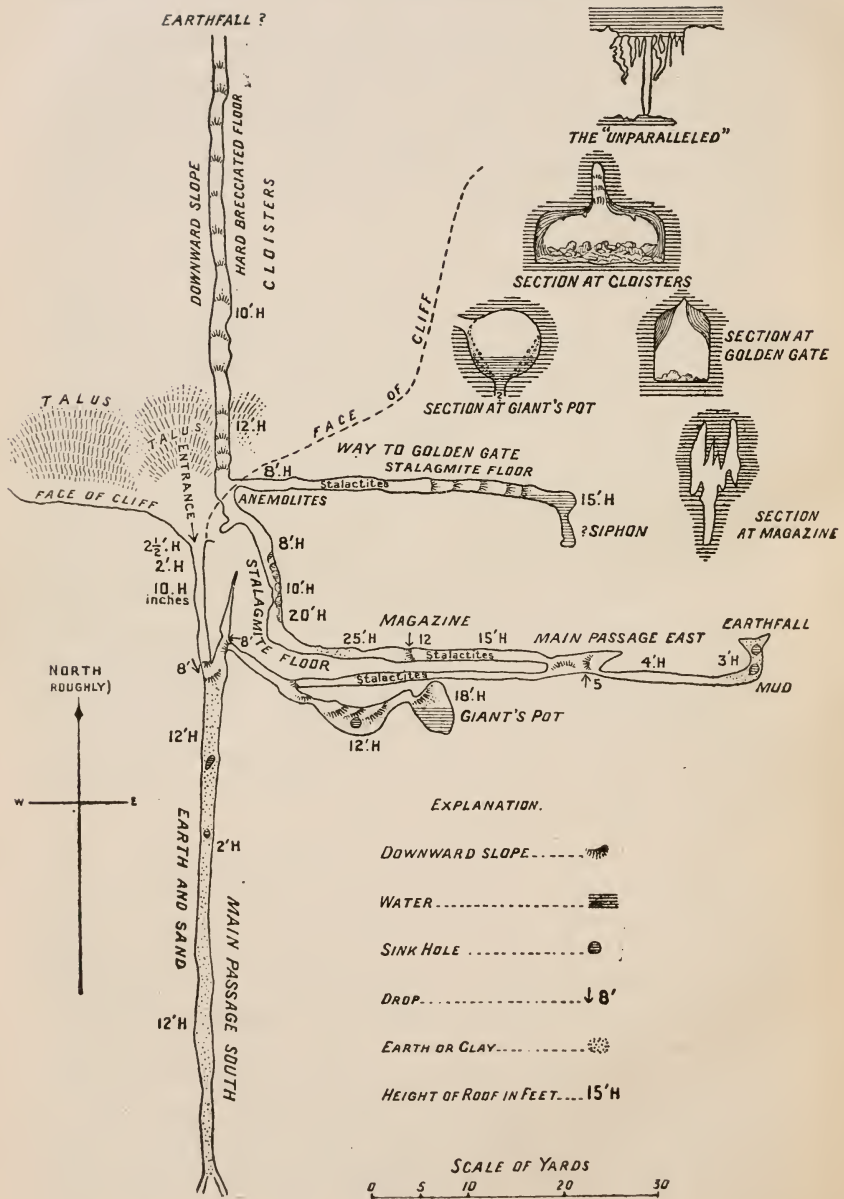
Having ascended a short talus just beyond a quarry (which is worked for lime by Mr. Fitzgerald, the owner of the farm), the party came to a small fissure, into which they wriggled for a few yards, where a stalagmite slope rose in the centre of the passage. On the eastern side there was less than 8 inches between the roof and floor, and on the western side there was only $9\frac{1}{2}$ inches at the widest part, which was beside the rock wall. The distance gradually lessened to the top of the slope. Mr. Ronayne, with a determined effort, succeeded in wriggling through, and on his signalling a high gallery beyond, the remainder of the party followed suit. A drop of eight feet landed the party in a lofty main-joint fissure running north and south. This is about fifty yards long, and with an average height of 15 feet. It contains a large number of the ordinary yellow stalactites. Taking a sharp turn immediately after negotiating the 8 feet drop, a small tunnel will be perceived on the eastern wall of the fissure, also at a height of about 8 feet. This leads to the galleries which contain the most remarkable features of the cave.

It is necessary to state here that the party being at Kanturk on other business, and the expedition to the caves being hurriedly organized, they were unprovided with a compass, clinometer, or any instrument for taking levels. The distances were estimated by pacing. The directions were roughly traced on a sheet of paper *en route*. The stalactite measurements, the plumb lines, and the height where the roof could be reached were measured with a small tape-measure. However, with these poor materials every effort was made to ensure accurate returns.

After a short journey along the above-mentioned passage the tunnel divides into two. That on the right, a bedding cave, winds slightly towards the south; the rock-bed dips at a steep angle, but is covered with a coating of silt, which greatly diminishes the slope. One can slide to the bottom without danger. After wet seasons however it would seem as if the floor becomes covered with water. A small sink-hole occurs, in which water was perceived a foot below the mouth of the funnel. Climbing the slope, a feat which cannot be always performed at the first attempt, as one slips down the soft clay, an opening about 9 feet in circumference disclosed another bedding cave, which takes the form of a kind of "Giant's Pot." The dip is here very steep, and the bottom of the cave is covered with a pool. On plumbing we found the water five feet deep and the slope 15 feet long., the height of the roof being about 18 feet from the water-level. We did not descend, as the operation could not be performed with safety without the aid of a rope.

A journey of about thirty yards, taking the passage to the left, brings one to a gallery, which exhibits the most remarkable luxuriance of stalactite growths in the cave. This gallery runs towards the west. The large bosses, resembling the projectiles of a big gun, suggested the name "Magazine." Continuing the journey beyond the "Magazine" the floor rises, and one can no longer walk. At a point about 70 yards from the 8-foot drop, near the entrance, an earth-fall stops further progress. Just before reaching this point two remarkable sink-holes open in the floor. The tops of these funnels are some yards in circumference, but they narrow lower down to 3 feet. On plumbing one we found it 20 feet

CAVE OF GORTMORE



deep, the depth of the water at the bottom being 8 feet. Around these dangerous funnels the floor was covered with slippery clay, seemingly of considerable thickness. On casting in a large stone one of the party detected an unpleasant odour. What seems an odd feature is that the sink-holes occur at the highest level of the cave. Here is one problem for the subterranean hydrologist. Just before reaching the sink-holes the roof in one place was scratched—as if it had been subjected to some grinding force.

Retracing their footsteps to the “Magazine,” the explorers beheld for a course of about 25 yards festoons of pendants from the roof, attaining in some cases the length of 8 feet. A most remarkable feature is that some of the stalactites are yellow, while others in the same cluster are glittering white. In this cavern is the “Triangle,” a stalactitic curtain 12 feet by 8 feet by $5\frac{1}{2}$ feet, suspended over the middle of the gallery. It is so thin that the light of a candle shines through it with a beautiful crimson lustre. A cluster which was named “The Octopus” was 8 feet long by 12 in circumference around its widest part. A drop of ten feet occurs immediately under this cluster, and the roof beyond rises to a height of 25 feet. Some distance farther on, a zigzag course of several yards (in the floor of which are situated several small “gours” or stalagmite water-terraces) brings us to a magnificent arched gallery running in an absolutely straight line for about 80 yards. There is a gradual descent to its northern extremity. There is a fall of rocks at the end, and progress beyond seems to be very difficult, if not impossible. Although this chamber seems at a low level, its floor is drier than in any other portion of the cave, and consists of a compact brecciated stalagmite. By keeping the middle of the passage one can walk upright beneath a fissure which cuts the roof of the gallery for nearly the whole length of its course, giving it a fine appearance. The resemblance of this gallery to the beautiful work of the mediæval monks suggested the name “Cloisters.” This gallery seems to run beyond the face of the cliff in the direction of the river. It is undoubtedly an ancient water-tunnel, as corrosion by percolation alone could never have excavated such a symmetrical formation.

Near the head of the "Cloisters," at a spot marked by a large fallen rock (which is the only one of any magnitude in the cave), a gallery branches off to the east. At the entrance to this gallery stands a most remarkable group. First there is a delicate growth of brown anemolites 2 feet long and taking an interlaced zigzag form, and so fragile that they would break off at the slightest touch of the finger-tips. There follows a white stalactite 2 feet long. Then a white pillar $7\frac{1}{2}$ feet in length joins roof and floor; this is obviously a stalactite which has reached the floor at a comparatively recent period, as there is no boss at the bottom. Another delicate series of growths succeeds, and then two stalactites emerging from the roof some inches apart unite and form an anemolite 6 feet long resembling a stout bamboo cane and ridged like the latter at regular intervals. There is a very rapid drip from this stalactite. Beyond this stalactite is another very delicate growth. What is most remarkable in this group is that all the anemolites bend towards the centre pillar, those to the east of it bending west, and those to the west bending east. It would seem as if the pillar and the stouter white stalactites act as a shelter to the smaller growths. We found several anemolites of lesser note at the junction of other passages in the cave. We experienced a very perceptible draught in the "Cloisters." This is probably the reason why anemolites occur at the junction of this with other passages.

A course of about 27 yards past another beautiful curtain (with folds giving it a resemblance to a half closed bat's wing, 12 feet by 15 feet by 5 inches in dimensions) brought us to a beautiful stalagmite arch which suggested the name "Golden Gate." There was a steep descent along a stalagmite floor to this point. Beyond the "Golden Gate" there was a pool of clear water, and here occurred a phenomenon which suggests another problem for the hydrologist. When the party returned the following night the pool had disappeared!

We measured the space which it had occupied and found it to be 16 yards long, 3 yards wide at its narrowest point, and 9 yards at its widest point, where it forms a slight curve at the end of the gallery (which is here 15 feet high.) The average depth, as evidenced by the line on the side wall, was $2\frac{1}{2}$ feet.

Sheets of cracked mud occupied the floor. Under the south wall of the gallery was a horizontal fissure, through which the water had apparently vanished. The highest level at which the water ever stands is about $4\frac{1}{2}$ feet. This is plainly marked on the side walls. This pool may be in siphonic communication with the River Blackwater, which flows at a distance of about 100 yards from the cave's mouth, but then there was no noticeable change in the level of the river during the 24 hours to account for this remarkable disappearance of a sheet of water $2\frac{1}{2}$ feet deep. Moreover, the water was clean cave-water, and did not look like the brown overflow which would be brought in from the Blackwater. Another difficulty suggests itself. If this be an overflow channel it should surely rise to a height greater than $4\frac{1}{2}$ feet when the heavy winter floods bring down the drainage of one of the wettest counties in Ireland. A light could be thrown on the subject by a comparison with the temperature of the Blackwater, and by taking a series of levels at the points where water occurs in this and in the other caves along the cliff. Mr. F. W. Clare informed one of the party that with a companion he descended into a deep muddy passage in one of these caves, along which they travelled until they heard the rush of a river over stones and shingle. They imagined it was the Blackwater flowing overhead! There are cases of subterranean streams flowing in siphons under large rivers, but it is difficult to believe that there could be a dry channel under the Blackwater, especially in a cave containing water on a higher level. Local tradition alleges that there is a passage under the river, but, then, local tradition in the case of caverns is almost invariably wide of the truth. The taking of levels, however, might show that not only the pool chamber but the north end of the "Cloisters" are below the level of the river. The "Cloisters" seem to run under the space between the cliffs and the river bank.

Mr. John Fitzgerald, the owner's son, accompanied the party through and assisted them in their explorations.

IRISH SOCIETIES.

BELFAST NATURALISTS' FIELD CLUB.

JUNE 11.—DROMORE.—The party, which numbered about sixty, travelled by the 2 p.m. train, and were conducted by J. M. Dickson. On arriving at Dromore, the Cathedral was visited. Other features of interest visited during the afternoon were the Bishop's Palace, the great ratli, the holy well of St. Colman, and the ancient stone cross. The geologists of the party examined a glaciated surface which is exposed in a disused quarry. The lower part of the quarry is excavated in a grit of Ordovician age, and the upper part in Boulder-clay. The surface of the grit is striated, the markings running from N.N.W. to S.S.E. The botanists of the party went down the banks of the River Lagan and explored the Gillhall demesne, with its magnificent beech and lime trees. The plants noted included *Cornus sanguinea*, *Carex acuta*, *Ceranium Phœum*, *Epipastis latifolia*, and *Arenaria trinervia*. Owing to the dryness of the day collectors of invertebrates were at somewhat of a disadvantage, and only a few common species of coleoptera, lepidoptera, and mollusca were noted. Of the terrestrial isopods four species were observed, one of which was the pigmy wood louse *Trichoniscus pygmaeus*, which has only recently been added to the Irish fauna, the first specimen having been found in County Down. After tea, a short business meeting was held, Mr. N. H. Foster, M.B.O.U., in the chair. A vote of thanks was passed to the Rev. J. W. and Miss Cooke for kindly exhibiting to the party the various articles of interest in the Cathedral. One new member, Mr. Rankin, was elected. The party returned to Belfast by various trains during the evening.

JUNE 25.—PARKMORE AND GLENARIFF.—The party travelled by the 9.15 train, and on reaching Parkmore drove to Glenariff Lodge, where they were received by Miss Dobbs, who acted as conductor. The day was spent in exploring the upper part of Glenariff, after which all met at Glenariff Lodge, where they were entertained to tea. After tea a business meeting was held on the lawn, the Vice-President (W. J. C. Tomlinson) in the chair. A vote of thanks was passed to Mrs., Miss, and Mr. Dobbs for their kindness in giving the Club the opportunity of exploring the glen and for their hospitality. Two new members—Miss Minnie Murray and Mr. J. A. S. Stendall—were elected. Belfast was reached about 8.10 p.m.

A considerable amount of field work was done. The geologists had an opportunity of studying the mineral contents of the aluminous and iron-ore beds. The mineral contents were best studied at some of the old ore workings, and also at the ravines, gullies, and stream-courses of the escarpment. The woodland species of land mollusca were well represented, *Helix fusca*, *H. lamellata*, *Limax arborum*, and *Acme lineata* being taken in the glen below Glenariff Lodge. Freshwater species were almost absent, but *Ancylus fluviatilis* was plentiful to an altitude of about 1,000 feet. On the upland bog the only species seen was *Limnaca truncatula* and a *Pisidium*. No species of mollusca was,

however, taken in the lakes which lie on the peaty area, though three species of freshwater beetles were found. The ground covered was of special interest to the botanists, for Glenariff has long been noted for the richness of its flora. The plants seen included the following:—*Lycopodium alpinum*, *L. clavatum*, *Hieracium stenolepis*, *H. anglicum*, *Galium boreale*, *Arenaria verna*, *Drosera anglica*, *Neottia Nidus-avis*, *Saxifraga hypnoides*, *Vaccinium Vitis-Idea*, and *Polypodium Phegopteris*. The prize for the best set of photographs illustrative of the geology of the district visited at the previous excursion offered by the Vice-President was won by D. J. Hogg.

JULY 2.—ARMAGH.—Travelling by the 1.50 p.m. train from Belfast the party set out on foot. Robert Bell acted as conductor. The route travelled was north-west to the Carboniferous limestone quarries at Carrickaloughran, then south-west to the Navan quarry, from which the return was made to the Cathedral City. At Carrickaloughran the chief interest of the quarry is a huge dyke of basalt over 20 feet in width, which rises almost vertically through a fissure in the limestone beds, cutting the nearly horizontal bedding planes of the latter almost at right angles. Many fossils were collected both here and at the Navan. A short distance south-west of the Carrickaloughran quarry is an extensive low-level esker-like deposit of sands and gravels. It has been extensively worked locally for building sand. Some interesting sections are exposed in the pits from the clayey sands, in one of which a member of the Club, Mr. Joseph Wright, F.G.S., recently obtained a number of foraminifera. The clay bands which yield these foraminifera are intercalated with laminated and current-bedded sands, overlying the whole being a series of gravelly and pebbly beds, all indicating water action and current-bedding. From these pebbly beds one member obtained a shell fragment of arctic type. An examination of 100 pebbles or erratics, chosen almost at random from a small section, yielded the following result:—Carboniferous rock, 65; basalt, 24; mica schist, 6; quartzite, 4; and flint, 1. It is clear, then, that, though the majority of the erratics here are local, yet there is a fair proportion of "travelled" rocks in the deposit. Adjoining the sand pits is a rounded hill or drumlin of Boulder-clay. At the Navan quarry the limestone is still extensively worked, but not nearly as much for the sake of its building stone as formerly. The stone is usually of a light-grey colour, though some of the deeper beds have a purplish tint. Both here and at Carrickaloughran several of the beds exhibit an arenaceous appearance and texture. All the beds are fossiliferous, fish remains being most prevalent at Navan. The floor of the latter quarry, which is from fifty to sixty feet from the surface level of the top, is composed of hard crystalline masses of coral, the prevalent type being *Lithostrotion basaltiformis*. The botanical members of the party were well pleased with the result of their afternoon's ramble. *Ranunculus trichophyllus*, only once before recorded from County Armagh, was seen in a disused quarry at Carrickaloughran. On the neighbouring esker the Pyramidal Orchis (*Orchis pyramidalis*) grew in the greatest profusion. It was likewise seen in dry pastures in another locality, and also

near the Navan Fort. *Trifolium medium* occurred in abundance over the same area. The visit to the ancient royal stronghold of Emania, now known as Navan Fort, yielded one of the best botanical finds of the day—namely, the Wood Vetch (*Vicia sylvatica*), not hitherto recorded from the county. Other notable plants seen were *Carduus acanthoides*, *Lamium album*, *Juncus glaucus*, and *Brixa media*, in all cases so common as to be characteristic of the area visited. About forty species of land and fresh-water shells were noted, including the spotted variety of the Great Slug (*Limax maximus*), a very large form of *Arion ater*, var. *rufa*, and many *Amalia gagates*. The rare *Helix arbustorum*, known to live on the Navan Fort, was not seen on this visit. *Helix pulchella* was noted, also *Ancylus lacustris*, *Planorbis fontanus*, and *P. contortus*, with both Valvatas. Of Woodlice, *Porcellio pectus* was found; also *Trichoniscus pygmeus* and *Armadillidium vulgare*, both these species being additions to the known fauna of County Armagh. The site of Emain Macha, the ancient palace of the Kings of Ulster, was visited, and, after tea, St. Patrick's Cathedral in Armagh. Belfast was reached shortly after midnight.

CORK NATURALISTS' FIELD CLUB.

The officers and committee for 1910-11 have been elected as follows:—
 PRESIDENT—Professor Isaac Swain. VICE-PRESIDENTS:—Professor M. Hartog, T. Farrington, H. Lund, W. Humble Johnson, R. A. Phillips, J. J. H. Bennett. HON. TREASURER:—W. B. Lacy. HON. SECRETARY:—Jas. Noonan. COMMITTEE:—Mrs. Brooke-Hughes, Jas. Coleman, William Miller, F. R. Rohu, J. Scott-Kerr, R. Blair.

The Club has recently contributed a number of cases of natural history specimens to the Museum, Fitzgerald Park.

The following excursions have taken place:—

SATURDAY, JUNE 18.—KILLUMNEY and BALLINCOLLIG (Conductor, Mr. T. Farrington).—A large party travelled by wagonette to the caves at Ovens. The exploration of the caves was conducted by the aid of lighted candles, &c. Among other things, the curious honeycomb markings, and incipient stalactites, were noted. The members afterwards walked to Ballincollig.

SATURDAY, JUNE 25.—SPIKE ISLAND (Conductor, Prof. Hartog).—This was an excursion for the study of marine zoology, at low water. Hence the party started at an early hour. Thanks to the good offices of Lieut. R. R. Hoare, R.N., a special steam-launch was placed at the disposal of the members by the naval authorities.

WEDNESDAY, JUNE 29.—CROSSHAVEN (Conductor, Prof. Swain).—This excursion was arranged for the study of local geology. A little to the south of Weaver's Point, a magnificent anticlinal fold in the Old Red Sandstone rocks was noticed. South of this again is a rock platform, carved out at a time when the sea stood some 12 feet higher than it does now. Three distinct types of loose deposits are arranged upon it. North of Poulnacalee Bay occurs a section showing boulder clay, lower "head," and blown sand, and at the ladies' bathing place, lower "head" and

raised beach materials were observed, with the addition of glacial gravel showing current bedding. Walking further on to Myrtleville, lower "head," blown sand, and raised beach materials were viewed in a fine section of cliff. In one of the gullies, the differential weathering of sandstone and slate was well displayed. Further on again was found evidence of glacial grooving and polishing, and sections showing dip and cleavage. Numerous small faults were also noted along the shore of Ringabella Bay.

DUBLIN NATURALISTS' FIELD CLUB.

JUNE 25.—IRELAND'S EYE.—Under the conductorship of J. de W. Hinch the geological formation of the rocks was studied. Owing to unfavourable weather conditions dredging off the island had to be abandoned. A special feature of interest at this time of year was the number of birds nesting on the rocks; the north side of the island was especially favourable for observing them. After a very pleasant afternoon the party returned to Howth, where tea was provided.

NOTES.

BOTANY.

Cnicus pratensis in Co. Dublin.

In his *Flora of the County Dublin* Mr. Colgan says of the above that it has not been recently seen in the county, but states it as his opinion that further search is "likely to show that it is not yet extinct." His optimism is fully justified, for it is now found to occur in considerable quantity in a meadow in Glenasmole, near St. Anne's graveyard. To be more exact as to locality it occurs 300 or 400 yards to the south of the graveyard. It was in July of last year I first had the pleasure of happening on this handsome thistle in this locality. This year, on the 12th June, in company with Mr. D. L. Murphy, I again visited the spot. The land was again under meadow, and *Cnicus pratensis* was again noted, apparently in equal profusion. It occurs scattered irregularly over a considerable area; but in at least one spot it forms quite a dense, almost circular cluster perhaps ten feet in diameter. In the same meadow in fine vigour and in full bloom occurred *Habenaria albida* in some profusion, in company with *H. chloroleuca*, *Orchis Morio*, *O. maculata* and the Twayblade (*Listera ovata*.) We also got here the locally rare composite *Antennaria dioica*.

W. B. BRUCE.

Dublin.

Allium triquetrum naturalized in Co. Cork.

This handsome southern alien has been twice recorded as occurring in Co. Cork. In 1890 Mr. R. A. Phillips found some 25 plants growing in a grassy hollow near Dunkettle (*J. Nat.*, 1896, p. 167), and in 1896 Mr. W. G. Axford found it farther south at Monkstown in the same county, in

what quantity is not stated (*Cybele*, 2nd Ed, p. 513). Towards the end of April last a flowering specimen was sent to me by my friend, Miss Amy Warren, from the latter station, Monkstown, where she informed me she found it growing in great abundance in many places along the roadside. In further correspondence I learned from Miss Warren that the plant grows literally in thousands at intervals for a space of about three miles along the sea road at Monkstown, but that she failed to find any trace of it inland or farther south along the shores of Cork Harbour at Ring or Crosshaven. For at least 14 years the plant has persisted at Monkstown where in all probability it first appeared as an outcast or escape from garden culture. It is evidently so fully established there at present as to merit admission to the Irish flora as a naturalized alien.

In Southern Europe this onion has a marginal or coastal distribution chiefly along the Mediterranean. At Monkstown it no doubt spreads chiefly by seed, which it freely ripens there.

N. COLGAN.

Sandy Cove, Co. Dublin.

In 1899 I saw this plant growing in wooded ground away from houses near Kenmare, Co. Kerry, and looking naturalized.

R. J. L. PRAEGER.

ZOOLOGY.

Common Tern near Kingstown in March.

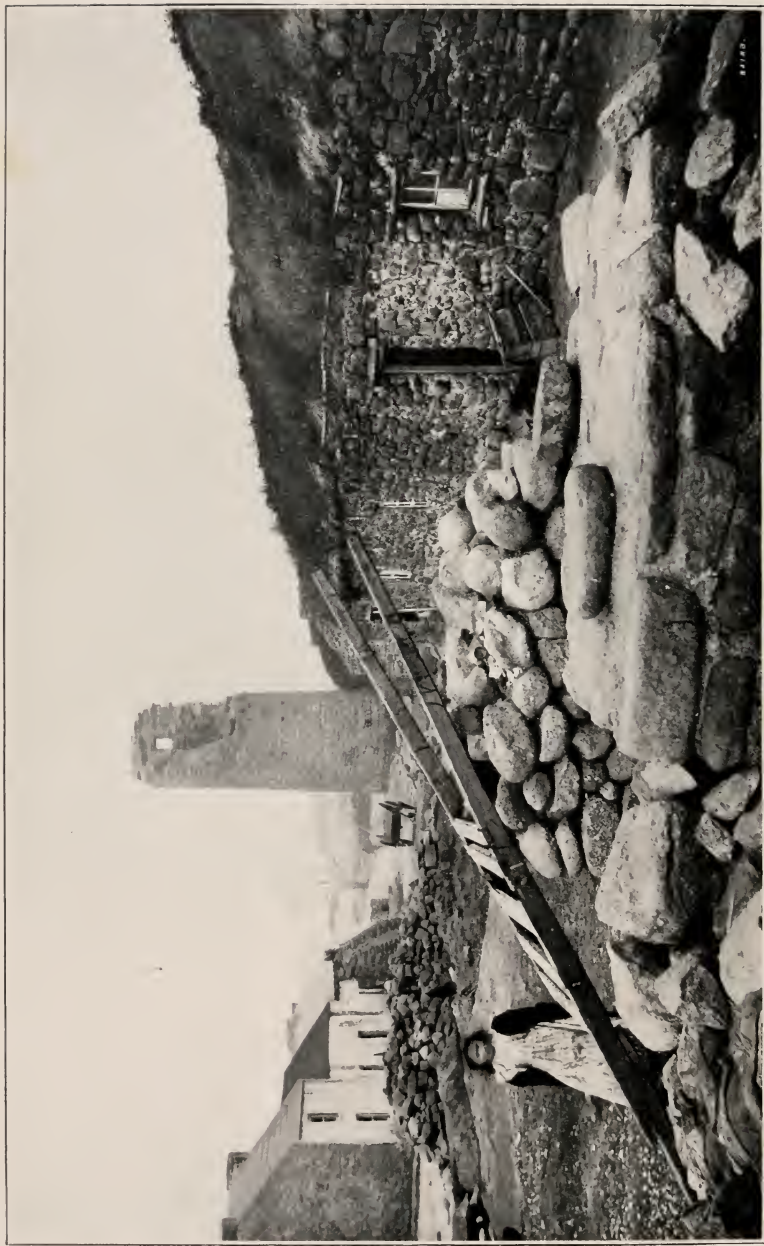
On Wednesday, March 16th, 1910, I observed a Common Tern (*Sterna fluvialitis*) two miles outside Kingstown Harbour. The bird came close astern of the steamer on which I was a passenger, and after keeping to port for three or four minutes it headed away in the direction of Dublin, passing through a large gathering of Herring-Gulls which were feeding on floating garbage. The appearance of this tern so early in the Spring is, I believe, unusual, though it is interesting to note that its larger congener, the Sandwich Tern (*Sterna cantiaca*) sometimes makes its appearance in British waters towards the end of March. I should mention that the above-mentioned Common Tern was in mature plumage.

C. J. PATTEN.

Sheffield.

Walrus reported from Clew Bay.

Mr. Ussher draws our attention to a note in the *Field* of 30th October, 1909, in which the writer, Mr. E. Thomas O'Donel of Newport House, Mayo, reports a Walrus as seen by him in Clew Bay in about four feet of water, the long tusks coming down from the upper jaw being conspicuous. In a letter to Mr. Ussher, Mr. O'Donel adds that a few hours later a man fishing four miles away also saw a Walrus.



WEST TOWN, TORY ISLAND.

R. Welch, Photo.

IRISH FIELD CLUB UNION.

REPORT OF THE
SIXTH TRIENNIAL CONFERENCE AND EXCURSION
HELD AT ROSAPENNA, JULY 8TH TO 13TH, 1910.

GENERAL ACCOUNT.

BY R. LLOYD PRAEGER,

Hon. Secretary, Irish Field Club Union.

THE Sixth Triennial Conference and Excursion of the Naturalists' Field Clubs of Ireland was held at Rosapenna, in Co. Donegal, on July 8th-13th, 1910. Twice had the Clubs met previously in Connaught—at Galway in 1895, and at Sligo in 1904; twice in Muinster—at Kenmare in 1898, and at Cork in 1907; once in Leinster—at Dublin in 1901; the present was the first meeting in Ulster, the home of the premier Irish Field Club. The Rosapenna Hotel, now one of the largest and best managed hotels in Ireland, lying among the Carrigart sand-dunes, with the interesting promontory of Rosguill adjoining on the north, a great area of mountains and lakes stretching to the south, and the placid waters of Sheep Haven and Mulroy extending on either hand, was an ideal centre for a meeting such as the present. In every direction lay wild unexplored ground—unexplored, that is, as regards many groups of plants and animals. The Phanerogams were already well known, having been long since worked out, and published by H. C. Hart in his "Flora of Donegal." For other groups of plants, the district was almost entirely unexplored. As regards its fauna, all the vertebrates were, of course, tolerably well known. Among the invertebrates, the marine Mollusca had been collected by Hart, and the non-marine groups had recently been very well worked by Messrs. Welch, Stelfox, and some English friends. But in all other groups there was plenty of room for further work, and many large sections of the fauna were entirely untouched. The visit arranged to Tory Island, of which the Phanerogams alone had been worked out, was especially looked forward to. There was in all directions the prospect of an interesting

harvest, and it is therefore to be regretted that, as at the Cork Conference, the working members were so few. But those who were present strove, by strenuous collecting of many groups, to redeem the absence of their colleagues.

The party numbered 47 all told—precisely the same number as at Cork three years previously; about two-thirds of these were of the Belfast Club, the remainder being members of the Dublin Club, with three from Limerick; the Cork and Omagh Clubs were without a representative, and there was an absence, which all regretted, of any of the English zoologists who have on many occasions joined the Conference parties.

Perfect weather favoured the meeting. The good luck of the Conferences in regard to weather is now proverbial. During the six meetings that have been held, each lasting a week, no excursion has ever been abandoned or curtailed owing to rain; a heavy shower on the Aran Islands, and another at Lough Gill, represent the worst charges that our parties can bring against the weather. On the present occasion conditions were more favourable than ever; following on several weeks of very broken weather, no drop of rain fell during the period of the meeting, neither was it on any day unpleasantly hot. The sea-fog which prevailed during the visit to Tory, while obscuring some very fine and interesting views, did not interfere with work, and was the means of providing members with an amusing experience, unique in the annals of Field Club work in Ireland—of which more anon.

The arrangements for the meeting were made by R. Welch and A. W. Stelfox, respectively President and Secretary of the Belfast Club; and—barring the experience just referred to—the time-table was carried out without a hitch or a delay.

On July 7 the Limerick and Dublin contingents travelled to Belfast, spending the night in the Kelvin Hotel, destined to be the scene of a disastrous and fatal fire a few days after their visit. Some members who arrived in the afternoon found time to explore the geology of the Cave Hill and other classic Belfast hunting-grounds.

FRIDAY, JULY 8.

The combined party assembled at the Great Northern Railway, Belfast, and took the 7.30 train for the north. Joined at Portadown by some members, they changed at Strabane to

the narrow-gauge line, and were soon in Letterkenny. Here a wait of an hour and a half occurred, which was employed in exploring the town. Joined here by two more members, the party, now at its full strength of 47, again took train, and reached Creeslough at 2.13. The last section of the journey was of high interest and great beauty. First the long climb along the northern side of the fine valley of the Swilly, then peeps of the high mountains to the north-west; later the passage of the remarkable gap of Barnesbeg, followed by the crossing of the great Gweebarra rift, closing in the distance to the deep cut of Glenveagh. At Creeslough a dozen cars were in waiting, with carts for the luggage, and soon all were driving to Doe Castle, the first stopping-place, beautifully situated on a wooded rocky point projecting into Sheep Haven. The fine keep and bawn, though of 15th century or earlier date, are in good preservation and were inhabited till recently. Exploration of the castle was followed by tea on the lawn, and an examination of the old churchyard adjoining, where attention was divided between several interesting monuments and the operations of the conchologists. Leaving at 5.15, Rosapenna was reached in good time for dinner. In the evening many members explored an interesting sea-cave close by, now cut off from the sea by a heavy fall of rock, but clearly connected still during storms through its rocky floor.

SATURDAY, JULY 9.

At 9.30, mounted on cars, the party left to explore the Rosguill peninsula, on the sandy neck of which Rosapenna Hotel is built. The road, hilly and picturesque, runs along the eastern slope of the hills, with the waters of Mulroy Bay below. Fanny's Bay was passed, the lying-up place of the herring-fleet which has its head-quarters at Downings Bay, situated on Sheep Haven close to Rosapenna. Leaving the rocky slope of Ganiamore behind, a breakneck descent led to the level grass-grown sands of Tranarossan, stretching across from sea to sea, with the bare side of Crocknasleigh, or Melmore Mountain, half schist, half granite, rising abruptly from the flat (Plate 6). Beyond this, at Gortnalughoge Bay, the party camped for the day. The sun shone gloriously, and, abandoning coats and wraps, a start was made across the peninsula for the Murder Hole. The route lay across a heathery shoulder and

steeply down to Melmore Lough, a beautiful sheet of water banked in between the flat sands and the rocky hill. The "Murder Hole" itself is a lovely sandy cove amid fine rock-scenery, with the waves tumbling in out of the open Atlantic (Plate 7). The water was irresistible, and soon many were wading. An outlying grassy stack—"Rough Island"—was explored, which yielded some interesting plants, and also the nests and nearly full-grown young of the Great Black-backed Gull. A return was made to Gortnalughoge for lunch. In the afternoon further exploring was carried out, a number of members walking to Melmore Head, the extremity of the promontory, where many gulls, shags, &c., were breeding. At 5 o'clock the return journey was commenced, a halt being made at Mevagh to visit the old church and large rude cross that stand there. Rosapenna was reached punctually, and the party returned delighted with their first day's excursion.

SUNDAY, JULY 10.

Sunday was as usual a *dies non*, but during the day the party scattered far over the district, and members might have been met anywhere from Melmore Head to Glenveagh. To the latter place a section drove, including several collectors, and good work was done among the native woods that clothe the steep slopes above the lake. Others looked for prehistoric remains among the sand-dunes with success, and others again explored the rocky and sandy shores of Sheep Haven.

MONDAY, JULY 11.

At 9.30 the party started on cars for Lough Salt. The route lay southward through pretty hilly country, with much natural scrub, to the hamlet of Glen; thence steeply upward, with lovely views of Glen Lough opening out below. As the ascent continued the panorama increased in extent, including the Gweebarra rift to the pass beyond Glenveagh, Sheep Haven with Horn Head beyond, Muckish and many other mountains. A wide stretch of moorland and a further ascent to 880 feet, followed by a slight drop, brought the party to Lough Salt, delightfully situated on a long shelf of Lough Salt Mountain, which rises steeply from the water to an additional height of over 700 feet (Plate 5). Here a halt of several hours was made, during which lunch was served. The more active members started at once for the summit of Lough Salt Mountain. Others followed down the outlet stream—which descends a little



LOUGH SALT AND LOUGH SALT MOUNTAIN.

R. Welch, Photo.

solution gorge in a band of primitive limestone, sinking underground and reappearing in characteristic fashion—to the adjoining picturesque Lough Reelan, where collecting and bathing were indulged in. The shores and waters of Lough Salt were also explored for plant and animal life.

At 2.30 a start was made southward along the lake shore. A very slight rise—now being tunnelled for the Letterkenny Waterworks, which will draw their supply from Lough Salt—leads to the southern slope of the ridge, and a breakneck descent into the cultivated country ensued, following which the road led west and then back north into Barnesbeg, which could now be examined in more detail than when traversed in the train a few days before. Towards the northern end of the gap tea was picturesquely set out among the heather by the roadside, and was very welcome. Then cars were again mounted, the steep descent into the Gweebarra rift was negotiated, and, turning north-east, the valley was traversed, through bog and natural birch woods, and along the beautiful shores of Glen Lough, to Glen, where the route of the morning was rejoined. Rosapenna was reached about seven o'clock.

TUESDAY, JULY 12.

By 6.30 a.m., the whole party was astir, and jubilant at the prospect of a visit to Tory Island. Until the previous evening, it had looked as if the Tory excursion, by far the most interesting feature of the Rosapenna meeting, would have to be abandoned. A few days before the arrival of the Field Clubs, the ss. "Melmore," which had been chartered for the cruise, ran on the rocks of Ramore Head when leaving Portrush, and though not seriously damaged, had to dock for overhaul. The steamer which replaced her on the regular service to Mulroy Bay, etc., had, alas! a passenger certificate for twelve only. However, at the last moment, the energy of Mr. Manning, Manager of Rosapenna Hotel, prevailed, and the ss. "Cynthia," which plies between Londonderry and Moville, was secured, the difficulty that her passenger certificate applied only to Lough Foyle being got over by the procuring of a special permit. After an early breakfast, the party walked across the sands to the pier at Downings Bay, and by 8 o'clock all were on board. The morning was very bright and calm, and the ocean exceptionally smooth, so that

all augured well. Tory Island offered many possibilities to the naturalist. The botany, indeed, at least as regards the higher plants, was already known, and as regards the lower plants not very much was to be expected, save in the domain of marine algae, which could not be adequately explored on a visit of a few hours. But as to its zoology, Tory was almost a *terra incognita*. So small bottles of methylated spirit were distributed, with many adjurations to the members to collect vigorously. The President of the Belfast Club announced the offer of a prize¹ for the best general collection made on the island during the day. Meanwhile Sheep Haven had been crossed diagonally, and Horn Head was looming up massively ahead. The steamer was slowed down, and crept slowly along the glorious range of cliffs, stopping occasionally to allow of photographs being taken (Plate 8). To see the great colonies of breeding sea-birds to the best advantage, a small boat which could go close in under the cliff would have been necessary; but from the steamer fine general views were obtained; while the geological and other features of the headland were seen to perfection.

When the huge rocks of "The Horn" proper were passed, a course was shaped for Tory, which was hidden from view by a bank of fog—a thin driving mist, blotting out everything over a couple of hundred yards distant, into which the steamer ran presently. Speed was reduced after a while, and a sharp look-out was kept; suddenly warning voices were heard, and simultaneously a rift in the fog showed a line of bleak stony shore close on the starboard bow. The engines were reversed, and the invisible voices guided us to an anchoring place, with high rocks dimly visible to left and right. Then a large open boat manned by seven men came alongside, and the party were soon ferried ashore, to find they had reached not West Town, as they expected, but Port Doon, at the extreme east corner of the island. No time was lost in getting to work. Leaving out of account the time occupied by lunch—which was served at Port Doon—four hours were available for exploring the island, and in that time the members penetrated every corner of it—despite the persistent driving fog—even to the summit of the lofty light-house that stands at the western extremity. Much was accomplished by the working members. Special attention was paid to the land and fresh-water mol-

¹ Subsequently awarded to Miss Jean Agnew for a collection including 38 species of animals.

lusca, the flowering plants and mosses, and to the photographing of the antiquities of the island—the round tower, the famous “Tau Cross,” and the other remains at West Town (Plates 4, 12). The Tory people proved most friendly and helpful, and gave information and assistance freely.

By five o'clock all were aboard again enjoying a hearty tea, and the “Cynthia” steamed off into the fog, which was slowly becoming denser. Experiences were exchanged, observations compared, notes made, and specimens safely put away. Meanwhile, Horn Head being—presumably—repassed, the steamer edged southward, endeavouring to find her way into Sheep Haven. The light north-easterly breeze died away; the slight lazy roll on the ocean ceased, showing that the vessel was now within the heads; but still no land, until at length a clamour of sea-birds, growing gradually louder, arose to starboard, and then suddenly the white foam around a conical stack became visible close ahead, followed by a long line of foam along the base of a range of cliffs. The place could not be identified, and so in thirteen fathoms the anchor went down. Air and water alike were still, and the only sound was the incessant clamour of the birds—the musical cries of hundreds of Kittiwakes, the hoarse notes of Guillemots and Razorbills and the shrill piping of their young, and the calling of Herring Gulls. Time passed slowly, but presently, as darkness was falling, a cheer heralded the approach of a long white fishing-boat. From her crew the befogged party learned their position—close in under the “Little Horn,” south-east of Horn Head; but in view of the gathering darkness and the heaviness of the fog, the captain decided not to move. So the party settled down for a night at sea. A few cushions and rugs were produced, and life-belts were requisitioned as pillows. A smoking concert was organised on the upper deck, in which Mr. McDonald, assistant manager at Rosapenna, proved invaluable; and at 10.30 “dinner” was announced—a cup of tea without milk and one sandwich all round. By 1 a.m., all was silence, but a couple of hours later the birds again took up their chorus, and a new day came. At four o'clock our indomitable waiter went round with a number of lumps of sugar in a saucer—the last of the provisions. At seven, the fog seemed a trifle lighter, and the captain warily crept away eastward, and

presently land was sighted which was made out to be Black Rock off Rosguill. Then the end came with startling suddenness. The mist began to lift ; soon the sun came bursting through ; and by 8 o'clock the "Cynthia" came up to Downings Pier in full sunlight, with the mist rolling in sheets of flowing white off the surrounding hills. Never was breakfast more welcome than that to which the party sat down half an hour later.

WEDNESDAY, JULY 14.

To-day's programme consisted of driving to Cratlagh and Bunlin, at the extreme upper end of Mulroy Bay, and exploring the woods and shores there. Fortunately this was a programme that could still be carried out in a curtailed period. After their night in the open, members were given a couple of hours' respite. This was used by some in sleeping ; by most in strolling, lounging, or bathing in the bright sun ; while to a few it supplied a welcome opportunity of putting the captures of the previous day in order. An early lunch was served at noon, and at one o'clock all drove off. The route lay through Carrigart, and then eastward and southward, with varied views of Mulroy Bay on the left and heathery hills on the right. No stop was made till Bunlin Waterfall, the rendezvous for the afternoon, was reached, where the party scattered in pursuit of their various hobbies. Presently tea was served here, and then a leisurely return was made, with a stop on the way to examine and photograph one of the few "lint-wheels" still remaining in the district (Plate 13).

CONFERENCE.

After dinner half of the large dining-room was cleared, and the usual conference and exhibition of scientific results of the meeting was held. None of the party having been in bed the previous night, the formal proceedings were curtailed as much as possible.

R. WELCH, M.R.I.A., President of the Belfast Field Club, in taking the chair, referred to the five triennial conferences which had preceded the present one, and to the good work which had been accomplished on them, not only in an increased knowledge of the fauna and flora of Ireland, but in the establishment of more intimate relations between the



MELMORE MOUNTAIN AND KITCHEN MIDDENS. *R. Welch, Photo.*
S—schists. G—granite. M—middens. X—blowing sand. P—sand-plain.



CONTORTED QUARTZITES, MUSLAC CLIFFS, ROSAPENNA.

R. Welch, Photo.

various clubs, which had an aggregate membership of about 750 persons. The attendance at the conferences had fallen from 100 at Galway in 1895 to 47 at Cork (1907) and Rosapenna; but he thought this was a measure of the success of these meetings rather than of their failure, for the dropping off was due to the fact that the objects for which the conferences were instituted were now largely accomplished. The members of the different clubs now knew each other and each others' districts; and instead of working at their particular studies within their own neighbourhoods, they had extended their observations so as to include in many cases the whole of Ireland. The important combined work which was now going on in the country—the survey of Clare Island, for instance—had to a great extent been made possible by these conferences, and was accountable in many instances for the non-attendance of those working members whose presence was now missed. Since last conference Irish Field Club work had sustained a grievous loss in the death of the veteran Belfast naturalist, S. A. Stewart, and he called on Mr. Praeger, who was intimately associated with Mr. Stewart in his later work, to express the sense of the meeting in the loss which his death entailed.

R. LL. PRAEGER said he was proud to be asked to offer a tribute to the memory of Mr. Stewart. Few men had done a better life's work in scientific field work in Ireland than he, and it was fitting that this meeting of Irish naturalists, meeting for field work, should do honour to his memory. He proceeded briefly to sketch Mr. Stewart's life and labours, and dwelt on his helpfulness to other workers, his unassuming modesty, and his intense love of truth and of conscientious work.

Mrs. BERNAL proposed and Rev. SIDNEY SMITH seconded a cordial vote of thanks to J. W. Manning, manager of the Rosapenna Hotel, Mrs. Manning, and Mr. M'Donald, assistant manager, for the excellent way they had seen to the comfort of the party and the success of the excursion.

J. W. MANNING replied suitably.

Rev. Canon LETT then spoke on the Mosses and Hepatics found during the excursion, and exhibited specimens.

A. W. STELFOX followed, with notes on the Land and Fresh-water Mollusca.

R. LL. PRAEGER spoke of the Phanerogams and Ferns.

R. J. USSHER referred to the Birds, and exhibited a number of bones of the Great Auk, collected from the sand-dunes adjoining the hotel. He concluded by proposing a vote of thanks to the conductor (Mr. Praeger), which was seconded by W. F. DE V. KANE.

R. LL. PRAEGER said that thanks were due not to him, but to R. Welch and A. W. Stelfox, who were entirely responsible for the arrangements, which it was a simple matter to him to carry out.

A. W. STELFOX said that thanks were due not to him and Mr. Welch, but to Mr. Manning, who had himself arranged practically the whole programme; and the meeting adjourned amid applause and laughter.

The members subsequently spent some time examining the various objects arranged on the table for exhibition, in which they were joined by numerous visitors staying in the hotel.

The following morning the party broke up, the majority proceeding by the morning train to Belfast.

GEOLOGY.

BY J. DE W. HINCH.

THE rocks involved in the geological history of the district visited by the Field Clubs are not only of high antiquity—being referred to early Palæozoic times—but in every case the original strata have undergone a greater or lesser degree of alteration accompanied by intense earth-movement, resulting in the production of a complex of highly metamorphosed rocks in which each member of the complex has largely lost its original characters.

Stratified and igneous rocks occupy about equal portions of the district, the stratified series of quartzites, mica-schists and crystalline limestones occurring in the Errigal and Muckish range in the north-west, and in the range of Lough Salt and Scraigs in the south-east of the country.

The igneous rocks consist of a number of interesting granites, often foliated, forming the Glendowan and Derryveagh ranges, while altered basic rocks appear as intrusive sheets of epidiorite in the stratified series.

The geological axis of the North-western Highlands passes from north-east to south-west through the great rift valley of Glenveigh and Gweebarra. The granite in which the valley has been formed rises on the north-west side into the Derryveagh Mountains and on the south-east into the Glendowan hills. To the north west of the Derryveagh range rises the Errigal and Muckish range, composed of metamorphic rocks, while to the south-east of the Glendowan hills rise the Lough Salt and Scraigs range, composed of the same metamorphic types.

This three-fold parallel series of mountains—a central granite ridge flanked by a metamorphic series on the north-west and south-east—had its origin at the close of the Silurian Period as a result of the “Caledonian” earth-movements, a system of intense plications which, acting over the British area from Connacht to the Highlands of Scotland, produced a general system of folding, the longitudinal axis running in general from north-east to south-west. Prolonged erosion has no doubt modified to a considerable extent the original contours of the land; later earth-movements, and even the ice sheets of the Glacial Period, played their parts, but the general outline that was then impressed on the Donegal Highlands remains the dominant tectonic feature of the district.

This general formation of the country can be well seen on the journey from Letterkenny to Creeslough. First the traveller meets the rugged hills of the Lough Salt district, then succeed the sweeping granite outlines of Glendowan and Derryveagh, while away to the west appear first Muckish and then Errigal, and as the train crosses the viaduct and over the Owencarrow River the rift valley of Glenveigh opens out gloriously to the south-west.

When the broad tectonic outlines of the district have been pointed out, the extraordinary length of the lakes of Donegal as compared with their width receives an explanation. There can be no doubt that glacial erosion and glacial deposition, and even the solution of the limestone, have given rise to certain features in the lakes; but the “Caledonian” earth-movements produced results which no later occurrences have been able to obscure.

The great sea-loughs of Sheep Haven and Mulroy Bay, visited during the Conference, represent submerged river-valleys flooded during the last depression of the land, though it is possible that Mulroy Bay may have been modified by ice action during the Glacial Period to such an extent that it might be better considered as a submerged rock-basin, the lip being represented by "The Narrows," a narrow winding channel with a depth of only two fathoms on the bar, as compared with the fourteen fathoms reached farther inland.

That there has been an elevation of the land during recent geological times in the district around Sheep Haven is shown by the curious relations of Horn Head and Rosguill peninsula to the mainland. Horn Head is so loosely attached to the mainland by the causeway at Dunfanaghy as to be in reality an island, and Rosguill peninsula is a collection of islands running from Carrigart to Melmore Head, and connected with each other by low rock-ledges and blown sand. Tranarossan, visited during the Conference, is the most striking of these.

On the excursion to Rosguill and Melmore Head the Lough Salt series of rocks was seen in fine sections, the quartzites (Plate 6) of the Murder Hole and the relations of the granite to the metamorphic rocks being especially striking. During the excursion to the district in which the Lough Salt series is typically developed, the part played by solution in the formation of lakes and rivers was seen in Lough Salt itself and in the river that flows out of it to the north. Lough Salt Mountain is composed of quartzite, and from its summit a very extensive view can be obtained, including practically the whole of north-western Donegal. On the road to Lough Salt through Glen, and from Lough Salt to Creeslough by Barnesbeg, the granite chain of Glendowan was crossed, and splendid examples of foliation were observed, as well as many examples of inclusions of mica-schist, limestone, and quartzite in the margins of the granite. In the very fine transverse valley of Barnesbeg a magnificent section of fine-grained grey granite may be seen interbedded with schist, the grey granite being replaced in its lower portions by a salmon-coloured one rich in quartz. The return along Glen Lough showed a rather remarkable instance of a narrow lake some miles in length being fed by streams at both ends and discharging



MURDER HOLE BAY AND PINK CLIFFS, FROM ROUGH ISLAND, ROSGULL.

R. Welch, Photo.

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itself to the westward by means of a river at its centre. At Lackagh bridge very felspathic types of granite were observed, and on the road to Carrigart the "mullion structure" of the micaceous quartzite was noted in a number of openings; this "mullion structure" being the result of a shearing movement across the bedding which produced a peculiar fluting like that of a Gothic column.

The visit to Glenveigh gave an opportunity of seeing the northern end of the Gweebarra depression, a rift valley which, commencing near Glen, in the north of the county, runs in a practically straight line for thirty miles to Gweebarra Bay. This very remarkable depression has its origin in a series of faults, and in the foundered bottom of the rift lie Glen Lough, Lough Veagh, and Lough Barra. The western side of Glenveigh is bounded by enormous rock-precipices rising almost vertically from the waters of the lake; the granite of which they are formed being often foliated, and traversed by a large number of basaltic dykes. As the road to Calabber Bridge was being traversed Muckish and Errigal emerged to the westward, and there could be no more striking example of the effect produced by denudation upon different rock-material than that afforded by Errigal and the Derryveagh range. The latter being composed of granite showed the usual rounded outlines, so well known to those who have studied the Leinster *massif*, but Errigal is formed of quartzite, and takes the shape of an almost perfect cone, and there are few more striking scenes than the beautifully white pyramid of Errigal rising from its sombre foreground of diorite, schists, and limestone. On the journey to Tory Island the massive quartzites of Horn Head were seen rising to a height of 600 feet above the water, and in a number of instances dykes of diorite could be traced intruded between the bedding, and sometimes even striking across it horizontally.

TORY ISLAND.

Tory Island is composed to a great extent of granite, which varies much in texture; the grey type with large and in many cases almost perfect crystals of orthoclase being most prevalent on the portions of the island visited. The eastern end of the island—the Doon peninsula—is formed of compact tabular white quartzite carved by the sea into bays, headlands, and sea-stacks (Plate 9), which looked most fantastic seen through the blanket of fog which lay over the island the whole day. The solid geology of Tory has been studied exhaustively by the

Geological Survey, and no new facts can be reported in this direction, but it is of interest to note the occurrence of a very rubbly boulder-clay at several places on the island. Its occurrence on the low ground covered by bog was noted, but it is only in the cliff sections that anything definite could be seen. On the granite cliffs to the north of East Town fairly continuous runs of a very sandy boulder-clay from 1 to 1½ feet thick were seen, containing a number of erratics ranging in form from rounded pebbles to angular fragments. Scratched stones turned up in most of the sections, though not in proportion to the rest of the material. The most abundant erratic types were grits and mica-schist; quartzites and granite also occurred. The sections were usually capped with a thin deposit of peat, which in turn was covered by surface soil. The meagre depth of the island clay as compared with that of the mainland, where it often reaches a depth of forty feet, is, of course, very marked, but it is probable that the contours of the adjacent mainland were not favourable to a large mass of ice working out in the direction of Tory, and perhaps the outer limit of the ice was being reached, as the boulder-clay has the curious rubbly appearance which also appears in the South of Ireland.

National Library of Ireland.

BIRDS.

BY R. J. USSHER, M.R.I.A.

THE birds of this part of Donegal are characteristic of the north and west coasts. The Wheatear is one of the commonest land-birds, and the following were often seen—Wren, Pied Wagtail, Rock Pipit, Swallow, Sand Martin (breeding in scarps of the sand-hills), House Sparrow, Twite, Corn Bunting, Yellow Bunting, Skylark, Starling (in small flocks, Rosapenna), Rook, Rock Dove, Corn-crake (heard even on Tory Island), Coot (on Rosapenna Lake), Heron.

There was a general absence of Thrushes, Warblers, Tits, and Finches. One Magpie was seen towards Glen Lough. We met with no Choughs, not even on Tory Island, but we were told that three pairs of Ravens have nested there this year. Ravens formerly nested there so numerously that my informant stated he had counted thirty-six when the young broods were going about, but they killed so many chickens that the islanders shot them.

The Cormorant was seen on Mulroy Bay, but the Shag was much more numerous, as it is on the west coast generally. On Melmore Head, Shags were nesting near the top of the cliff in more exposed sites than I had seen before. Oystercatchers were found in several places where they doubtless breed, and Ringed Plovers (which had eggs or young) were numerous at Rosapenna and on the strands of Rosguill. Above one of these the sandy tract extended up the slope of the land, and here five pairs of Little Terns were uttering the cries of a nesting-colony. Common or Arctic Terns were flying over Sheep Haven. A few adult and immature Black-headed Gulls were on the flats of the golf-links, where there was a large assemblage of Common Gulls (*L. canus*) in the evenings, evidently seeking slugs. I saw no Common Gulls on the sea-cliffs, but there is a very fine colony of Herring-Gulls on Melmore Head, where the sloping, rocky point is separated from the hill behind by a chasm not easy to pass. The young were beginning to fly (13th July) but had not quitted the breeding-place. A pair of Great Black-backed Gulls were at home at Melmore Head, and another pair with two young on Rough Island at the Murder Hole. Kittiwakes had vast colonies at Horn Head, and some on Tory Island, and the Auk family were breeding as usual in both localities. On Tory Island the Puffins had scattered colonies along the cliffs and slopes on the north side, which present views of such marvellous stacks and tors. Our view of Tormore was obscured by a dense fog.

We had a fine view of the Horn Head cliffs as the steamer took us close under them on the 12th, but the bird life there did not seem to me as numerous as when I visited Horn Head in 1891. We saw a Black Guillemot at the mouth of Dunfanaghy Bay. On Tory Island a boy brought in four eggs of Peregrine that he had taken some time before, and said that other pairs breed on the island. We heard that the Petrels' breeding-places were difficult to approach, and the fog rendered this impossible.

Bones of Great Auk had been found by Dr. Scharff among the kitchen-middens at Rosapenna, and additional evidence was now discovered by Miss Weir and myself in the shape of five humeri representing four individuals (Plate 10).

Cappagh, Co. Waterford.

LAND AND FRESH-WATER MOLLUSCA.

BY A. W. STELFOX, A.R.I.B.A., AND R. WELCH, M.R.I.A.

LITTLE work remained to be done in this branch of zoology ; indeed few districts have received better and closer attention than that in which the sixth Conference was held. R. Welch's notes in the *Irish Naturalist*, vol. xv., p. 67, included good lists from Rosguill and Sheep Haven areas, with several records from other neighbouring places, such as Doe Castle, Lough Salt, and Doaghmore in Fanad. Unlike the last Conference, only two conchologists were in attendance, and the weather being of the usual "Field Club" variety, militated against many fresh discoveries. Everywhere on the mainland shells were few and far between, and it was only on Tory Island, where the cliff slopes were drenched with a heavy mist, that any abundance of molluscan life was noted.

Taking the various places in the order visited : Doe Castle and its surrounding furnished a fair list of land species, with one brackish-water one, viz., *Hydrobia ulvae*. Slugs were particularly common under some fallen trees west of the castle, under one of which a large specimen of *Limax flavus* was taken, being the first record of this species for the west division of Donegal. *Amalia Sowerbyi* was also observed here, with an abundance of *Arion subfuscus*. In the graveyard the large western form of *Hyalinia cellaria* was collected, juvenile specimens being seen in great abundance. If we are to trust specimens in the Dublin Museum named by Dr. Westerlund, this form is known on the continent as *Hyalinia cellaria* var. *sylvatica*, Morch ; and it is the shell described in 1908 by Mr. A. S. Kennard, F.G.S., as *Vitrea (Hyalinia) hibernica*. Specimens from this and other Irish localities were frequently mistaken in the past for *Hyalinia Draparnaudi*, a species practically confined to the southern and eastern counties in this country. Passing to the Rosguill peninsula, where our second day in the open was spent, time prevented us from visiting perhaps the best habitat, namely the slopes of Ganiamore ; these slopes include patches of rough talus with a fairly rank vegetation, and, as already proved, shelter an interesting fauna. At Melmore Head, the extreme north of the peninsula (which latter is really four islands connected to each other and the mainland by sand-flats), *Agriolimax agrestis*,



CLIFFS OF HORN HEAD FROM THE SEA.

Height 600 feet.

R. Welch, Photo.

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Hyalinia alliaria, *Helix ericetorum*, *H. nemoralis*, *H. aspersa*, and *Pupa cylindracea* were noted. On Rough Island, in Murder Hole Bay, approachable at low tide, we took *Helix ericetorum*, *H. nemoralis*, *Pupa cylindracea*, and a very small form of *Clausilia bidentata*. The best spot visited during the day was the smaller of the Melmore lakes, around which among other snails live *Limax arborum*, *Hyalinia cellaria*, and *Pupa muscorum*, and in the lake itself *Limnæa peregra*, *Planorbis crista*, *Valvata cristata*, *V. piscinalis*, *Pisidium subtruncatum*, *P. nitidum*, *P. henslowianum*, *P. personatum*, *P. gassiesianum*, and *P. Lilljeborgii*. In the real Melmore Lough nothing new was observed, but fine specimens of *Limnæa auricularia* var. *acuta*, *L. peregra*, and particularly *L. palustris* were collected, with *Planorbis albus*, *P. glaber*, *P. crista*, and *Pisidium gassiesianum*. It is of special interest to find *Planorbis albus* in this locality, as it is always local and seldom common in the north and west, when we have once left the limestone areas behind.

The day in Glenveagh produced nothing new either, but *Hyalinia excavata* var. *vitrina* and *Helix lamellata* were both refound, while on the journey *Limax maximus*, *Helix hispida*, and *Balca perversa* from the wood west of Lackagh Bridge; *Valvata piscinalis*, *Pisidium subtruncatum*, *P. gassiesianum*, and *P. pusillum* from Lough More, Creeslough; and *Arion intermedius*, *Hyalinia nitidula* var. *Helmii*, *H. pura*, and *Pupa anglica* from a small glen near Glassan are perhaps worth mentioning.

Next comes our excursion to Lough Salt, and owing to its elevated position and to its being partly formed by erosion in the limestone, we give the full list of species taken in this locality. This lough lies at an altitude of 817 feet above the sea, and its neighbour, Lough Reelan, about 50 feet lower. The following shells were collected by us along the shores of Lough Salt:—*Agriolimax agrestis*, *Limax arborum*, *Arion ater*, *A. intermedius*, *Hyalinia alliaria*, *H. nitidula*, *H. pura*, *H. radiatula*, *H. crystallina*, *Helix rotundata*, *Cochlicopa lubrica*, and *Pupa cylindracea*. In both lakes *Ancylus fluviatilis* and *Limnæa peregra* were common, the latter resembling slightly a large form of the var. *Boissyi*, but wanting the sharp spire and clean cut suture of that variety. One specimen, dead, of *L. truncatula* was picked up in the marsh between the two lakes. In Lough Salt we were only able to discover one

Pisidium (*P. personatum*), but in Lough Reelan these shells were common in the shallow end into which the outlet of Lough Salt drains. We were greatly disappointed in not being able to locate Mr. R. Patterson's habitat for *Pisidium henslowianum*, which he collected in this district in the year 1891. In the lower lough a most suitable habitat for this somewhat fastidious species was to be found where the fine quartz sand brought down by the outlet of Lough Salt mingled with the mud of Lough Reelan; but although worked carefully this spot only yielded the species mentioned.

TORY ISLAND.

Of the mollusca of Tory Island little was known, and the only published list known to us was that which appears in the *Ulster Journal of Archæology* for the year 1853, in which the late G. C. Hyndman mentions *Agriolimax agrestis*, *Helix nemoralis*, and *Limnæa peregra* as being observed on the island. Our friend, Mr. J. N. Milne, while in residence near Derry twice visited the island, first in 1894, and again in 1897. On neither of these occasions had he much time to spare for collecting, but the following species occurred to him:—*Hyalinia alliaria*, *H. nitidula*, *H. crystallina*, *Helix nemoralis*, *Pupa cylindræa*, *Limnæa peregra*, *L. truncatula* and *Pisidium pusillum*. Mr. Milne thinks that he also saw both *Helix hispida* and *H. aspersa*, the former under coffin-boards in the graveyard, and the latter near a house in West Town, but as he is not quite sure that he saw them, and as he has no specimens to confirm the record, he wisely suggests that we do not record these two species until we have further evidence in the matter. Neither of these shells was observed on our visit, but the environs of West Town did not particularly attract our attentions. From experience gained on other western islands our steps were at once turned to the cliffs (Plate 10), which in places shelter a luxuriant flora; and to Legrehy, or the Ram's Hollow, a fallen-in cave in which there is also plenty of cover under the loose boulders and rank vegetation with which the bottom is covered. With the exception of the above-mentioned situations, the surroundings of West Town, and some rough ground lying around Lough Ayes, the greater part of the island has been completely stripped of its turf by the inhabitants for fuel; at least three-quarters of the area is therefore quite incapable of supporting more than a

very meagre fauna. On the grass-covered slopes of the eastern cliffs ten species were taken, viz., *Agriolimax agrestis*, *Amalia gagates*, *Arion ater*, *A. intermedius*, *Hyalinia alliaria*, *Helix rotundata*, *H. nemoralis*, *Pupa cylindracea*, *Cochlicopa lubrica*, and *Clausilia bidentata*. Of these all but *Amalia gagates* and the last two species on the list were abundant, but only one specimen of the *Clausilia* was taken, and both the others mentioned were rare. In Legrehy, *Agriolimax agrestis*, *Arion ater*, *A. intermedius*, *Hyalinia alliaria*, *H. nitidula*, *H. crystallina*, *Helix rotundata*, *Pupa cylindracea*, and *P. anglica*, all appeared to be fairly common, living either at the roots of the plants or under stones. The Common Sorrel, *Rumex Acetosa*, which here grew to a height of at least two feet, seemed particularly to attract the majority of the species mentioned, and many specimens of *Arion ater* were seen feeding on its leaves. Several additions to the above lists were made at the western end of the island, where *Agriolimax agrestis*, *A. lævis*, *Amalia gagates*, *Arion ater*, *A. intermedius*, *Vitrina pellucida*, *Hyalinia alliaria*, *Helix rotundata*, *H. nemoralis*, and *Pupa cylindracea* were picked up.

The freshwater shells taken by us, were *Limnæa peregra*, *L. truncatula*, *Planorbis crista*, *Pisidium personatum* and *P. casestanum*. All but the last species were taken at the western part of the island, the eastern end only yielding *Pisidia*. As several of the species showed certain insular peculiarities, we think it necessary to give a few notes on the various species.

Agriolimax agrestis, L.—All the specimens taken were of an almost uniform pale brown, which had a slightly pinkish tinge. Many examples showed darker brown longitudinal stripes on each side of the shield similar to those usually to be seen on *Limax marginatus*.

A. lævis, Müll.—One specimen only, under a stone on shore of Lough Ayes. Quite normal.

Amalia gagates, Drap.—All examples were very small, and all of a dark bluish slate-colour.

Arion ater, L.—Only the jet black form noted.

A. intermedius, Normand.—Extraordinarily abundant on the cliffs; almost all of the greyish form, with dorsal stripes, which so closely resembles a pale *A. hortensis*.

Vitrina pellucida, Müll.—One dead shell on cliffs east of lighthouse. Normal.

Hyalinia alliaria, Miller.—Type rare, with the green and milky-white forms fairly common. The shells of this species are of the usual island type and are coarse in striation, large and flat, with a wide umbilicus.



NORTH CLIFFS. TORY ISLAND.

John Brown, Photo.



THE TORS, TORY ISLAND.

John Brown, Photo.

SHELLS COLLECTED ON THE SOUTH-EASTERN CLIFFS,
about 150 feet alt.

<i>libellula</i> , 12345, purple lip,	.	.	.	.	.	10
„ „ white lip,	.	.	.	.	.	3
„ (12) 345, purple lip,	.	.	.	.	.	1
Total,						14

In order to be quite sure that we were not dealing with *Helix hortensis*, which has been recorded from some of the Scotch western islands, probably in at least a few cases erroneously, we examined the darts of those specimens which most nearly resembled that species. In all cases these darts were quite typical of *Helix nemoralis*.

Cochlicopa lubrica, Müll.—Cliffs at east end only. Normal.

Pupa cylindracea, Da Costa.—Very abundant on the cliffs, and a few in Legrehy. The predominating form is that which is common to all the western Irish islands from which we have seen specimens, and appears to be the *Pupa anconostoma* of Lowe,¹ first described by that authority from the Atlantic Islands, and now considered as a mere variety of *Pupa cylindracea*. None of the Tory specimens were quite edentate, but in all cases the denticle was very small. Of specimens of this species, taken on St. Kilda, Messrs. Waterston and Taylor give the following note:—“Singly, and in small colonies everywhere, all the edentulous form and probably the same as the *Pupa semprouii* of Switzerland.”

Pupa anglica, Fér.—Of the large dark “marsh” form, about six specimens were taken in Legrehy at the roots of the vegetation.

Clausilia bidentata, Ström.—One half-grown dead shell on the south cliffs at the east end.

Limnæa peregra, Müll.—A small form common in Lough Ayes and the neighbouring pools. The largest of the specimens measured about 10 × 7 mm., and all might be referred to a form of the var. *Boissyi*.

L. truncatula, Müll.—Abundant around the margin of Lough Ayes. A short and stumpy form.

Planorbis crista, L.—Small specimens in a pool between L. Ayes and the Light-house.

A few notes on the distribution may be of interest. Of the species recorded by us only one, *Pupa anglica*, has not a wide range in Europe; all are usually to be found on the Irish and on some of the Scotch islands, and 13 of the 17 land-shells are common to Tory and St. Kilda; 6 are recorded for the Shetlands, 4 for the Faroes, 4 for Iceland, 2 for Greenland, and 4 for North America; while 9 are also known to inhabit the Atlantic Islands.

Returning to our work on the mainland after an “all night sitting,” neither of us were in the best hunting form when we

¹ *P. cylindracea* var. *anconostoma* is recorded by Dr. Scharff (*I. N.*, vol. vii. p. 10), from the Great Skellig in South Kerry.

reached the old woods of Cratlagh, which fringe the western shores of Mulroy Bay. We were, however, partly able to gratify our expectations by finding a few specimens of *Hyalinia excavata*, but although searched for keenly, *Limax cinereo-niger* was not found. We had rather expected to turn up this beautiful slug, as Mr J. N. Milne has taken it in similar woods at Ray in a neighbouring parish. Besides *Hyalinia excavata*, the other members of the Zonitidæ seen were *Hyalinia cellaria* (*Vitrea hibernica*, Kennard), *H. alliaria*, *H. nitidula*, *H. pura*, *H. crystallina* and *H. fulva*. Specimens of the last species taken on the uplands above the wooded area were particularly large and rather pale in colour. Slugs of the genus *Arion* were especially common, all five species being taken. The *Helices* were poorly represented, *H. rotundata* and *H. nemoralis* being the only two to figure on the day's list. No doubt a further search would also produce *Helix pygmaea*, *H. aculeata*, *H. lamellata* and *H. fusca*. The only other land-shells seen in this locality were:—*Vitrina pellucida*, *Agriolimax agrestis*, *Cochlicopa lubrica*, *Carychium minimum*, *Pupa cylindraca*, *P. anglica* var. *pallida*, *Balea perversa*, and *Clausilia bidentata*.

With the exception of the *Pisidia*, kindly identified by Mr. B. B. Woodward, F.L.S., whose names we have adopted for this genus, the nomenclature is that given by Dr. Scharff¹ in his "Irish Land and Freshwater Mollusca."

Belfast.

DIPTERA.

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

- Chloromyia formosa**, Scop.—Melmore Lough.
Haematopota pluvialis, L.—Glenveagh, &c.
Theriopectes montanus, Mg.—Cratlagh Woods.
Chrysophilus cristatus, F.—Cratlagh Woods.
Hybos grossipes, L.—Cratlagh Woods.
Clinocera stagnalis, Hal.—Glenveagh.
Hercostomus nigripennis, Fln.—Cratlagh Woods.
Onesia sepulchralis, L.—Glenveagh.
Calliphora erythrocephala, Mg.—Melmore Lough.
Hydrotæa irritans, Fln.—Melmore Lough.
Opomyza germinationis, L.—Dunfanaghy.
Borborus geniculatus, Mcq.—Dunfanaghy.

Edinburgh.

¹ *Irish Naturalist*, vol. I.

COLEOPTERA.

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

None of the beetles call for much remark. They are all fairly common species, and such as might have been expected to occur. The most plentiful was *Calathus cisteloides*, of which I received twenty-one specimens, nineteen of which were captured on Tory Island. *Cetonia aurata*, the Rose Beetle, has occurred in Donegal at Milford, and on the top of Slieve League. It has a western range in Ireland, and seems particularly attached to islands.

TORY ISLAND.

<i>Carabus catenulatus</i> , Scop.	<i>Philhydrus melanocephalus</i> , Ol.
<i>C. clathratus</i> , L.	<i>Tachyporus humerosus</i> , Er.
<i>C. granulatus</i> , L.	<i>Quedius tristis</i> , Grav.
<i>Nebria Gyllenhali</i> , Sch.	<i>Ocyopus olens</i> , Mull.
<i>Notiophilus biguttatus</i> , F.	<i>O. ater</i> , Grav.
<i>N. aquaticus</i> , L.	<i>Creophilus maxillosus</i> , L.
<i>N. palustris</i> , Duft.	<i>Xantholinus glabratus</i> , Grav.
<i>Harpalus æneus</i> , F.	<i>X. tricolor</i> , F.
<i>Pterostichus niger</i> , Schall.	<i>Lathrobium fulvipenne</i> , Grav.
<i>Pt. nigrita</i> , F.	<i>Aphodius ater</i> , De G.
<i>Amara aulica</i> , Panz. (spinipes, auct.)	<i>Cetonia aurata</i> , L.
<i>Calathus cisteloides</i> , Panz.	<i>Athous hæmorrhoidalis</i> , F.
<i>Anchomenus parumpunctatus</i> , F.	<i>Gastroidea viridula</i> , De G. (raphani, F.)
<i>Olisthopus rotundatus</i> , Payk.	<i>Otiorrhynchus atroapterus</i> , De G.
<i>Trechus minutus</i> , F.	

ROUGH ISLAND, MURDER HOLE, ROSAPENNA.

<i>Calathus cisteloides</i> , L.	<i>Philonthus varius</i> , Gyll.
<i>C. melanocephalus</i> , L.	<i>Coccinella xi-punctata</i> , L.
<i>Amara communis</i> , Panz.	<i>Athous hæmorrhoidalis</i> , F.
<i>Helophorus viridicollis</i> , Steph.	<i>Otiorrhynchus atroapterus</i> , De G.

BUNLIN, MULROY BAY.

<i>Nebria brevicollis</i> , F.	<i>Chrysomela polita</i> , L.
<i>Pterostichus niger</i> , Schall.	<i>Crepidodera transversa</i> , Marsh.
<i>Pt. striola</i> , F.	<i>Ceuthorrhynchus ericæ</i> , Gyll.
<i>Bembidiu saxatile</i> , Gyll.	

GLENVEIGH.

<i>Pterostichus nigrita</i> , F.	<i>Adrastus limbatus</i> , F.
<i>Pt. striola</i> , F.	<i>Dolopius marginatus</i> , L.
<i>Anacæna globulus</i> , Payk.	<i>Anaspis maculata</i> , Fourc.
<i>Staphylinus erythropterus</i> , L.	

Poyntzpass.

THE AQUATIC COLEOPTERA OF WEST DONEGAL.

BY FRANK BALFOUR BROWNE, M.A. (OXON.), F.R.S.E., F.Z.S.

THE published records of water-beetles for the vice-county of West Donegal produces, so far as I can find, a list of about 27 species, but in my researches on the distribution of the group I have seen a number of species in the collections of several entomologists, and in that of the National Museum, Dublin, and I have also made one excursion to the north-west, so that my list now runs to 66 species.

The absence of entomologists at the Conference was unfortunate, as the only water-beetles collected were taken by Messrs. R. Welch and A. W. Stelfox who, in the course of their own work, very kindly kept for me any specimens they came across. They collected altogether 23 species and added two (*Agabus chalconotus* and *Ilybius ænescens*) to my list.

Since so many captures in the vice-county have not yet been put on record the present seems a good opportunity for publishing a full list of species, and with the consent of those responsible for the Conference publications, this is here done. I am largely indebted to the Rev. W. F. Johnson and Mr. R. Welch, to the former for allowing me to see all his water-beetles, and to the latter for sending me from time to time specimens taken by him during his visits to the vice-county, and in the following list I have given the localities in which species were taken, and also the name of the collector, except where I took the species myself. I have added at the end of the paper a bibliography of the only published lists I have been able to find.

Haliplus obliquus, F.—Dunfanaghy and Carrickfin (1908).

H. confinis, Seps.—Dunfanaghy (1908).

H. flavicollis, Sturm.—L. Salt Mountain¹ (Dublin Mus. Coll.).

H. fulvus, F.—Dunfanaghy and Carrickfin (1908).

H. ruficollis, De G.—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin, (1908); Rosapenna L. (R. W., 1910).

H. lineato-collis, Marsh.—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin (1908); near L. Salt (R. W., 1910).

Noterus sparsus, Marsh.—Tawney (Dublin Mus. Coll.).

Laccophilus obscurus, Panz.—Carrickfin (1908). Rosapenna L. (R. W., 1909); Melmore L. (A. W. S., 1910).

¹ I think that most, if not all, of the L. Salt, Tawney and Milford water-beetles in the Dublin Museum collection were taken in 1906.



ON THE NORTH CLIFFS, TORY ISLAND, *S. H. Douey, Photo.*
the best habitat for Mollusca. A. W. Stelfox collecting.



HUMERI OF GREAT AUK (*Alca impennis*), *S. H. Douey, Photo.*
from sandhills at Rosapenna.

- Cælabus v-lineatus**, Zett.—L. Salt Mtn. and Tawney (Dublin Mus. Coll.).
- C. inæqualis**, F.—Narin (R. W.); Dunfanaghy and Carrickfin (1908); Rosapenna L. (R. W., 1909 and 1910); Melmore L. (A. W. S. 1910).
- C. ix-lineatus**, Steph.—Dunfanaghy (G. W. Chaster, *ex. coll.* J. Kidson Taylor.) I took a specimen in Carnboy L., Carrickfin (1908).
- C. impressopunctatus**, Schall.—Dunfanaghy (one specimen) (1908).
- Deronectes assimilis**, Payk.—Milford and Tawney (Dublin Mus. Coll.); Dunfanaghy (L. Sessiagh) and Carrickfin (Carnboy L.), one specimen in each (1908).
- D. xii.-pustulatus**, Ol.—Dunfanaghy (L. Sessiagh) (1908).
- Hydroporus pictus**, F.—Dunfanaghy (1908).
- H. lepidus**, Ol.—Ardara (W. F. J., 1892); L. Salt Mtn. (Dublin Mus. Coll.); Dunfanaghy and Carrickfin (1908).
- H. rivalis**, Gyll.—L. Salt Mtn. (Dublin Mus. Coll.).
- H. tristis**, Payk.—L. Salt Mtn. (Dublin Mus. Coll.); “near Glenveagh” (R. W., 1910).
- H. umbrosus**, Gyll.—Carrickfin (Dunmore L.) (1908).
- H. Gyllenhalii**, Schiöd.—Ardara (W. F. J., 1892); L. Salt Mtn. (Dublin Mus. Coll.); Dunfanaghy and Carrickfin (1908).
- H. vittula**, Er.—Dunfanaghy (in one collection only), (1908); Mulroy Bay (R. W., 1910).
- H. palustris**, L.—Ardara (W. F. J., 1902); L. Salt Mtn. (Dublin Mus. Coll.); Dunfanaghy and Carrickfin (1908); Rosapenna L. (R. W. 1910).
- H. erythrocephalus**, L.—Ardara (W. F. J., 1892); L. Salt Mtn. (Dublin Mus. Coll.); Dunfanaghy and Carrickfin (1908); Mulroy Bay (R. W., 1910); Tory Island (A. W. S. and R. W., 1910).
- H. memnonius**, Nic.—Milford (Johnson and Halbert, Beetles of Ireland, 1901).
- H. obscurus**, Sturm.—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin (1908).
- H. nigrita**, F.—Ardara (W. F. J., 1892); Dunfanaghy (in one collection only) (1908).
- H. pubescens**, Gyll.—Ardara (W. F. J., 1892); L. Salt Mtn. and Milford (Dublin Mus. Coll.), Dunfanaghy and Carrickfin (1908); Glenveagh; Mulroy Bay and “near L. Salt” (R. W., 1910); Tory Island (A. W. S. and R. W., 1910).
- H. planus**, F.—Carrickfin (one specimen, 1908).
- H. lituratus**, F.—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin (1908); Tory Island (A. W. S., 1910).
- Agabus paludosus**, F.—Dunfanaghy (1908).
- A. nebulosus**, Forst.—Dunfanaghy and Bunbeg (1908).
- A. Sturmii**, Gyll.—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin (1908).
- A. chalconotus**, Panz.—Mulroy Bay (R. W. 1910).

- Agabus bipustulatus**, L.—Ardara (W. F. J., 1892); Milford (Dub. Mus. Coll.); Narin (R. W., 1907); Dunfanaghy and Carrick (1908); Tory Island (A. W. S. and R. W., 1910); Melmore L. (A. W. S., 1910); Glenveagh and Rosapenna L. (R. W., 1910).
- Ilybius fuliginosus**, F.—Dunfanaghy and Carrickfin (1908); Melmore L. and Rosapenna L. (R. W., 1910).
- I. ænescens**, Thoms.—Glenveagh (R. W.)
- Rhantus bistriatus**, Berg.—Ardara (W. F. J., 1892); Milford (Johnson and Halbert, Beetles of Ireland, 1901).
- Colymbetes fuscus**, L.—Narin (R. W., 1907); Dunfanaghy (1908); Rosapenna L. (R. W., 1909); Glenveagh (R. W., 1910).
- Dytiscus punctulatus**, F.—Dunfanaghy (1908).
- D. marginalis**, L.—Ardara (W. F. J., 1892); near L. Salt (R. W., 1910).
- Acilius sulcatus**, L.—Ardara (W. F. J., 1892).
- Gyrinus minutus**, L.—Killystewart L., Ardara (W. F. J., 1892).
- G. elongatus**, Aubé.—Dunfanaghy and Carrickfin (Dunmore L.) (1908).
- G. natator**, Scop.—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin (1908).
- G. opacus**, Sahlb.—Carrickfin (1908).
- Orectochilus villosus**, Müll.—Portsalon (Johnson and Halbert Beetles of Ireland, 1901).
- Hydrobius fuscipes**, L.—Ardara (W. F. J., 1892); Ballymore near Dunfanaghy (flood-refuge) (1908).
- H. fuscipes**, var. **picicrus**, Thoms.—Rosapenna L. (R. W., 1909).
- Philhydrus melanocephalus**, Ol.—Ardara (W. F. J., 1892); L. Salt Mtn. (Dub. Mus. Coll., 1906); Dunfanaghy (1908); Glenveagh (R. W., 1910).
- P. coarctatus**, Gredl.—Dunfanaghy and Carrickfin (1908).
- Anacæna globulus**, Payk.—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin (1908); Tory Island (A. W. S. and R. W., 1910); Glenveagh (R. W., 1910).
- A. limbata**, F. (including the pale forms separated as *A. ovata*, Reiche).—Ardara (W. F. J., 1892); Carrickfin (1908).
- Laccobius sinuatus**, Mots.—Ardara (W. F. J., 1892). [This may be *L. nigriceps*, Thoms., as the record was made before these two species were separated by British collectors. I have not seen the specimens].
- L. alutaceus**, Thoms.—Bunbeg (Chaster, *ex coll.* J. Kidson Taylor); Dunfanaghy and Carrickfin (1908); Rosapenna L. (R. W., 1909); Melmore L. (R. W., 1910); "L. Swilly" [E. or W. Donegal?] (W.F.J.).
- L. minutus**, L.—Dunfanaghy and Carrickfin (1908); Rosapenna L. (R. W., 1909 and '10).
- L. bipunctatus**, F.—Carrickfin (1908); Rosapenna L. (R. W., 1910).
- Limnebius truncatellus**, Thunb.—Dunfanaghy and Carrickfin (1908); near L. Salt (R. W., 1910).
- Chætarthria seminulum**, Herbst.—Carrickfin (1908).
- Helophorus aquaticus**, L.—Dunfanaghy and Carrickfin (1908).
- H. viridicollis**, Steph. (*œneipennis*, Thoms.).—Ardara (W. F. J., 1892); Dunfanaghy and Carrickfin (1908); near L. Salt and Glenveagh (R. W., 1910).

- H. granularis**, L. (*brevicollis*, Thoms).—Dunfanaghy (1908).
H. brevipalpis, Bedel.—Dunfanaghy and Carrickfin (1908); near L. Salt and Rosapenna L. (R. W., 1910).
Octhebius bicolor, Germ.—Dunfanaghy and Carrickfin (1908).
O. Lejolisii, Rey and Muls.—Dunfanaghy and Carrickfin (1908).
Hydræna riparia, Kug.—Dunfanaghy (1908).
H. gracilis, Germ.—Mulroy Bay (Dub. Mus. Coll., 1906).
Cyclonotum orbiculare, F. —Ardara (W. F. J.); Glenveagh (G. W. Chaster, *ex coll.* J. Kidson Taylor); Dunfanaghy and Carrickfin (1908).

In addition to the above list, there are a few records for "Donegal," the most interesting of which is *Dytiscus lapponicus*, recorded by Somerville. I have no doubt the species still survives in some of the mountain tarns, and that several other "Arctic" species also occur. For instance, *Hydroporus morio*, Dej., *H. melanarius*, Sturm, and *H. celatus*, Clark, all occur in the north of Ireland. I took one specimen of *Agabus congener*, Payk., in the Mweelrea Mountains (Mayo W.) last March, so that this species probably occurs in Donegal. Mr. Stelfox brought me a specimen of *Deronectes griseostriatus*, and also one of *Agabus arcticus*, Payk, from near Parkmore (Co. Antrim), in June, and I have since found the former species fairly common in a peaty loch on the Sallagh Braes (Co. Antrim). These are not likely to be the only habitats of these species in the north of Ireland, and *A. arcticus* has already been recorded from the Wicklow Mountains, so that I expect both species occur in Donegal.

There must be a number of other species still to be discovered in West Donegal, as the present total is not up to the average for those neighbouring counties which have been well worked. Donegal E., which has also had but little attention paid to it, has a list of 70 species. Down has 96, Antrim 90, Derry 74, and Mayo W. has 83.

Some west of Ireland species, such as *Paracymus nigroæneus*, Schlb., and *Helochares punctatus*, Sharp, which occur again in the west of Scotland, are at present absent from the list; and, further, the list as at present known might be described as rather "colourless," being composed of species very generally distributed, neither "Arctic" nor "Southern" types being represented by species other than those which are found in suitable habitats in various parts of the country, e.g., *Hydroporus tristis* and *H. Gyllenhalii*, *Ilybius ænescens*, &c., and *Octhebius Lejolisii*, &c.

Tory Island only produced 5 species, though, doubtless, this is only a small proportion of the total number. Of the 29 specimens which were collected there, 14 were *A. bipustulatus* and 10 *H. pubescens*, two species which are, I think, always dominant in the western islands.

With regard to *Helophorus granularis*, L., I first found the species at Dunfanaghy, where I took five specimens, each in a different collection. Since that time I have taken the species commonly in Antrim, Down, Derry, and Mayo W., usually in flooded grassy ground. There is a specimen in the Dublin Museum collection from Kerry S., and the species has been recorded from Kerry N., so that in Ireland its distribution as at present known is distinctly marginal.¹

There are great difficulties as to synonymy with these small Helophori, and how far the records for "*granularis* L." really apply to this species it is difficult to say. There is only one Scottish record—Edinburgh; but in England there are records from many counties. I have taken the species in Surrey and have seen a specimen from Sussex E. So far as my experience goes, it is only common in the spring.

Until a more complete list is forthcoming it is useless to discuss the fauna in relation to that of other parts of the country, so the bare list with these few remarks must suffice for the present.

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Queen's University, Belfast.

¹ *Vide* Praeger, *Proc. R.I.A.*, 1902.



ROCHE MOUTONNÉE AT MELMORE HEAD. *S. Wear, Photo.*



DOE CASTLE, SHEEP HAVEN.

R. Welch, Photo.

HYMENOPTERA.

BY CLAUDE MORLEY, F.E.S.

- Formica fusca**, Latr.—Cratlagh Woods.
Myrmica rubra, L., race **sulcinodis**, Nyl.—Tory Island, Cratlagh Woods, Glenveagh.
Tenthredo viridis, L.—Glenveagh.
Selandria stramineipes, Klug.—Cratlagh.
Diapria suspecta, Nees.—Dunfanaghy.
Megaspius versicolor.—Dunfanaghy.

HEMIPTERA.

BY J. N. HALBERT, M.R.I.A.

- Acanthosoma dentatum**, De G.—Cratlagh Woods.
Stygnus pedestris, Fall.—Dunfanaghy.
Drymus sylvaticus, Fab.—Dunfanaghy.
Hydrometra stagnorum, L.—Bunbeg.
Velia currens, Fab.—Tory Island and Glenveagh.
Gerris lacustris, L.—Bunbeg.
G. odontogaster, Zett.—Bunbeg.
Salda saltatoria, L.—Tory Island.
Calocoris bipunctatus, Fab.—Rosapenna.
Nepa cinerea, L.—Bunbeg; Melmore Lough.
Notonecta glauca, L., variety **fucata**.—Bunbeg.
Corixa Geoffroyi, Leach.—Bunbeg.
Corixa striata, L.—Melmore Lough.
Dorthesia cataphracta, Shaw.—Glenveagh.

APTERYGOTA.

BY PROFESSOR G. H. CARPENTER, B.SC.

I have had the opportunity of examining the springtails and bristletails collected by the members of the Conference, together with some specimens taken in the locality by R. Welch in September, 1908. From these I can compile a list of five species only.

- Machilis maritima**, Leach.—Horn Head, Carrickfin, Dunfanaghy, Tory Island. On Tory this insect was common and occurred—so I am told by Mr. G. O. Sherrard—twenty feet above high-water mark.
Isotoma viridis, Bourlet.—Tory Island.
I. hibernica, Carpenter.—Dunfanaghy.
Tomocerus longicornis, Müller.—Glenveagh, Bunlin, Dunfanaghy, common.
T. tridentiferus, Tullberg.—Mulroy, Cratlagh Woods, Dunfanaghy.

ARACHNIDA.

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

THE Spiders collected are for the most part common species, and only two call for special notice.

The specimen of *Tibellus* struck me as differing from the typical form of *oblongus*, Walck., so I sent it to the Rev. O. P. Cambridge, who tells me that Dr. A. R. Jackson has lately called his attention to the fact that we have two species of *Tibellus* amongst those up to now known as *oblongus*. This is, therefore, the first time that *Tibellus parallelus*, C.L.K.-Kulcz. is recorded as Irish, though when we have had time to examine again all the specimens of *Tibellus oblongus* already taken in Ireland, we shall probably find examples of *T. parallelus* amongst them.

Tmeticus prudens, Cb., has only previously been taken in Ireland on the summits of high mountains; its capture on Tory Island is, therefore, interesting.

The Rev. O. P. Cambridge has been kind enough to name several of the phalangids for me.

SPIDERS.

- Harpactes Hombergii**, Scop.—Murder Hole (Rough Island).
Segestria senoculata, L.—Tory Island.
Clubiona reclusa, Cb.—Bunlin.
Theridion lineatum, Cl.—Glenveagh.
Pedanostethus lividus, Bl.—Glenveagh.
Lepthyphantes Blackwallii, Kulcz.—Bunlin.
Bathyphantes concolor, Wid.—Tory Island.
Tmeticus prudens, Cb.—Tory Island.
Erigone arctica, White.—Murder Hole (Rough Island).
E. promiscua, Cb.—Murder Hole (Rough Island) and Tory Island.
Diplocephalus fuscipes, Bl.—Tory Island.
Meta segmentata, Cl.—Glenveagh.
M. merianae, Scop. *var. celata*, Bl.—Glenveagh and Tory Island.
Epeira cornuta, Cl.—Glenveagh.
E. diademata, Cl.—Tory Island.
E. quadrata, Cl.—Bunlin.
Tibellus parallelus, C.L.K.-Kulcz.—Glenveagh.

PHALANGIDS.

- Nemastoma lugubre**, O.F.M.—Glenveagh; Bunlin; Tory Island
Phalangium opilio, L.—Tory Island.
Oligolophus tridens, C.K.—Glenveagh; Bunlin.
O. morio, abr., *var. alpinus*.—Glenveagh.

Fenagh House, Bagenalstown.

ISOPODA TERRESTRIA.

BY NEVIN H. FOSTER, M.B.O.U.

THE Woodlice collected by members during the Conference Week have been submitted to me, and I have to thank Mr. D. R. Pack-Beresford, who kindly assisted me in the examination of some of the more critical species. There are seven species, two of them new records for Donegal West.

Ligia oceanica, Linn.—Tory Island.

Trichoniscus pusillus, Brandt.—Bunlin ; Doe Castle ; Rosguill ; Glenveagh ; Tory Island

Trichoniscus pygmæus, Sars.—Doe Castle : Bunlin ; Tory Island. This minute species had not previously been recorded for Donegal West, though it now seems probable that it has an extended Irish distribution ; as, since its first discovery in Ireland two years ago, it has been found in 10 counties.

Haplophthalmus Mengii, Zaddach.—The capture of three specimens of this peculiarly marked Woodlouse by Mr. A. W. Stelfox at Doe Castle, is the most interesting discovery in this group. Canon Norman and Mr. W. F. de V. Kane found this species in Co. Clare in 1900 (this being the first Britannic record), and last year it was taken in Dublin, Leitrim, and Donegal East.

Philoscia muscorum, Scopoli.—Bunlin ; Tory Island, a few.

Oniscus asellus, Linn.—Doe Castle ; Glenveagh ; Bunlin ; Rough Island ; Melmore ; Tory Island ; Barnesbeg. The specimens of this species from Tory Island are remarkable for their bright coloration, in this respect resembling those observed during the Cork Conference. Many of the specimens are of the "butter-scotch" colour, and some of them possess bright reddish-orange markings, others being light yellow. Most of the specimens are of unusually large size.

Porcellio scaber, Latreille.—Melmore ; Doe Castle ; Tory Island. Like the previous species some of these from Tory Island are brightly coloured. In many specimens the side plates of the mesosome are tawny, and in some instances the dorsal face is more or less marked with patches of yellow or orange.

Hillsborough, Co. Down.

MARINE AMPHIPODA AND ISOPODA.

BY WILLIAM TATTERSALL, M.SC.

Orchestia littorea, Leach.—Tory Island, Horn Head.

O. mediterranea, Costa.—Horn Head.

Gammarus marmus, Leach.—Tory Island.

Talitrus locusta, L.—Tory Island, Horn Head.

Idotea baltica, Pallas.—Tory Island.

Manchester Museum.

PHANEROGAMS AND VASCULAR CRYPTOGAMS.

BY R. LLOYD PRAEGER.

I.—MISCELLANEOUS NOTES.

PHANEROGAMIC botany was poorly represented at the Rosapenna Conference; but little work was done, and the notes I have to draw on are almost entirely my own, made in the intervals of conducting. Nevertheless five additions to the well-worked flora of West Donegal are recorded below, and second stations for several plants previously reported from only one locality.

Though possessing a fairly extensive flora, the Rosapenna district is not one of the most interesting in Donegal, this being largely the result of the absence in the immediate vicinity of any of the higher mountain-groups. Its plants, like those of the rest of Donegal, are well known, being fully detailed in H. C. Hart's "Flora of Donegal" (1898). On the Rosguill peninsula, from Rosapenna northwards, the species found during our excursions included—

Arabis hirsuta.	Orobanche rubra.
Spergularia rupestris.	Euphorbia portlandica.
Trifolium medium.	Juniperus nana.
Sedum Rhodiola.	Habenaria conopsea.
Eryngium maritimum.	Orchis pyramidalis.
Crithmum maritimum.	Phleum arenarium.
Anthemis nobilis.	Koeleria cristata.
Statice occidentalis.	Ophioglossum vulgatum,

all noted from this neighbourhood in the "Flora." One or two plants not previously recorded were also obtained:—*Gentiana Amarella*, abundant on sandhills at Rosapenna, in Hart's "Flora" noted from only one Donegal station, namely, sands between Bundoran and Ballyshannon; and the curious var. *littoralis* Parnell of *Catabrosa aquatica*, on wet sands at Tranarossan, not previously found in the county. In Rosapenna Lough, also, grew *Chara polyacantha* and *C. hispida*, not included in the "Flora of Donegal," though the latter has been subsequently recorded by Hart from a station in West Donegal.¹

About Lough Salt *Anthemis nobilis*, *Listera cordata*, and *Lastrea Orcopteris* were seen, and in Lough Reelan adjoining *Nitella opaca*, which had only one previous West Donegal station.

¹ Hart, *Journ. Bot.* xxxvii., p 159, 1899.



R. Welch, Photo.

TAU CROSS, TORY ISLAND,
(and Seaweed drying for Kelp).

In Glenveagh the abundance of the two Filmy Ferns on stones and tree-stems was remarkable. One dense sheet of *H. tunbridgense* on a boulder measured eight feet long by three feet wide. Extremely large and old Junipers (*J. communis*) are also a feature of the place, as well as luxuriant *Lastrea aemula* and *L. Orcopteris*. Down the boggy valley below Glenveagh *Carex limosa* and *C. filiformis* were noted, and *Populus tremula*.

A couple of days spent at Bunbeg immediately after the Conference yielded a few plants worthy of note. On the sands were *Arabis hirsuta*, var. *glabrata*, *Viola arvensis*, *Habenaria conopsea*, *Phleum arenarium*, *Koeleria cristata*, and near by grew *Potentilla procumbens*, *Juncus obtusiflorus*, and *Chara vulgaris*, all three new to West Donegal. *Elymus arenarius* was seen flourishing in the station given in Hart's work. On Gola Island *Sedum Rhodiola* grew on a pebbly beach a few feet above tide level—an unusual situation; *Peplis portula* was frequent on that island, and *Cochlearia graenlandica* was also found.

II.—NOTES ON THE FLORA OF TORY.

The plants—that is, the Phanerogams and Ferns—of Tory are already well described, thanks to the labours of R. M. Barrington, who spent nearly a week there in July, 1877, and “examined its flora each day carefully,” the result being an annotated list of 145 species, published in the *Journal of Botany* for the same year (vol. xvii., pp. 263-270). Previous to that, our only information relative to the vegetation of this remote island was contained in an Appendix by G. C. Hyndman to Edmund Getty's paper,¹ published twenty-two years earlier, which contained a meagre list of forty-two plants, from observations made in 1845. Mr. S. Weir has drawn my attention to a paper by J. A. Mahony,² written shortly after Barrington's visit, in which a few plants are mentioned, including *Carex panicea*, not previously recorded.

In view of Mr. Barrington's work, the chief interest of our recent visit, so far as the higher plants were concerned, lay, therefore, not in the examination of an unknown flora, but rather in the observation of what changes might have occurred in the vegetation during the intervening period. The

¹ The Island of Tory: its History and Antiquities. *Ulster Journal of Archaeology*, i., 1853.

² On the Archaeology and Natural History of Tory Island. *Proc. Nat. Hist. Soc. Glasgow*, iv. (1878-80), pp. 80-84, plates iii-iv., 1879.

condition of the island would appear to have changed very little, and it was of considerable interest to discover in how far the native flora might have suffered by the continuance of human activities, or the introduced flora have altered or increased by the same means. Just four hours were available for the carrying out of this investigation, but I endeavoured to make the most of them, and, perhaps, the sea-fog that wrapped the island the whole time, by shutting out all distant views, and, indeed, everything but the foreground, tended to concentrate one's attention and to produce intensive observation. Anyhow, the result was a larger list than I had anticipated—145 species, or exactly the same number as noted by Mr. Barrington. Of these, 123 are in Mr. Barrington's list; he found 22 not seen by me, and I 22 not noted by him. Mr. Sylvanus Weir has since sent me a few plants collected by him on the island on the same occasion, among which are two further additions to Mr. Barrington's list, namely, *Molinia cærulea* and *Kæleria cristata*.

For the benefit of those who have not by them Mr. Barrington's paper, which describe the features of the island, it may be said that the surface of Tory (which is nearly three miles long by half a mile broad, the long axis running W.N.W.) slopes from east to west, and from north to south, and is exceedingly bare and wind-swept. Only a small portion is under cultivation, and the barrenness of the remainder is doubled by the practice of the islanders of cutting every available sod for fuel, a mere desert being the result.

Very little change in the flora was discernible as compared with its description in Barrington's paper. A few species—notably *Ranunculus Baudotii*, *Cerastium tetrandrum*, *Spergularia rupestris*—appeared to have become more widespread and commoner. *Beta maritima* was seen in a second station—Portachalla. Lough Aher—now a mere succession of boggy pools—was apparently not visited by Tory's previous explorer; at least, it yielded a number of plants formerly recorded only from the two other lakes of the island—Lough Ahooney and Lough Ayes. To show the persistence of the flora, it may be mentioned that *Viola sylvatica*, *Rosa spinosissima*, *Hedera Helix*, *Solidago Virgaurea*, *Athyrium Filix-femina*, all in small quantity, and a single bush of *Lonicera Periclymenum*, were seen at the Ram's Hollow, and there

only, exactly as described by Barrington thirty-three years ago.

The weed flora likewise was found to have changed very little. The characteristic species as listed by Barrington are all there still, but a few of the plants in the list of additions may be recent introductions.

If I give the plants in Barrington's list not seen on the recent occasion, the plants common to both lists can be obtained by anyone desirous of doing so. I add in a parallel column the species noted last July which have not been recorded from the island previously.

NOTED BY BARRINGTON.

Brassica Napus.
 Lythrum Salicaria.
 Haloscias scoticum.
 Crithmum maritimum.
 Cnicus pratensis.
 Centaurea nigra.
 Linaria vulgaris.
 Stachys arvensis.
 Atriplex angustifolia.
 Babingtonii.
 Orchis maculata.
 Luzula maxima.
 Juncus conglomeratus.
 Schaeenus nigricans.
 Carex extensa.
 Anthoxanthum odoratum.
 Alopecurus geniculatus.
 Agrostis canina.
 Poa pratensis.
 Festuca rubra (*var. duriuscula*).
 Blechnum Spicant.
 Lastrea dilatata.

NOTED BY PRAEGER.

Cardamine pratensis.
 Cochlearia danica.
 graenlandica.
 Arenaria peplodes.
 Sonchus arvensis.
 Lycopsis arvensis.
 Galeopsis Tetrahit.
 Polygonum Persicaria.
 Atriplex hastata.
 Sparganium minimum.
 Triglochin maritimum.
 Juncus lamprocarpus.
 Potamogeton pusillus.
 pectinatus.
 Scirpus caespitosus.
 Carex flava.
 Agrostis vulgaris.
 Poa annua.
 Festuca ovina.
 Isoetes lacustris
 Chara fragilis.
 Nitella opaca.

To the right-hand list may be added the two grasses already mentioned as found by Mr. S. Wear.

Of the plants above not seen by me, there is no reason to think that any of them are now extinct. Most of them were seen by Barrington in one station only; and this was in several cases on the Dun, a place I had not time to explore. Neither is it probable (as will appear from an examination of the second list) that more than one or two of the plants seen only by me are new-comers; the most likely species to belong to this category are the *Lycopsis*, *Galeopsis*, *Polygonum* and

Poa. It may be noted that it is possible that the Atriplices of the two lists are identical, these plants being far from mature in July, the date of both our visits.

Two or three plants in my list require more particular mention. *Isocetes lacustris* grew sparingly and very dwarf on peat in a few inches of water on the south-west shore of Lough Ahooley. *Cochlearia graenlandica*, a rare west coast plant in Ireland, was in Donegal previously known from a couple of stations in the Rosses; it was seen in two spots on Tory, near the edge of the cliffs. Of the *Potamogeton pectinatus*, Mr. Arthur Bennett writes:—"var. *salinus*, Voch. = var. *pseudomarinus*, Ar. Benn. It is a form which has been frequently named *P. marinus*, L., by some Central European botanists, and is, I believe, what is so named in some English floras."

Four species which were recorded by Hyndman were not seen by Barrington, namely, *Crambe maritima*, *Erica Tetralix*, *Gentiana campestris*, and *Juniperus communis*. None of them were found by me either. The first is probably extinct, and the last, no doubt, an error; the second and third may possibly still linger in some corner, though very possibly exterminated by the cutting of sods.

National Library, Dublin.

MOSSES AND HEPATICS.

BY REV. CANON H. W. LETT, M.A.

TAKING long drives through beautiful scenery to the accompaniment of agreeable companions is not the best way for examining the flora of a district, though it is a most enjoyable way of spending a holiday. And the all-too-short time provided by each day's excursion from Rosapenna for "moss-tramping," did not make it possible even for the most enthusiastic to get into, or search thoroughly any of the most likely places for mosses and hepatics. So that the record of these plants collected during the Conference week, by H. W. Lett, J. Glover, and R. Ll. Praeger, is not so large as might otherwise have been anticipated from the localities that were visited.



S. Wear, Photo.

OLD LINT-WHEEL OR FLAX BRUISER, MULROY BAY.



S. H. Douey, Photo.

RAMPARTS OF DUN BALOR, TORY ISLAND.

The totals collected were—Sphagnaceæ 11, Musci 123, and Hepaticæ 53; and of these, 5 Sphagnaceæ, 21 Musci, and 8 Hepaticæ are new records for Division 35—West Donegal; which, considering the work done during recent years by Mr. J. Hunter and Mr. D. M'Ardle in this same district, is a fair result.

The new records are:—

MOSSES (after Braithwaite).

Polytrichum attenuatum.	Amblystegium Kneiffii <i>var.</i> polycarpon.
Fissidens decipiens.	
taxifolius.	Barbula spadicea.
bryoides.	brevifolia.
Dicranella cerviculata.	lurida.
Anisothecium rubrum.	revoluta.
Didymodon denudatus.	unguiculata
Dicranum Bonjeani.	convoluta.
Mollia crispula <i>var.</i> elata.	cylindrica.
inclinata.	recurvifolia.
nitida.	Tortula muralis.
Barbula fallax.	lævipila.
Amblyodon dealbatus.	

HEPATICS (after H. W. Lett).

Aneura latifrons.	Scapania subalpina.
Metzgeria hamata.	speciosa.
Trichocolea tomentella.	uliginosa.
Lepidozia setacea <i>v.</i> sertularioides.	Plagiochila interrupta.

SPHAGNACEÆ (after Warnstorf).

Sphagnum cymbifolium.	Sphagnum obesum
rufescens.	cuspidatum.
inundatum.	

TORY ISLAND.

The moss flora of Tory Island was found to be restricted to the most common species, and the plants were nowhere met with in any quantity. The conditions on the island are unfavourable for mosses, the whole surface, except in odd corners and a few sheltered nooks, being exposed to the full force of all the winds that blow from the Atlantic. And the practice of the inhabitants in continually digging away the surface vegetation where there is any trace of peat in the soil to use for their fuel, has a direct tendency to keep down the growth of these plants.

The following is a full list of what were found on the island on this occasion :—

MOSSES.

Polytrichum subrotundum.	Pohlia albicans
aloides.	nutans.
Fissidens osmundioides.	Bryum pallescens.
Dicranella cerviculata.	Mnium hornum.
heteromalla.	punctatum.
Anisothecium rubrum.	Amblystegium viride.
Campylopus pyriformis.	fuitans.
atrovirens.	serpens.
flexuosus.	Kneiffii.
brevipilis.	var. polycarpon.
fragilis.	sendtneri.
Dicranum scoparium.	palustre.
bonjeani.	fluviatile.
Mollia tenuirostris.	Hypnum prælongum.
litoralis.	rutabulum.
inclinata.	Plagiothecium undulatum
nitida.	denticulatum.
Tortula muralis	Stereodon cupressiformis.
lævipila.	var. ericetorum.
Barbula cylindrica.	resupinatum.
convoluta.	Hylocomium loreum.
Grimmia apocarpa.	squamrosum.
Glyphomitrium polyphyllum.	Ctenidium molluscum.
Anoetangium mongeotii.	Isothecium myosuroides.
Weissia phyllantha.	Acrocladium cuspidatum.
Funaria obtusa.	

HEPATICES.

Aneura multifida.	Lophocolea bidentata.
latifrons.	Aplozia crenulata.
pinguis.	Alicularia scalaris.
Pellia epiphylla.	Southbya obovata.
Lejeunia serpyllifolia.	Lepidozia reptans.
var. heterophylla.	Kantia trichomanis.
Diplophyllum albicans.	Lepidozia setacea var. sertula-
Scapania purpurascens.	rioides.
undulata.	Saccogyna viticulosa.
subalpina.	Cephælozia pallida.
uliginosa.	bicuspidata.
Gymnocolea inflata.	lunulæfolia.
Plagiochila interrupta.	curvifolia.
Jungermania ventricosa.	

SPHAGNACEÆ.

Sphagnum cymbifolium.	Sphagnum obesum.
Aghaderg, Co. Down.	

ARCHÆOLOGY.

BY JEAN AGNEW.

KITCHEN-MIDDENS.

THE sand-dunes at Rosapenna (Plate 14), and Tranarossan visited during the Conference yielded the usual evidences of having been the sites of the dwellings of primitive man. The finds made at Rosapenna included a deer's antler made into a pick, showing clearly the marks of the primitive saw, and a stone disc, characteristic of the Donegal sand-dunes. Among the great heaps of edible shells the hinges of *Lutraria elliptica*, used as scrapers, were found, as well as large numbers of bones of deer, ox, pig, rabbit, Great Grey Seal, &c., the larger bones in many instances having been split to extract the marrow; also bones of the Great Auk, as recorded in Mr. Ussher's report on the Birds (p. 171).

All efforts to discover any of the bronze ornaments and pottery, which have been found frequently on these sites, were unsuccessful.

ROCK SCRIBINGS.

The rocks bearing inscribed concentric circles lying above the shores of Mulroy Bay to the south of Mevagh church, were visited. It was noted that only these rocks which faced the east were inscribed. This, however, may have been due to the fact that just at this point the broadest and smoothest rock-surfaces slope to the east. Time did not permit of a visit to those in Barnesbeg, &c.

FORTS.

Immediately to the right of Port Doon (the port of the fort or castle), where the members of the Conference landed on Tory Island, is a height known as Dun Balor, after the famous Fomorian, Balor of the Mighty Blows. A native of Tory eagerly pointed out to us fragments of mortar adhering to small stones which, he said, had been used in building Balor's Fort! It is just possible that the stones displayed were the last fragments of the castle of the O'Roarties built above Port Doon about 300 years ago, and now completely dispersed.

A little further east, on the isthmus which connects the peninsula known to Getty as Balor's Prison with the island, is a fine promontory fort—four distinct ramparts running across the isthmus (Plate 13). On this eastern peninsula itself is to be

traced a fort, and on the bare soil near here fragments of early pottery are not rare.

These prehistoric fortifications have seen war-like doings of a later date, for it was here that Shane M'Manus Oge M'Donnell took his last stand in 1608, after the flight of the Earls.

At Rosapenna, near to Lord Boyne's House, is the remnant of a cashel, the stones of which were removed to help to make the new road to Rosguill. A cairn stands on the summit of Ganiamore.

STANDING STONES.

The gallaun or standing stone of Mevagh stands in the churchyard shadowed by the great stone cross—Christian and Pagan symbol side by side. On the gallaun there formerly rested a wishing-stone ("the Lucky Stone of Mevagh") which the natives say is now lost, but which is really hidden from possible thievish excursionists, say the wise. Another gallaun was passed on the roadside above Rosapenna.

PREHISTORIC BURIAL PLACES.

At the west end of Tory is an ancient burial ground—a number of low mounds scattered over a considerable area. Of late years the thin turf covering the surface has in certain cases been removed by the natives for firing, and some of the kistvaens are now exposed. A circle of standing stones surrounds some of the burial mounds. The place deserves much more thorough and careful investigation than was possible in the time available during the visit of the Conference. In this connection we may quote Harkin, "It is a very ancient and time-honoured custom in Ireland to select as a burial ground for the illustrious dead some island adjacent to the coast." "Torro" is the Irish word for burial or funeral. May not, then, the name of Tory mean burial or funeral isle instead of "Torach" or towery as is generally supposed?

Immediately in front of the Rosapenna Hotel, on the sand-dunes, is a stone cist, which was found some time ago when alterations were being made on the golf-links. The cist was re-erected in its present position exactly as when found, and consists of nine large flat stones of mica schist and quartzite set vertically. These enclose a space flagged with four other large flat slabs of stone (Plate 14). The odd position was on the summit of a large kitchen-midden.



KISTVAEN, ROSAPENNA KITCHEN-MIDDENS.

W. A. Green, Photo.



S. Wear, Photo.

OLD LAND-SHELL DEPOSIT IN BOTTOM OF A DUNE VALLEY, ROSAPENNA.

To face p. 197.

CHRISTIAN ANTIQUITIES.

Tory Island.—Near West Town, said to have been the landing-place of St. Columba, stand the remains of some of the most interesting island antiquities of Ireland. Near the harbour, and mounted on a platform of rude stones, is the famous Tau Cross (Plate 12). Getty says—"It is a monolith of the following dimensions:—Full height, 6 feet; breadth of shaft, 2 feet 2 inches; breadth across arms, 3 feet 8 inches; and is formed of mica slate, $5\frac{1}{4}$ inches in thickness, of very durable texture." The peculiar type of the cross warrants the suggestion that it may have been pre-Christian in origin, but it was undoubtedly consecrated from very early times.

West of the cross is the cloch-teac or bell tower attributed to St. Columba (Plate 4). It was by this tower that the Church of St. Columba formerly stood. According to W. F. Wakeman the first monastery on Tory was founded by St. Martin, a friend and companion of St. Patrick. It appears to have been re-founded by St. Columba *circa* 545 A.D. There is a record of the re-erection of the church of Tory, 616 A.D., by the Cinel Connail, it having been destroyed some time before. The religious settlement existed on Tory until 1595, when George Bingham, Governor of Sligo, landed on the island, murdered the monks, and pillaged the monastery. Little now remains save the cloch-teac, which is interesting as being one of the smallest round towers known, a fact probably rendered necessary by its exposure to the great gales of the Atlantic. Immediately in front of the round tower a number of interesting fragments of ancient stone sculpture have been built into a square altar-like structure known to the islanders as St. John's Altar. These fragments include two stone coffin slabs, showing remains of Celtic ornamentation; a trough-like hollow stone, hardly as deep as a coffin; a curious circular stone, evidently the base of a cross; several sculptured stones, and the central portion of a cross on which is carved a human figure, which may represent either St. Columba or St. Ernan. On the altar are several rude stone vessels. Near the tower is the Abbey enclosure, or Rath Finian, which according to the Four Masters, was founded by St. Ernan. It is to be regretted that the single arch described as standing in 1845 by Getty has entirely disappeared.

Further to the west, on the outskirts of West Town, stands the Murrisher, or Church of the Seven. Of this small building, which stands on a kind of platform, little remains except the western gable. Its walls are three feet in thickness, and internally it measures about eleven by eight feet. At the east end a rough stone-altar is built, but this shows some slight evidence of more modern work than the rest of the building, which may date from the sixth century. A short distance from the Murrisher is the Nun's Grave, about which many strange traditions are told. A little soil from the grave is still carried in each fishing boat setting out from Tory, as a protection from shipwreck.

Mevagh.—The old church of Mevagh would seem from architectural evidence to date from the eleventh century. It shows in the slender lancet which pierces the east gable an interesting example of an arch formed by small flat stones. On the south side of the church stands the old stone cross of Mevagh—a huge unornamented monolith.

Doe Castle.—Doe Castle (Plate 11), stands at the head of Sheep Haven, in a strong position, surrounded by water on three sides. Now in a ruinous condition, the date of its erection is lost, but it was apparently in existence in 1440. At one time the stronghold of the Mac-Swyne-na-Doe, it latterly passed through the hands of several owners, until towards the close of last century it ceased to be a residence.

In the graveyard near the castle, the former site of a Franciscan Monastery, is an interesting inscribed stone slab built into the north wall. The slab, which is the memorial of the MacSwyne family, is sculptured with a fine Celtic cross, having a curious seven-rayed head. Down the left side four strange monsters are carved, and on the right are four elaborate ornaments of interlaced pattern and the well-known crest of the MacSwynes. Most of the graves in this tiny churchyard and at Mevagh are marked by the wooden crosses of a curious foliated pattern, so characteristic of the country churchyards of north-west Donegal.

Rosapenna Castle.—The ancient seat of the Viscounts Boyne was destroyed by the shifting of the Campion sands. The demesne is still covered by the blown sand, and only a mere remnant of the house remains. Sixteen farms were destroyed at the same date, about 1784.

NOTES OF TORY.

Tory presents a strange mingling of the old poverty-stricken state of the island with the newer more prosperous conditions due to the establishment ten years ago of up-to-date methods of conducting the fisheries. The houses of West Town are an instructive contrast, half of them being the new ugly comfortable Congested Districts Board cottages, the others hardly better than hovels, with great stagnant middens in front of the doors (Plate 4).

The natives cling to old usages with the customary conservatism of isolated communities. Wooden ploughs are still in common use on the island. Slide cars of a special type, unlike the corn- or turf-creel type in Antrim, are used. The Tory type is raised well off the ground by long slanting runners fixed on to the end of the shafts, usually by means of an old horse-shoe (Plate 4).

On the coast of the mainland at Sheep Haven and Mulroy the curraghs have generally sharp bows and square sterns; on Tory the curraghs are mostly smaller, and square or nearly so at both ends. Both differ in shape, size, and construction from the curraghs of the Aran Islands, and those of the Mayo coast.

One of the natives of Tory boasted to us that there were no poor people on the island—that every family had a horse. These ponies are particularly interesting, some having the same light colour, and with the zebra markings on the fore-legs like the ponies on Clare Island. These zebra markings did not seem to be quite so distinct as on the Clare Island breed. A clear dark brown line down the back of the animal was also noticed.

On the mainland in MacSwyne-na-Doe's country, and the "Old Kingdom of Fanet" are found the last of the lint-wheels or flax bruisers (Plate 13), one or two of which have only quite recently gone out of use, while the great stones of many others can be seen lying beside the circular platforms round which horses drew the wheels over the flax. The wheels here are narrow and large in diameter, quite unlike the very broad heavy wheels with small diameter formerly used in Down and Antrim.

FOLK LORE.

BY ELIZABETH ANDREWS.

I was told in Tory that fairies could make themselves large or small, their hair might be red, white, or black, but they wore black clothing. This is the only case where I have heard of fairies being dressed in black. Red appears to be their favourite colour, but sometimes they wear tartan, and in the north-east of Antrim are often dressed in green. If in the fairy tales we have a reminiscence of dwarf races, I should think the difference in apparel points to tribal differences. It is very rarely that we find fairies associated with the spirits of the departed, but an elderly woman in Tory said those who were drowned became fairies, and also those who had exceeded in whiskey. This woman took me to see the old cross, the fragments of a second cross, the round tower, and the ruins of a very small church with a rude stone altar. She also pointed out to me a small cairn of stones, where prayers were formerly offered to St. Bridget. There are stories also of King Balor and his daughter, but these would be too long for insertion here. I may refer the reader to the "Donegal Highlands," by the Most Rev. Dr. MacDevitt.

If Balor is the grim hero of Tory Island, on the mainland one hears of Finn McCoul, and of a still larger giant, Goll.

Fairies also abound. In the woods of Cratlin a young girl told me that some, like the angels, guide people aright, others lead them astray. Contrary to the common belief she held that fairies would be saved at the last day. A woman in Rosguill called the fairies "sheegees." A lad in the same neighbourhood gave me a variant of a story I had heard at Gueedore and Kincasslagh :—how a man rode with the fairies when they carried off a young girl, but saved her from them and brought her home to his mother, where she remained for a year deaf and dumb, until a few drops from a fairy bottle restored her speech.

The same lad in speaking of the kitchen middens said the Danes lived and had their houses on the water. Is this possibly a tradition of early tribes who like the lake dwellers built their habitations on a wooden structure above the waters of the sea?

Belfast.



E. T. Church, Photo.

Yours Truly
Sa Stewart

SAMUEL ALEXANDER STEWART.

I. HIS LIFE.

Ireland for some reason has had few working-men naturalists. There have been a number of examples in England and Scotland of self-educated men, true lovers of nature, who in spite of great hindrances have made a name for themselves and extended the knowledge of natural science. Samuel Alexander Stewart was the most remarkable, it might almost be said, the only example in Ireland.

The Stewarts were a family of well-to-do farmers who came from Scotland in the seventeenth century and settled at Ballynure in Co. Antrim, some twelve miles north of Belfast. The family had its share in the difficulties about the land which arose in that part of the country in the eighteenth century.

Then came the political troubles of 1798, in which many families living in that district were involved. Stewart's grandfather went to America about that time and settled at Philadelphia. William, his son, married Sarah Funston, a member of a family which had come from England, and a branch of which settled at Castlederg, Co. Tyrone.

William Stewart owned a large house in North Front Street, Philadelphia, where Samuel was born, 5th February, 1826, and two years later his sister Margaret Ann, now Mrs. Bain, who survives him, and was his companion for a considerable part of his life, as he never married.

The boy was not robust. He attended a private school in Philadelphia kept by a Mrs. Lowry, but ill health led to little progress being made, and contributed as will be seen to his taking up studies which led him into the open air. Their mother died when the children were young, and a business panic so affected his father's trade that he gave it up and returned to Ireland in June, 1837.

On his return from America, William Stewart went to live with his brother Samuel, who was unmarried and had a trunk-maker's shop at 56 North Street, Belfast. Circumstances were straitened at this time and hard for the motherless young people. William and his son worked at a rectifying

distillery near Corporation Street, the former earning twelve shillings, the latter two shillings a week. This did not allow much chance for education, but Samuel used to attend a night school for six weeks each winter at Sarum Methodist Church, York Street.

William then took over the trunk-making business from his brother, and started with a capital of five pounds. His daughter undertook the work of keeping the shop at the age of fifteen, while her father and brother continued to work at the distillery. Later on her brother came to work in the shop. They made trunks, bellows and other articles.

Samuel had a boy companion with whom he "ran" at this time, James Neill, a lad somewhat older than himself, clever and intelligent and fond of country rambles.

Every Saturday he called for Samuel and they went off for expeditions in the country, and on Sundays when Sunday School was over, and in this way they explored together all the neighbourhood, and the hills within reach of Belfast. In after years it was their custom to meet once a year and go over the Cave Hill in memory of old times.

After this, Neill got a position in a flour mill. While there he established a night school which was attended by Stewart, and these seem to have been years of strenuous labour and progress in Stewart's life, working by day in the shop, where he was most skilful at his trade, especially in making skin-covered trunks, studying in the evenings, and acquiring that culture and knowledge of many subjects which was so remarkable in later life, and on holidays and every occasion which could be snatched from work or study hastening to the hills and open country he loved so well.

Stewart was a most remarkable instance of a self-educated man, without school or college training, without means. In spite of many difficulties at home instead of encouragement, he acquired an excellent general education, and learned to write such good and idiomatic English (as for instance in the introduction to his *Flora*), as many so-called well educated people might envy.

The years 1860 and 1861 were fruitful in determining definitely the set of his life and leading him to devote himself entirely to the pursuit of natural science. Mr. William Swanston, a close friend of Stewart's since 1865, says:—"We

may safely assume that Stewart's early bent for natural science generally eagerly grasped the opportunities offered by the Science and Art Department who sent lecturers to Belfast; among others Professor Jukes, who lectured on Geology. This course was followed in 1861 by Mr. Ralph Tate (afterwards professor in the University of Adelaide) who became resident lecturer in Zoology, Botany and Animal Physiology. Stewart attended most of these courses and carried off honours in them. These lectures doubtless gave his studies a systematic lead which must have been of immense value to him. Owing to his zeal and thoroughness he soon became a favourite pupil of Tate's, and later a close friendship which proved to be life-long, ensued."

Mr. Joseph Wright, another old friend of Stewart's, states that on a recent visit to Belfast, Professor Tate said "he had had a great many pupils through his hands in the course of a long professional career but he had only met with one Samuel Alexander Stewart." Mr. Wright says "He was one of the most intelligent persons I ever came across in his younger days. He had a wonderful gift of observation, even in respect of things with which he was not familiar, as I have proved when we were on expeditions together."

The years immediately following Mr. Tate's coming, were marked by great progress in the study of geology and botany in Belfast. On Saturday evenings Tate used to take his pupils out for excursions, amongst others, Stewart, George Donaldson, Hugh Robinson and W. M'Millan. The Belfast Naturalists' Field Club, established in 1863 by Mr. Tate, in conjunction with a number of his pupils, was the direct outcome of his work.

In 1863 Tate published his *Flora Belfastiensis*, where the results of Stewart's earliest botanical work may be seen. Stewart continued to work at his trade, all the time he could spare from it being given to geology and botany, until the year 1880, when he was appointed assistant curator of the Belfast Museum at a trifling salary. In August, 1891, when Mr. William Darragh retired, he succeeded him as curator at a salary of £65. During these years he took much interest in the Field Club, attending the meetings and excursions, and helping, as he always did, others who were working at his favourite studies, and contributing to its *Proceedings*.

Early in his botanical career Stewart was elected a fellow of the Botanical Society of Edinburgh, but the honour which he valued most came to him late in life in 1904, when he was elected Associate of the Linnean Society, an occasion which was seized by his friends in Ireland, who presented him with an address and a purse of £120 at a meeting in the Museum.

His retirement in 1907 was due to advancing years. He took a small house in Springfield Road, at the foot of the Belfast hills, and lived there with his sister. His death on June 15, 1910, was the result of an accident. He was crossing Ann Street when he fell in trying to avoid a dray, and he survived only a few hours.

His work was chiefly that of a field naturalist, and it is astonishing how much he was able to accomplish with the means at his disposal, for Belfast did not possess a good or complete herbarium or library with modern botanical works of reference such as the *Journal of Botany* or the last edition of *English Botany*. When one tries to sum up the impression left by his character and work perhaps the most prominent feature is this. He was a "helper of many." First the shop in North Street, then the Museum was the centre to which all those persons in Ulster turned for advice, help, and encouragement who were interested in botany. Many look back to those days and thank him for help always so freely given. Then his accuracy was great, a fact which makes his *Flora* the valuable book it is. Mr. A. G. More once said to a friend that "it was essential to ask contributors to send their specimens with their records [for the *Cybele Hibernica*] and that this method had been rigidly followed with one exception; the records of Mr. S. A. Stewart of Belfast were invariably admitted without question."

His perseverance and enthusiasm never failed in trying to clear up doubtful points. The unassuming humility of the man was apparent. His extreme caution and dread of jumping to a conclusion sometimes especially in later life led him to miss results he might have gained. Love of truth was always his characteristic.

II. HIS WORK.

Among those whose lives have gone to the building up of natural history in Ireland, the figure of Samuel Alexander Stewart stands unique. And this is not only because, handicapped from the start as regards both education and position in the world, he won for himself a foremost place among Irish naturalists, and left behind him valuable printed memorials of his researches in the field. The man was greater than his work, and to those who had the privilege of his friendship what will be best remembered will be his unassuming modesty, his helpful courtesy to those especially who were young, or beginners in the studies of which he was master; his whole-souled striving after the truth, and his impatience with what seemed to him to be slipshod or incompetent work. Of "the strife for triumph more than truth" he was incapable.

Stewart's love of investigation began early. He has told me how, landing in Belfast from Philadelphia at the age of 11, he looked with surprise at the dark hills towering over the west end of the town, and on the very first morning started off to scale them, unable to believe that those summits were really some miles away. In the same practical spirit, when as a young man, his scientific interest was first aroused by reading Hugh Miller's "Old Red Sandstone," he crossed the channel and set off on foot armed with a hammer to search in the Devonian rocks of Scotland for the strange fishes of which he had read. It was the natural history classes held in 1860 and the succeeding years by J. Bete Jukes and Ralph Tate, under the Science and Art Department, and the founding of the Belfast Naturalists' Field Club in 1863, when Stewart was 37 years of age, that brought him to the front in the local scientific circle. He was on the Club Committee from the beginning, and to the second indoor meeting of the Club, on 19th November, 1863, he contributed his first paper, "On the occurrence of some rare or little known Plants in the Belfast district." The same session he carried off first prize for a collection of Phanerogamia, and in the succeeding year a prize for the best collection of local plants not mentioned in Tate's *Flora Belfastiensis*, which had been published in the meantime. A second paper on the same subject followed in 1865. Another paper read in 1868, "A run through Galway

with a vasculum," followed a year later by "A Visit to the Sperrin Mountains," shows that Stewart had begun that series of field excursions in Ireland which for many years was one of his chief sources of pleasure. In the reports of these papers one notices the critical and careful attitude that was so characteristic of all Stewart's work. His gaining in 1869 of the Field Club's prize for Cretaceous fossils, with a collection of 78 species, shows that his energies were not devoted exclusively to botany. Geology, indeed, at this time engaged a good deal of his attention, for on 8th March, 1871, he read a very important paper, "The Latest Fluctuations of the Sea-level on our own Coasts," in which for the first time the raised beach deposits are correlated with the marine clays which underlie Belfast, and the movements which they imply are demonstrated; in the same year he published "A List of the Fossils of the Estuarine Clays of Antrim and Down," which gives the detailed results of the same investigations.

All this work, and indeed the scientific work of his whole life, was carried on during Saturday afternoons and Sundays, with an occasional week off; the shop in North Street, and subsequently the Belfast Museum, requiring regular attendance during business hours. During the seventies he published "A List of the Mosses of the North-east of Ireland," (followed in 1884 by a "Supplement"), and "The Mollusca of the Boulder Clay of the North-east of Ireland," both papers being the result of field-work extending over many years.

In the extensive campaign of botanical field-work of the eighties which was inspired by A. G. More, and financed by the Royal Irish Academy, Stewart played his part; and while Hart explored the mountain-ranges and rivers, and Barrington and Vowell some of the great lakes, Stewart examined the hills of Fermanagh, Rathlin Island, the Slieveanieran range and the estuary of the Shannon, and published reports on their floras in the *Proceedings* of the Academy. On these expeditions he did not spare himself. Twelve hours in the field day after day was his usual programme; to weather he was indifferent; and on more than one occasion he let darkness overtake him among the mountains, and spent the night in the open, sometimes in rain. This, and his

carelessness about food, may have been accountable for the rheumatism from which he suffered in later years.

In 1888 Stewart's crowning work, the *Flora of the North-east of Ireland*, was published. Although Corry's name appears on the title page, the work was almost entirely Stewart's, his colleague having been drowned in a lamentable boating accident on Lough Gill in 1883, a few years after collaboration had been agreed upon. The *Flora* represents thirty years of field-work by Stewart over three counties—work carried out in the brief intervals of business, at a time when trains were few and slow, and the bicycle still unknown as a scientific accessory; and its fullness, accuracy and scholarly style place it high among works of the kind.

Two years later, in 1893, Stewart undertook in conjunction with the present writer his last heavy piece of work—the systematic exploration of the Mourne Mountains. Two seasons were spent in thoroughly searching this range for plants, with good results; and the writer will always rank as a great privilege his companionship with Stewart during the many long days spent at that time among the mountains. By the time the report on this work was published, Stewart was sixty-five, and henceforth he confined himself to less arduous excursions. But until well past seventy he was still able to get out into the fields and hills he loved so well, and his latest walks were to the well-known places where he had, under Tate and Jukes, done his earliest field-work—Crow Glen, the Lagan and the People's Park. Until the end he was still ever ready with assistance and advice, and remained a final court of appeal for Belfast naturalists, not only on botanical subjects, but on many problems of geology and zoology besides.

Our portrait was taken in 1881, when Stewart was fifty-five years of age, and in the midst of his field-work.

R. LLOYD PRAEGER.

A LIST OF THE WRITINGS OF S. A. STEWART.

Compiled by R. LLOYD PRAEGER.

BOTANY.

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[Rare or overlooked plants in the neighbourhood of Belfast.] B.N.F.C., Annual Report for 1865-66. 1866.

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A visit to Dungiven and the Sperrin Mountains. Sixth Annual Report, B.N.F.C. (1868-9), 26-28. 1869.

Guide to Belfast and the Adjacent Counties. By Members of the Belfast Naturalists' Field Club. 8vo, Belfast, 1874. Botany, pp. 78-90. [Stewart wrote the Botany, and also part of the Zoology, pp. 91-131.]

Mosses of the North-east of Ireland. British Association Report for 1874, Sections, 134. 1875; and Nature, x., 433. 1874.

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(With R. LLOYD PRAEGER).—Report on the botany of the Mourne Mountains, County Down. Proc. R.I. Acad., (3), ii., 335-380. 1892.

Notes on the flora of the North-east of Ireland. I.N., iii., 35-38, 52-56. 1894.

(With R. LLOYD PRAEGER).—A supplement to the "Flora of the North-east of Ireland" of Stewart and Corry. Proc. B.N.F.C., 1894-5, Appendix, 133-236. 1895.

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Note on the arrangement of a Flora. I.N., viii., 123. 1899.

Poa nemoralis, *P. compressa*, *Calitriche obtusangula* in the North of Ireland. I.N., viii., 113-114. 1899.

Criticisms of the "Cybele Hibernica," ed. 2. Journ. Bot., xxxvii., 396-397. 1899.

The march of *Matricaria discoidea*. I.N., ix., 269. 1900.

Poa compressa again. I.N., ix., 269. 1900.

A Botanical Coronation Fête [at Belfast, 28 June, 1838.] I.N., xi., 171. 1902.

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The Boulder Clay of the North-east of Ireland. Proc. B.N.F.C., 1880-1, 51-52. 1882.

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IS HYALINIA HELVETICA, BLUM FOUND IN IRELAND?

BY A. W. STELFOX.

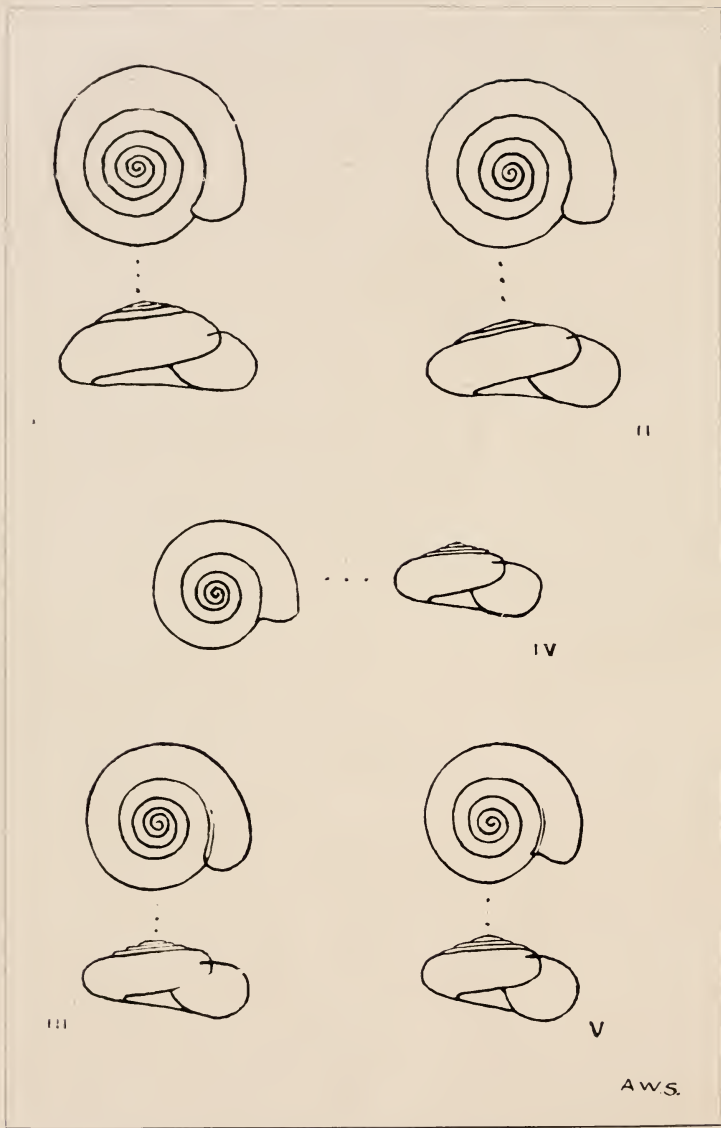
[PLATE 15.]

In the year 1890, Mr. J. G. Milne, in a list of shells collected by him during a tour in Ireland, recorded *Zonites glaber* (= *H. helvetica*), from Smithborough in Co. Monaghan.¹

Then during a period of three years we heard no more of this supposed Irish mollusc, but in the year 1893 some shells collected by Mr. R. A. Phillips at Whitegate in East Cork, and others taken by Dr. Scharff at Bantry in the west division of the same county, were submitted to Prof. Boettger, Dr. Westerlund, and the original describer of the species, Herr Blum, all of whom agreed that the Irish shells were *Hyalinia helvetica*. This at first was taken as final, and Mr. Phillips definitely recorded the species as Irish in 1894.² Subsequently Mr. J. W. Taylor³ has given *Hyalinia helvetica* as found in no less than six of Watson's divisions of Ireland: viz. Sligo, Monaghan, Kerry, S. Cork, S. Tipperary and Waterford.

It was only after a couple of years collecting in the south-eastern counties of England, where *Hyalinia helvetica* is common, that I began to doubt the Irish records; and when at the beginning of the present year I commenced to compile further material for the Irish census, and wrote to Mr. Phillips asking him for specimens, he replied that he then had grave doubts as to the correctness of the identification of his shells, and would send me specimens when time permitted.

In the meantime I examined those named by Mr. Taylor and collected by Mr. Welch at the Sligo Field Club Conference in 1904, and consider them to be a form of our ordinary Irish *Hyalinia cellaria*. When Mr. Phillips's shells arrived, Mr. Welch and I spent several hours on different occasions comparing them with specimens of the various species of the genus in our cabinets, and although we could not at first separate some shells from Kilrush, Co. Clare, sent by Mr. Phillips, from some English specimens of *Hyalinia helvetica*, yet we felt quite sure that they were not the same species. It was not until I had almost abandoned the task that I found a permanent difference between the two groups of shells. This difference I have since looked for in all specimens of the *Hyalinia cellaria* and *H. helvetica* groups which have passed through my hands, and I have never found it wanting.



HYALINIA CELLARIA (1, 2, 3) and H. HELVETICA (4, 5).

1. Glencar, Sligo. R.W. 15-7-04. (recorded in Taylor's "Monograph," vol. iii., p. 55, as *H. helvetica*, Blum.)
 2. Curraun, Mayo, W., A.W.S. 14-9-09.
 3. Ranmore Common, Surrey, A.W.S. 24-5-08.
 4. do. do. do. do. do.
 5. Logan Rock, Cornwall West. A.W.S. 6-7-08.
 1. Specimen in Cabinet of R. Welch. 2-5. from the Author's Coll.
- All Specimens x2.

It is this: that whereas the lines of growth in *Hyalinia cellaria* and its allies curve in a convex manner (Plate 15, figs. 1, 2, 3) as they approach the suture, those of *Hyalinia helvetica* have a concave appearance (figs. 4, 5). A glance at the accompanying illustrations, which are diagrammatic rather than absolute representations, will give a clear idea of the differences. This is admirably shown in the drawings by Messrs. J. Davy Dean and J. W. Taylor, on Plate vi., vol. 3 of Taylor's Monograph. In addition to this, the sutures of the two shells are different, that of *Hyalinia cellaria* being much more strongly marked and amounting to a distinct trough.

In many parts of Ireland *Hyalinia cellaria* is a woodland species, and has not yet abandoned its primeval surroundings for the neighbourhood of habitations, which as its name almost indicates, is its usual habitat in most countries. The shells of those specimens which live in these shady and moist localities are sometimes very glossy when young, and are more fragile, higher in the spire and therefore narrower in the umbilicus, and finally less clouded with white beneath than those which live in more exposed situations. When full grown this Irish shell is seldom less than from 12 to 14 mm. in maximum diameter, and therefore when only half or three-quarters grown it equals in size an ordinary English or continental specimen of *Hyalinia helvetica* or *H. cellaria*. As I think all the species of this genus are in the habit of breeding before their shells have reached full size, it is difficult to say when we are dealing with full-grown shells. I have no doubt however that most of the supposed Irish *Hyalinia helvetica* could be grown into the normal large form of *Hyalinia cellaria* commonly met with in Ireland (= *Vitrea hibernica*, Kennard).

From its distribution on the Continent, it is extremely unlikely that *Hyalinia helvetica* would occur in the south-western counties of Ireland and not in the eastern ones, from none of which, though they have been well worked, have any specimens of this shell been recorded.

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OBSERVATIONS ON THE SANDERLING OF
DUBLIN BAY.

BY ALEXANDER WILLIAMS, R.H.A., N.B.A.

Owing to the widely spreading desire for nature study, and the number and enthusiasm of those who, with pen, pencil, and camera, engage in its pursuit, it is becoming increasingly difficult to add new facts to our knowledge of native birds. However, the discovery made by me of numbers of Sanderling (*Calidris arenaria*) occurring in Dublin Bay during the entire month of July, for three years in succession, when they are supposed by natural history authorities to be away in the northern regions engaged in the reproduction of the species, was referred to by Professor Patten, of Sheffield University, at the meeting of the British Association in Dublin in 1908, and may be of some interest.

My first acquaintance with Sanderling commenced many years ago when I was out collecting near the mouth of the Boyne River at Drogheda, almost thirty miles north of Dublin, about the middle of July. I had fired at a small party of waders that suddenly flew past, and on picking up two birds I was greatly surprised to find that the feathers of the neck, back, and head were a rusty brick-red colour, with darker mottlings. I had been so accustomed to the grey winter plumage of waders that it was a revelation to see for the first time, as I afterwards learned, the Sanderling in its full nuptial plumage. Since then, thanks to the splendidly instructive collection of native birds in our National Museum in Dublin, there is little excuse for want of knowledge amongst bird lovers. Perhaps on account of its great diversity of plumage and colour changes, the Sanderling has been a special favourite of mine, and a few years back my brother Edward, Professor Patten, and myself, had very many opportunities of closely studying its plumage and habits. The removal of Professor Patten to Sheffield and the lamented decease of my brother terminated those delightful natural history rambles on the shores of Dublin Bay and its vicinity, but their recollection will be ever cherished. The east coast of Ireland from Kingstown Harbour to Carlingford Lough, a distance of nearly fifty miles, contains a succession of hard, sandy shores, well suited as habitats of the Sanderling, and they occur all through the

winter in the Bay of Dublin in flocks, which largely increase in the months of May and early in June when passing north on their spring migration. All through the month of May they are most numerous, and they have been observed on to the last week in June. The North Bull, Dublin Bay, is a favourite resort. But I noticed that a locality where the birds might be very conveniently studied was a sand-bank, only slightly raised above high water mark on the south side of the River Liffey, called the Shelly Bank or White Bank. The east or sea side of this bank consists of hard ribbed sand, but between high and low water mark, is a smooth sloping strand, greatly liked by the Sanderling, especially when the tide is ebbing. A broad deep stream flows round the point, and the west side slopes gently down to the sea-level, where in some places it becomes a kind of softer muddy sand, a very favourite feeding ground of the Dunlin. When the rising tide covers up the feeding-grounds for miles along the shores of the bay, various species of birds resort to the Shelly Bank, which at high tide becomes a long irregular-shaped tongue of land, almost a mile long, and varying from one to two hundred yards across. The middle portion consists of some sand-dunes and the rest small sandy hummocks only a few inches high, sparsely covered with bent grass. Early in the year 1906 I resolved to put this locality under strict observation, frequenting it as often as possible to ascertain all that I could about the movements of the Sanderling, which I found there constantly at high tide. In winter, when the Sanderling, Dunlin, and Ringed Plover associate together in flocks and resemble each other so much at a distance, being grey on the back and white beneath, it is not so easy to separate the different species as it is in summer, when the Dunlin become black underneath, with rusty-coloured backs, and the Sanderling show the rusty backs but have white underparts. These exceedingly active little waders, running along the margin of the tide in its ebb and flow with incredible swiftness, pursue their food up to their breasts in the wavelets, or plough with their beaks through the soft wet sand. They are unusually silent birds. When feeding they may be heard occasionally uttering a quiet twittering sound, and on taking wing a subdued quickly repeated note like "twick-twick," which exactly resembles one particular breeding-note of the Lesser Tern,

but unlike other waders they use no well-defined alarm note on being disturbed. In the course of many years' observations by myself and friends, we had never met with Sanderling in the Bay of Dublin after the last week in June, there was always an interval between that date and the early days of August, when the northern breeding birds with their young began to appear. The result of my observations tends, I think, to show the importance of keeping a close watch on a given locality if one hopes to add new facts to its ornithology. A small silent motor-boat I found excellent for cruising along the shores of the Shelly Bank at high tide, for it did not disturb the resting birds. Clad in a sand-coloured Burbury suit and hat, I have often crawled, even in bright daylight, over the dry sand, face down, and lying as flat as possible, and progressing crocodile fashion, by the assistance of my elbows and knees, taking advantage of every little depression and the scanty grass-covered inequalities of the surface, have approached within twenty yards of large mixed flocks of Dunlin, Ringed Plover, and Sanderling on the bank, all standing at attention and eyeing the unusual object approaching. Singling out the Sanderling, some sleeping in little groups by themselves, others scattered amongst the flocks, by the aid of my glass I have been able closely to note the diversities of their plumage and other points of interest.

There is something peculiarly satisfying to the field naturalist and house-dweller, thus to pit his intelligence against the wild boundless freedom of these suspicious little creatures, ever on their guard in their efforts for self-preservation. Though these same birds would never allow an intruder, walking erect, to approach within eighty yards, I have on some occasions made my way through a scattered flock in the manner described without alarming them, to get at more distant birds in interesting plumages. In my experience both land and sea birds dislike a high wind, and sometimes when I have been lying on the bank, with a gale blowing and the sand driving along a foot off the ground, I have been greatly interested in watching the various little dodges of the waders all round me to obtain shelter from the biting blasts and the blowing sand. The discomfort was shared by myself, for with my eyes on the level of the ground, my glass became useless, getting covered with sand. It is then that the advantage of a

head covering with a broad brim is so useful, as one can lower the front to the sand and cover the eyes. I have noticed at such times that the Dunlin frequently lay in the shelter on their sides and stretched a leg at full length, but I never saw the Sanderling do so. They, when resting, often lay on their breasts with their heads turned over their backs and their beaks poked under the feathers; others stood on one leg, their heads drawn down on the breast. Standing in a wisp, the rear birds that felt the most of the wind often ran forward and jostled the birds in the front out of the better-sheltered places. Ever on the watch, the sleepers would only close their eyes for a few moments, opening them with a start. Some birds of the flock were always alert, suddenly stretching their necks to the full they took a look all around and then quieted down for another few minutes. A bird would stretch its wings until they met over its head, and occasionally spread out a wing and a leg on the same side, for an instant. And frequently they hopped on one leg, a common habit of waders. It was amusing to see a solitary bird taking shelter in a little cup-shaped depression where some straggling grasses had collected the sand a few inches high, making a perfect cover. It would enjoy its newly-found comfort for only a few minutes, for the quick eyes of its companions followed it, and soon a string of birds would leave the flock and crowd up the hollow, filling it to overflowing.

Whilst out observing on the bank on the 29th of June, 1906, I was surprised to see a single Sanderling in the full rusty-coloured nuptial plumage at the edge of the water, accompanied by two smaller birds of the same species. I asked myself could it be possible that this was an adult bird, with its two young, back from the northern regions, or bred in this country. Using every device I approached within twenty-five yards, and carefully examined the group with my glass. There was a remarkable difference in the plumages. The two smaller birds greatly resembled the first young Sanderling that appear in August, pale grey with darker mottlings on the back, dark markings on top of head, and pale yellowish on sides of the neck with darker dots and markings. The group were joined by another Sanderling, also in the full nuptial dress. Here were two adults, accompanied apparently by two young birds, on the 29th of June. All their movements suggested that they were young; they

followed the two old birds along the edge of the tide, pausing when they did, and huddled closely up to them as if for companionship and protection. I returned home thoroughly puzzled, and as an experiment took a pair of Sanderling in nuptial dress and also a pair of birds of the year that I had set up in my collection and placed them at the end of a room; allowing for the distance, their appearance seemed to favour my suspicion that the birds I had seen might have been parents and young. Although keeping a close watch on the bank through the early days of July, 1906, I failed to meet with any Sanderling until the 12th, when I came across a flock of fifteen birds, in company of about thirty Dublin in summer plumage, that is, all having black breasts. The Sanderling had forsaken the water's edge, and were feeding voraciously on sand-hoppers in immense quantities among the refuse of the tidal fringe high up on the beach. On July 15th I found nine Sanderling near the same place, and on July 17th there was still the same number, nine, but on July 28th the number had risen to forty-two birds. On July 29th I paid a visit to the North Bull on the opposite side of Dublin Bay, as I wished to see what Sanderling I was likely to meet there. I saw a considerable flock of waders a long way out on the wet sand at the water's edge. They were all Sanderling, numbering fifty birds, and comparatively tame, as I easily got within sixty yards of them. It occurred to me that this flock may have been the same that I met with the previous evening on the Shelly Bank, but I could not account for their being so tame, perhaps they returned there at high water. Coming now to the year 1907, as early as the 6th of July I discovered that a small party of seven Sanderling were frequenting the Shelly Bank. None of them showed any trace of red colouring, they were all of the grey type of plumage that puzzled me so much. About this time I conceived the idea of taking a trip and searching the coast of Drogheda, about thirty miles off. On July 14th I found myself at the mouth of the Boyne, where so many years before I had obtained my first specimen, and walking along the water's edge I soon espied a flock of small waders, mixed up with a number of Common and Black-headed Gulls, and getting the glass on them counted thirty-seven Sanderling. Unlike the Dublin birds, these were very wild and unapproachable, and all flew back when alarmed in the direction of the

Boyne River. About a mile further on I met with another party of six Sanderling, they also flew towards the Boyne; and near Laytown, about three miles from Drogheda, I came across yet another party of seven. On the strand there I was surprised to find a flock of nearly fifty small waders, they were nearly all black-breasted Dunlin, but there were twenty Ringed Plover, and amongst the latter were several young birds of the year. I continued my walk as far as Balbriggan, but only met with one Sanderling. On July 28th I again walked to the Shelly Bank, Dublin Bay, and found that the flock of Dunlin had swelled in numbers up to three hundred. Ringed Plover had increased to forty, and I was able to separate and count a flock of fifty Sanderling.

The month of July, 1908, was remarkable for the unusual number of Sanderling that came under notice. On the 6th I visited the Shelly Bank and was successful in meeting with two birds, one had the summer plumage well marked, the other was quite free from any trace of red, its dress was pale grey with the darker markings well shown.

I had now reached the third year of my observations, constantly meeting with the two different phases of plumage amongst the birds throughout the months of July in each year, and I came to the conclusion, though I have a strong objection to take away life, that the only way to throw light on the problem was to endeavour to obtain some specimens for examination and comparison. On the 12th of July a flock was met with at the old haunt, the Shelly Bank, from which one specimen (now in the Irish National Museum) was obtained—there were ten birds in this flock. This specimen was one of the grey birds which so puzzled me on many occasions, and was in a most interesting stage of plumage. I found the feathers very much worn and abraded as well as faded, especially on the head and back, giving these parts a dark mottled appearance. The sides of the neck were pale yellowish grey, with dots and streaks of a darker shade. Even so early as the 12th the winter pale grey feathers were making their appearance over the back, altogether the plumage was most unusual and differed from any in my collection. I also compared it with a friend's specimens, and with set-up birds in the National Museum, Dublin, and by the kindness of the authorities with their collection of skins, but failed to find any similarly

marked. Dissection revealed a curious condition ; it was an adult female, and in a good healthy state, but the ovaries were exceedingly small, and only visible by the aid of a glass. Owing to their non-development the bird was barren, and non-breeding. Probably this fact accounted for the absence of the nuptial plumage ; the bird had never acquired the red pigment, or colouring matter, which is associated with birds in which the sexual impulse or "call" to go north is pronounced.

On July 18th I was again on the Shelly Bank and counted 32 Sanderling, an unusual number. This year there had been reported an early and warm summer in the arctic regions, and I had been wondering would that affect the numbers of waders visiting our shores later on. This time I was fortunate in obtaining two more specimens, one in grey and one in which there were slight traces of red feathers, and still more of the winter moult spreading.

Next day, July 19th, I again visited the coast at Drogheda, but although I walked several miles along the shore, I only met with 8 Sanderling.

Visiting the Shelly Bank on the evening of July 21st, I found the Dunlin had decreased in numbers, but the Sanderling were more plentiful than I had ever seen them before. The tide being at the full, all the birds were resting, and both Dunlin and Sanderling were well mixed together, but by manœuvring I managed to get a good view of them in the bright sunlight, and was able to pick out the white-breasted Sanderling easily, although they were very much scattered I counted up to 100 birds.

Absence from Dublin for a week prevented further observations, but on July 28th I was again on the Shelly Bank late in the evening, and searched the edge of the incoming tide. The hard ribby sand was covered with crowds of Dunlin, keeping up a shrill chorus as they called to each other, and Sanderling were keeping company with them, holding their beaks down in the little watery hollows, and moving rapidly right and left and in front, in the gathering darkness they were all round me only a few yards away. There were fully 100 moving about.

My last July visit was paid on the 30th, and the Sanderling on the bank were divided up into three flocks, numbering respec-

tively 34, 10, and 30 birds. There was a large increase in the Dunlin's number, and occasionally all the birds on the bank would join together—Dunlin, Sanderling, Ringed Plover, and Lesser Terns—in one compact flock, and after flying about over the sea for a while, on approaching the shore would separate into the different species. I managed, by crawling, to approach within 20 yards of the main flock of Dunlin, but although I scrutinised them long and carefully, I was unable to detect one solitary young bird of the year among them. Every one had the black on the breast more or less developed, and they were all, like the Sanderling, non-breeding birds. On both sides were several old Ringed Plovers that had nested on the bank, accompanied by their young, and in some instances little bits of fluff adhered to feathers on their necks. The scene was full of animated life, for overhead and continually swooping down to try and chase me away were crowds of Lesser Terns, and on the level of my eye on the rough sand, shingle, and broken shells I watched their young, unable yet to fly, scampering about like mice. The young Lesser Terns that are strong on the wing fraternise with the Sanderling, and may be seen flying in company and mingling freely with them at the water's edge when feeding.

A Sanderling obtained on this visit proved, on dissection, to be a male. It was also a "grey" bird, showing only very faint signs of any red colouring. The testes were only in a rudimentary state, being apparently undeveloped, and instead of the usual healthy colour were a faint yellow. Some Dunlin examined at the same time were in a similar condition. The weight of one of the earlier Sanderling was 2 oz. 5 drams, but this bird weighed slightly over 3 oz., and was enormously fat. When the skin was removed for preservation, none of the fleshy portions were visible, a thick coating of clear white oily fat completely enveloped it everywhere. All the organs in the bird's interior were coated and embedded in similar fat.

It had been my intention to continue these observations in the following year, but absence from Dublin prevented me; however, I was able to pay one visit to the bank on the 4th of July, 1909, when I found that two Sanderling were present.

From the foregoing notes and observations there would seem to be some features of interest, viz., the unsuspected presence of so many non-breeding Sanderling and Dunlin

frequenting the Bay of Dublin during the month of July ; and the peculiarities of plumage acquired by the non-breeding Sanderling during that month, when there is only a very short interval before they begin to assume the winter plumage.

I think it may be taken for granted that all the birds noticed during the month of July were non-breeders, either old or barren. Then the question would be, Did they remain behind in the bay and on the Drogheda coast, when the main body was speeding to their far northern breeding haunts in May or early in June? Or were they, as non-breeders, the early outposts of the main flocks on their return later, old and young, from the north? It is a curious fact that in Scotland, on the Outer Hebrides, which lie in the same longitude as Ireland, and yet so much farther north, Mr. J. A. Harvie-Brown informs me Sanderling have never been known to remain there later than May, although they occur abundantly on the sands of Barra in August. Why should they select our coast to remain until they become almost too fat to fly? One killed on the Shelly Bank whilst flying past at a height of only 6 feet, was so enormously fat, and its skin distended so much, that it burst open on touching the ground. There must be some unusual inducement in the way of food provided on the bank, for I have constantly observed the Sanderling desert the edge of the tide and greedily pick up food on the dry raised parts.

On the North Bull I have noticed them also away from the water busily feeding in very short grass ; the flock spread out like feeding Starlings, moved carefully forward picking amongst the stems of the grasses. It may be that they vary their food by eating seeds and land insects, for Prof. Patten¹ mentions the case of a Sanderling slightly winged, that he presented to the Dublin Zoological Gardens, which thrived on a diet of chopped bread, seeds, and meat.

On the west coast of Ireland I met with Sanderling on Inishkea, county Mayo, in multitudes, coming from the north in August ; they were in a very different condition, there was an absence of fat on several old birds examined, but the young birds of the year were in very good condition.

¹ "Aquatic Birds of Great Britain and Ireland," p. 318.

It will be seen from the accompanying list of dates, that only a few Sanderling were seen in the first week in July, about 4th and 6th, on the Shelly Bank. Then we find them more numerous on the 12th in Dublin, and in still larger numbers on the 14th on the Drogheda coast; their numbers increased on to the end of the month, and the birds were exceptionally numerous in 1908.

SANDERLING OBSERVED DURING THE MONTH OF JULY IN THE
YEARS 1906, 1907, 1908, 1909, 1910.

Date.	Locality.	Number of Birds.
1906—July 12th, ..	Shelly Bank, Dublin Bay, ..	15
„ „ 15th, ..	Ditto, ..	9
„ „ 17th, ..	Ditto, ..	9
„ „ 28th, ..	Ditto, ..	42
„ „ 29th, ..	North Bull, Dublin Bay, ..	50
1907—July 6th, ..	Shelly Bank, Dublin Bay, ..	7
„ „ 14th, ..	Mouth of Boyne, Drogheda, ..	37
„ „ 14th, ..	Laytown Strand, near Boyne,	7
„ „ 14th, ..	Three miles south of Laytown,	6
„ „ 19th, ...	Near Balbriggan, Co. Dublin,	1
„ „ 28th, ..	Shelly Bank, Dublin Bay, ..	50
1908—July 6th, ..	Ditto, ..	2
„ „ 12th, ...	Ditto, ..	10
„ „ 18th, ..	Ditto, ..	32
„ „ 19th, ...	Mouth of Boyne, Drogheda, ..	8
„ „ 21st, ...	Shelly Bank,	100
„ „ 28th, ..	Ditto,	Over 100
„ „ 30th, ..	Ditto,	Three Flocks, 34, 10, 50.
1909—July 4th, ...	Ditto,	2
1910—July 16th, ...	Sands of Youghal, Co. Cork, ..	30

During the time that elapses from their disappearance at the spring migration until their re-appearance on our shores in autumn, authenticated occurrences of the Sanderling in July have been excessively rare, and it has been impossible to procure the specimens so necessary and valuable to science for examination and comparison.

It will be seen that during this period these non-breeders undergo a considerable change; they have been found with the red colouring entirely absent, and also the soft grey margins of the feathers, which conceal the nuptial plumage in spring, completely worn away, and in some instances the ruddy colouration faded out, causing the birds to present a totally changed and misleading appearance.

I had an opportunity of closely searching the sands of Youghal, county Cork, for Sanderling whilst staying there in July of the present year, and on the 16th was fortunate to meet with a flock of 30 birds. I saw them again on July 20th, and also on the 24th, when two specimens were obtained, male and female. They differ from the Dublin Bay birds, showing more red on the necks, and one is almost a uniform dark brown on the back, exhibiting little trace of edge markings. There is a marked contrast in weight, one being under and one just over two ounces, and little fat was apparent. Prof. Patten has kindly made a microscopic examination, and is of opinion that, like the Dublin Bay birds, they had never bred. Punctual to a day, the Sanderling this year, old and young, have arrived from their northern summer haunts. On August 7th I had the pleasure of closely watching a large flock on the shore between Laytown and Drogheda. The young birds of the year were most numerous and most active, With a strong glass I could see they were pursuing flies abounding in the hot sun on the tidal fringe, with all the quickness and agility of Wagtails, picking them up right, left, and in front, and often doubling back with lightning rapidity.

Dublin.

IRISH SOCIETIES.

BELFAST NATURALISTS' FIELD CLUB.

JULY 30.—GREYABBEY AND BALLYWALTER PARK.—From Newtownards the party drove to Greyabbey, passing on the way through the demesne of Mountstewart. At Greyabbey all visited the abbey ruins, on which W. J. Fennell, F.R.I.B.A., gave an interesting informal address. The party then drove to Ballywalter, and explored the grounds and gardens of Ballywalter Park, courteously thrown open to them by Lady Dunleath. After the gardens had been visited, Lady Dunleath joined the party, and showed them over her aviaries, where a magnificent collection of rare and exotic birds are kept under ideal conditions. It speaks volumes for the perfect surroundings of the birds that on this day the Weaver Birds were busily making their curious nests, and a tiny Virginian Nightingale was hatched. Lady Dunleath had delayed the feeding of the birds until the Field Club arrived, so that they were seen to special advantage. The drive was continued to the Dunleath Arms, Ballywalter, where, after tea, a short business meeting was held—W. J. Fennell in the chair. A cordial vote of thanks was passed to Lady Dunleath for allowing the party to visit Ballywalter Park. A pleasant drive round the coast brought the party to Donaghadee in time for the 7.35 p.m. train for Belfast, which was reached in due course after a most enjoyable outing.

AUGUST 13.—SALLAGH BRAES AND KNOCKDHU.—A party of thirty-seven members and friends of the Belfast Naturalists' Field Club conducted by the President (Robert Welch, M.R.I.A.), travelled to Larne by the 9.5 a.m. train and drove along the Antrim coast road as far as Ballygally Castle, where the road turns inland to Knockdhu. The party had five hours at their disposal to explore the magnificent amphitheatre of the Sallagh Braes. The geologists of the party spent a busy day, and have an interesting list of rare accessory minerals found in the basalts, which will be given in the Club's Proceedings. It was to the botanists, however, that the day gave the finest opportunities. The botanical interest of the Sallagh Braes lies in the vegetation of the cliffs themselves and in the gullies carved out of the face of the escarpment by stream action, and most of the rarer plants of the Antrim basaltic escarpment are to be found there. The list was handed in by the botanists included:—*Epilobium angustifolium*, *Dryas octopetala*, *Arenaria verna*, *Vaccinium Vitis-Idaea*, *Saxifraga hypnoides*, *Hieracium silvaticum*, *H. stenolepis*, *Cystopteris fragilis*; *Cnicus lanceolatus*, a fine colony with pure white flowers; *Circea alpina*. The botanical prize offered on this excursion by the Vice-President (W. J. C. Tomlinson) for the re-finding of *Pyrola secunda* was won by A. W. Stelfox. A good collection of land-shells was made during the day, among which the best finds reported were *Helix lamellata*, *H. fusca*, *H. rupestris* and *H. arbustorum*. The tarn on the moor above the Braes contains five fresh-water species—namely, *Limnaea peregra*, *L. palustris*, *Pisidium pusillum*, *P. nitidum*, and *P. subtruncatum*. Five species of wood-lice were taken, of which *Trichoniscus*

pygmaeus was the only uncommon one. Cars were mounted about five o'clock. On arrival at Larne tea was partaken at the King's Arms Hotel, after which a short business meeting was held. Two new members, Messrs. Tait and Downing, were elected, and the party returned to Belfast by the 8.20 p.m. train.

AUGUST 20.—GEOLOGICAL SECTION.—PORTRUSH.—Leaving Belfast by 12 noon train, the members proceeded to the "White Rocks," where, after studying the striking erosion of the cliffs, as shown by sea-stacks, arches, and caverns, they went on to the large chalk quarry by the road side. The remarkable V-shaped hollow filled with spheroidal basalt was examined, and the following fossils obtained from the chalk and flints—the phragmacone of a belemnite, specimens of *Belemnitella mucronata*, *Ananchytes gibbus*, *Ananchytes ovatus*, the cast of a brachiopod, a fragment of *Inoceramus Crispi*, and fragments of sponges. A few minerals were obtained from the basalt—chabazite, analcite, calcite, and fibrous natrolite. The party then proceeded to Craigahulliar quarry, where there is a fine example of columnar basalt passing upwards into tabular basalt.

On returning to Portrush the indurated Liassic beds were examined, and some impressions of ammonites obtained. So much interest centres round these rocks, in connection with the controversy between the Neptunists and Vulcanists at the end of the 18th century, that regret was felt at finding them partly obscured by rubbish and advertisements, instead of being carefully preserved as a natural museum.

AUGUST 27.—CARRICKFERGUS.—The party, conducted by the President (R. Welch, M.R.I.A.), travelled by the 1.50 p.m. train, and on their arrival visited the Castle, to which they were admitted by permission of the authorities. The Castle had more than antiquarian interest for the party on the occasion of this visit. Several snails were observed climbing its walls, including *Agriolimax agrestis*, *Limax arborum*, *Helix aspersa*, and *Pupa cylindracea*; and the botanists collected fine specimens of *Parietaria officinalis*.

The party next visited the Church of St. Nicholas, through which they were most courteously conducted by Dr. Brierton. The church is an interesting example of how a great church by successive alterations may be changed to a smaller and debased structure. Tea was found waiting them on their arrival at the Y.M.C.A. Café, after which a short business meeting was held—the President in the chair.

SEPTEMBER 3.—MAGHERALIN.—The members of the Geological Section started by the 1.50 p.m. train for Moira, and proceeded thence to the large quarry near Magheralin. The fine sections of Upper Chalk with numerous bands of flint were examined and specimens of flint breccia obtained. "Paramoudras" were observed *in situ*, and a large barrel-shaped one lying on the floor of the quarry measured 35 inches by 33 inches by 33 inches. Fossils were scarce, but *Belemnitella mucronata* (Schloth), *Rhynchonella plicatilis* (Sow.), *Ostrea verticularis* (Lam.), and a few crushed echinoids were noted. Boulder-clay was examined, and yielded interesting "erratics" from Donegal, Tyrone and Antrim.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Patas Monkey from Mr. J. A. Henderson, a Galago from Mr. P. G. Shilston, a young Seal from Mr. R. M. Fleming, an Otter cub from Mr. W. T. Potts, a Squirrel from Mr. Williams, ten Chipmunks from the Right Hon. Jonathan Hogg, two Black Buck from Mr. R. R. Boyd, a Gannet from Mr. J. J. Collins, a young Long-eared Owl from Mrs. Forsythe, two Great Eagle-Owls from Lord Lilford, an African Owl from Mr. T. Crean, a pair of Long-eared Owls from Miss I. Anketell Jones, seven Ducks from Mrs. Cusack, three Sparrow-hawks from Mr. G. Howard Vyse, Peregrine Falcons from Mr. R. J. Usher and Mr. R. M. Barrington, Kestrels from Constable Colgan and Mr. T. Lombard, two Herons from Mrs. St. George, a Reeve's Pheasant and two Amherst's Pheasants from Mr. W. T. Potts, nine Pea-fowl from Sir Frederick Shaw, two Great-billed Touracous from Mr. H. de la Poer, a Wood-pigeon from Mr. W. W. Despard, a Cariama from Mr. R. Casement, C.M.G., three Canary Finches from Miss M. Barker, seventeen Canary Finches and three Saffron Finches from Lady Stoker, two Great Black-backed Gulls from Dr. R. R. Leeper, a West African Python from Mr. E. Lindberg, an Elephantine Tortoise from Rev. J. E. Hogan, eight Newts from Mr. L. S. Arbuthnot, and a Salamander from Mr. R. D. Baker. A Goshawk and two Little Bitterns have also been acquired. A White-nosed Monkey, two Yellow Baboons, three Negro Tamarins, two Ring-tailed Lemurs, two Variable Squirrels, a Prevost's Squirrel, and a Malabar Squirrel have been bought for the collection. Early in August a hybrid Zebra foal was born in the Gardens. This youngster, a most interesting addition to the collection, is in excellent health. In markings it resembles the mother (Burchell's Zebra) more closely than the father (Grant's Zebra).

DUBLIN NATURALISTS' FIELD CLUB.

JUNE 4.—GLENMALURE AND LUGNAQUILLA.—A party of thirteen members and visitors, under the conductorship of G. H. Pethybridge, took part in this excursion. An early start was necessary and the conditions of weather were very unfavourable. Heavy fog and rain was experienced all the way up the mountain until Kelly's lake was reached, where a halt was called for luncheon. The rain having stopped and the fog lifting occasionally, it was decided to proceed to the summit, which was duly reached, but the reward as regards view, &c., was practically negative. The descent was made with some difficulty owing to continued fog. Under the circumstances very little natural history work could be done. An interesting series of observations of the temperature of soil and air was made at intervals during the ascent by A. C. Forbes, the heights being ascertained by means of an aneroid. The Silurian rocks capping the granite near the summit of the mountain were observed. Some insect-collecting was done near the cairn, where the ground-beetles *Patrobis assimilis* and *Nebria Gyllenhalii* were found, while the Crane-fly *Tipula plumbea* occurred in enormous numbers and *Scatophaga squalida* was also noted. As regards the vegetation of this summit the chief feature

appears to be the abundance of the moss *Rhacomitrium lanuginosum*, which forms a very compact and carpet-like covering to the rocks from which apparently the deep peat which probably once covered them has long ago been denuded. The Starry Saxifrage (*Saxifraga stellaris*) was observed in flower along the banks of the mountain streams. After enjoying a capital meal at the hotel at Drumgoff, the party returned to Dublin by train from Rathdrum.

AUGUST 6.—PROSPEROUS BOG.—A small party of members and friends under the leadership of the Vice-President (W. F. Gunn) journeyed to Prosperous Bog, about 5 miles S.W. of Sallins. The cut-away portion of the bog was first traversed and a number of interesting plants were found. The uncut portion of the bog was then crossed where the vegetation consisted of heather, *Cladonia rangiferina*, *Scirpus cespitosus*, *Molinia caerulea*, and in the damp hollows several species of Sphagnum. Among other plants noticed was *Andromeda Polifolia*. This being the first excursion of the Club to this district, the conductor offered a double magnifying lens for the first addition to its flora. A. E. Moeran was elected a member.

REVIEWS.

ENTOMOLOGY FOR THE YOUNG.

Jack's Insects. By EDMUND SELOUS. With 44 illustrations, by J. A. Shepherd. Pp. 350. London: Methuen and Co., Ltd. Price 6s.

Books which embody natural history teaching in a tale are becoming common nowadays, and the volume before us is an excellent specimen of its class. Much information on insects from all parts of the world is given, and the story, with many flashes of humour, goes merrily on. The comedy on the modern nomenclature of mimicry is especially amusing, but is a children's book the place for such satire as this? The moral of the story is that to study live insects is better than to collect dead ones—a conclusion in which the author will find many supporters among our readers. Still he carries his protest against museums and cabinets to extreme lengths, and had Mr. Shepherd spent some time in a museum, studying how the nervures on insects' wings really run, his drawings might have gained in accuracy without losing in life and humour.

G. H. C.

BELFAST NATURALISTS' FIELD CLUB.

We have received the "Annual Report and Proceedings" for the year 1909-10. This contains as usual accounts of the summer excursions, and abstracts of the communications brought before the Club at winter meetings. The part is well illustrated, and we note a marked improvement in the printing as compared with some previous issues.

NOTES.

BOTANY.

Kerry Plants.

In the *Journal of Botany* for September, Mr. H. Stuart Thompson has a short article on plants observed recently in Kerry, and Rev. E. S. Marshall contributes a note on *Saxifraga Geum* × *serratifolia*.

Sisyrinchium angustifolium at Lough Erne.

This plant is plentiful on the east shore of Upper Lough Erne, townland of Derrydoon, about three miles from Cronn Castle, three miles S.W. of Newtownbutler, and between four and five miles of the Derryvore shore on west side, its original station.

N. CARROTHERS.

Belfast.

Pyrola secunda refound in Antrim.

The unexpected sometimes happens in the domain of botany as well as in other spheres. Many botanists have for a generation or two back made strenuous efforts to refind the Serrated Winter-green, *Pyrola secunda*, L., at Errigal Banks, Co. Derry, where it was discovered by the late Dr. David Moore, in 1835. The definiteness of the Garvaghl locality has had a peculiar fascination for local botanical explorers; and this season Errigal Glen was once more ransacked without success by a Kilrea botanist. Dr. Moore likewise recorded the plant from three localities in the East Antrim hills, between Larne and Glenarm, one of these localities being the well-known Sallagh Braes. There the much-sought-for *Pyrola* was at last refound, on Saturday, August 13, after an interval of over 70 years from its first discovery. The Belfast Naturalists' Field Club having arranged for a full-day excursion to Sallagh Braes on the date mentioned, I was asked by the Secretaries to write a note for the day's programme on the flora of the district to be visited. In complying with this request I made special mention of *Pyrola secunda* and the desirability of a big effort to verify Dr. Moore's record. I also offered a prize to the member who first succeeded in refinding the plant. The result was a triumphant success. To Mr. Arthur W. Stelfox belongs the honour of being the first member to "spot" the long-lost treasure. It occurs, quite sparingly, in two or three places on the cliffs, not on the Braes proper but on the northern face of Knockdhu, closely associated with *Dryas octopetala* and *Epilobium angustifolium*. The plants seen were mostly in fruit. I am indebted to Mr. Stelfox for a very healthy-looking and characteristic specimen, for herbarium purposes. Local botanists have every encouragement now to make a serious effort to re-discover the plant in its other Antrim localities.

W. J. C. TOMLINSON.

Belfast.

ZOOLOGY.

The Lough Finn Char (*Salvelinus Trevelyani*).

Two years ago I described the Char of Lough Finn, in Donegal, from a single male specimen, 8 inches long, sent to me by Major H. Trevelyan, after whom I named the species. From males of the allied form inhabiting Lough Eask (*Salvelinus Colii*, Günth.), this fish differs in the longer head, more produced and pointed snout, narrower interorbital region, longer lower jaw and stronger dentition.

I am indebted to Captain J. S. Hamilton for a second example of *S. Trevelyani*, a female of 6½ inches. It was caught in Lough Finn on July 3rd, at about 3 in the afternoon, and was taken with a fly in shallow water near the shore at the mouth of a small stream.

This specimen shows that in *S. Trevelyani* the sexes are distinguished by well-marked external characters, for the head is shorter, the snout blunter, the lower jaw shorter, and the teeth much weaker than in the type, although the fins are not less developed. The differences between the Char of Loughs Finn and Eask are less marked in the females than in the males. The following measurements (in millimetres) may have some interest:—

	<i>S. Trevelyani</i> , L. Finn.		<i>S. Colii</i> , L. Eask.	
	♂	♀	♂	♀
Length to base of caudal fin ..	181	151	190	164
Length of head ..	45	36	42	36
Snout	14	10	11	9
Diameter of eye ..	8	7.5	9	8
Interorbital width ..	13	10.25	13.5	11
Lower jaw ..	30	21.5	26	21

C. TATE REGAN.

British Museum.

The Jay in Queen's County.

Having been in Mountrath and the neighbourhood of Abbeyleix, Queen's County, for some time I noticed an abundance of Jays (*Garrulus glandarius*). They are well known to reside in those counties watered by the Nore, but, a gentleman who has lived for years in Queen's County, informs me they have never been seen so numerous before. Does not this seem as if this bird is rapidly spreading and becoming more common?

VICTOR E. STEPHENS.

Dublin.

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THE IRISH WHALE FISHERY.

BY R. F. SCHARFF, PH.D.

Some years ago the startling news was published in the daily papers that an establishment, with the necessary vessels and gear for the capture of whales, was to be set up on the west coast of Ireland. It had not previously occurred to anyone that whales in sufficient numbers to make such an establishment profitable, could be obtained off the Irish coast. Even when, ten years ago, I wrote my short paper on the whales of Ireland for the *Irish Naturalist*,¹ these animals were looked upon as interesting stragglers to our marine area rather than native mammals.

But the rumour was perfectly correct. The Aranmore Whaling Company chartered steamers and built a number of sheds on Inishkea, near the peninsula called the Mullet in the County Mayo, with the object of capturing whales and preparing their carcasses for trading purposes. More recently another company, known as the Blacksod Whaling Company, started the same business on the eastern shores of the Mullet, at a place called Elly Point. Both of these companies are under Norwegian management. The fishermen of Norway have always had a taste for this kind of work, which, indeed, calls forth all their best qualities, pluck, hardihood, and endurance.

Whether these undertakings pay does not concern us here. Our interest in the fisheries lies in the fact that they give us an insight into a branch of our mammalian fauna which we should scarcely have obtained by any other method. Nothing short of capturing a whale will enable us to identify it satisfactorily.

As I mentioned in my list of whales, and their relations the porpoises and dolphins, these creatures are all typical mammalia. They are warm-blooded, they breathe by means of lungs, they possess the vestiges, at any rate, of hairs on their bodies, and their young are brought forth alive and nourished with the milk of the mother. Their skeletons, moreover, are those of mammals and not of fish, and only externally are their

¹ Scharff, R. F. : A list of the Irish Cetacea. *Irish Naturalist*, vol. ix., pp. 83-90, 1900.

bodies fish-like. We can distinguish two well-defined groups, the toothless or WHALEBONE WHALES and the TOOTHED WHALES.

Hitherto the following five whalebone whales had been observed on the Irish coast, viz. :—the Southern Right Whale, the Hump-backed Whale, Sibbald's Rorqual, the Common Rorqual, and the Lesser Rorqual.

Whether we have two Irish Right Whales or only one kind is still uncertain. The Norwegians, as Mr. Holt informs me, distinguish between the "Greenlandshvalen" and the "Nordkaperen," two whales of the Right Whale type, but what they captured and brought to Inishkea in June, 1908, were all Nordkaperen, and were identified by Prof. Collett as *Balaena glacialis*. It remains uncertain, therefore, whether the other Right Whale (*Balaena australis*=*B. biscayensis*), frequents our coasts, or whether the old records are applicable to the "Nordkaper."

The Right Whale is distinguished from the other whalebone whales by the absence of the dorsal fin and of the peculiar long furrows found on the throat of the other species.¹

The value of the five Irish Right Whales taken in 1908 was estimated by Prof. Collett as amounting to from £1,500 to £3,000. A single one of the plates from the mouth of a full grown whale is worth about two guineas, and as a quarter of a ton of whalebone is sometimes obtained from a large specimen, the value of that article alone is about £400. I may mention that there is still a curious misconception as to the real nature of the substance called "whalebone." Some people persist in believing that whalebones are the whale's ribs. Others, possibly misled by the old feudal law that the tails of all whales belong to the Queen as a perquisite, to furnish Her Majesty's wardrobe with whalebone, think that it comes from the animal's tail. The fact, however, is that although all whalebone whales start life with rudimentary teeth, these soon disappear and are replaced by a horny substance which grows out from the upper jaw in long sheets of triangular plates. The plates are attached to the roof of the mouth and are longest towards the middle of it. Their outer edge is smooth, the inner frayed into innumerable hair-like processes. When the whale opens its mouth

¹ Collett, R.—*Balaena glacialis*. *Proc. Zool. Soc. London*, 1909, i., pp. 91-98.

and floats along the surface of the water for a time, numerous minute organisms, chiefly surface crustacea, find their way into the mouth. When this is closed again, the water is effectually strained out through the sieve-like plates, while the internal hairs prevent the food from escaping. Further particulars will be found in Mr. Beddard's work on whales.¹

The general use of whalebone for ladies' dresses is, of course, well known, but another use that is made of the fine internal fringes has been revealed to me by Mr. W. S. Green, the Chief Inspector of Irish Fisheries. He informs me that they are now employed for the manufacture of barristers' wigs, because they are light and retain the curl better than ordinary hair. It may not also be generally known that, in the manufacture of high class silks, the fine threads of whalebone are sometimes used for stiffening the tissue.

The whalebone or baleen in the Right Whale is perfectly black in colour. All the other whalebone whales possess whalebone of a much inferior quality, and all have great furrows along the throat and a back fin.

The largest living mammal, the Blue Whale (*Balaenoptera Sibbaldi*) or "Blauhval" as the Norwegians call it, belongs to this group. Mr. R. M. Barrington tells me that one measuring 88 feet long was obtained off Inishkea in July, 1908. Three other species of the same genus occur off the Irish Coast, viz.: the Common Rorqual, called "Finhval" by the Norwegians, the Northern or Rudolph's Rorqual, or "Seihval," and the smallest of all, the Lesser Rorqual, or "Vaagehval." Finally, the so-called Humpback or "Knolhval," is easily distinguished from the other whalebone whales by its enormously long white flippers. On the 10th July, 1908, Mr. Barrington wrote to me mentioning that 42 whales belonging to the following species had passed through the factory on Inishkea:

Right Whale	..	..	5 specimens
Common Rorqual	..	..	5 "
Sibbald's Rorqual	..	..	4 "
Rudolphi's Rorqual	..	..	27 "
Humpback	..	..	1 "
			42 "

¹ Beddard. F. E. A Book of Whales. London, 1900.

Of the toothed whales only the Sperm Whale or Cachalot, (Kaskelot in Norwegian) seems to be of any commercial value. To Mr. R. J. Ussher I am indebted for the information that four Sperm Whales had been obtained off the west coast of Ireland last June.

The whale fisheries have not therefore added much to our knowledge of this group, and the revised list of the Irish Whales, Porpoises and Dolphins is as follows:—

WHALEBONE WHALES.

- Southern Right Whale (*Balaena australis*) ?
- Northern „ „ (*B. glacialis*).
- Common Rorqual (*Balaenoptera musculus*).
- Sibbald's „ (*B. Sibbaldi*).
- Northern „ (*B. borealis*).
- Lesser „ (*B. rostrata*).
- Humpbacked Whale (*Megaptera böops*).

TOOTHED WHALES.

- Sperm Whale (*Physeter macrocephalus*).
- Bottle-nosed Whale (*Hyperödon rostratus*).
- Beaked Whale (*Mesoplodon bidens*).
- Porpoise (*Phocoena communis*).
- Killer (*Orca gladiator*).
- Ca'in Whale (*Globicephalus melas*).
- Risso's Dolphin (*Grampus griseus*)
- White-beaked Dolphin (*Lagenorhynchus albirostris*).
- White-sided Dolphin (*L. acutus*).
- Common Dolphin (*Delphinus delphis*).
- Bottle-nosed Dolphin (*Tursiops tursio*).

Sometimes I am asked by visitors to the Museum what is done with the carcasses of the whales killed by these whale fishery companies. Formerly the value of these creatures consisted mainly in the large quantities of oil extracted from their bodies. Since the introduction of coal gas and of mineral oil, the consumption of animal oil for lighting purposes has considerably decreased, but other uses have been found for whale oil. The oil is pressed out of the blubber which lies under the skin. As the blubber is about one foot thick in a full-grown Right Whale, a single large specimen yields about 30 barrels of oil. Sperm oil or spermaceti,

which is obtained from the head of the Sperm Whale, is much used as an ingredient in ointments, and an ordinary-sized animal yields as much as 12 barrels. Mr. Southern ascertained that 1843 barrels of oil were turned out this year by the Elly Point Company and 1500 by the Inishkea Company, and Captain Bruun very kindly gave me some further particulars about the latter which may be of interest to the readers of the *Irish Naturalist*.

The two steamers engaged in this fishery obtained 76 whales during their first year. They were mostly Common Rorquals and Northern Rorquals. During the last two years 124 whales were caught, but it must be remembered that four steamers are now employed by the companies, instead of two, as during the first year. Captain Bruun stated that every particle of the carcasses was used and turned into oil, cattle-food, guano and bone manure. The blubber yields the best oil, the bones the second best, while even the intestines contain some saleable oil. The flesh is used for cattle-food. After the bones and intestines have been boiled, and the oil extracted, the remainder is dried and ground down. Altogether the business, though not a very savoury one, would seem to be rather lucrative, but Captain Bruun states that the expenses are so heavy that little profit remains.

National Museum, Dublin.

OBITUARY.

JOHN COTTNEY.

It is with regret that we have to record the early death of Mr. John Cottney, Clogher, Hillsborough, who has occasionally contributed notes to this Journal, and who was a regular reader of its pages for many years. Mr. Cottney was a farmer of a type that is far too rare in Ireland, and from his early youth he took an intense interest in nature in general and birds in particular. He possessed a really fine and valuable collection of eggs well displayed in a good cabinet, which he never tired of showing to interested visitors. From his daily occupation Mr. Cottney was in constant touch with nature and his observations had the true ring of original research. Possessed of few books, his knowledge of birds, which was extensive, was mostly acquired by intimate acquaintance with the wild creatures themselves. He taught himself the art of taxidermy, and gained considerable proficiency in mounting birds. Always ready to help others, he made many friends among the naturalists of the North, by whom his early death is deplored.

REVIEWS.

OUR NATIVE SEA SLUGS.

A Monograph of the British Nudibranchiate Mollusca: with Figures of the Species. Part VIII (Supplementary). Figures by the late JOSHUA ALDER and the late ALBANY HANCOCK, and Others. Text by SIR CHARLES ELIOT, M.A., D.C.L., LL.D., K.C.M.G., C.B. London, Ray Society, 1910. 4to. Pp. 1-198. Plates I.-VIII.

This part just published forms a Supplement to the Monograph of the British Nudibranchiate Mollusca by J. Alder and A. Hancock published in seven parts in the years 1845-1855. It is based, Sir Charles Eliot tell us, on a selection from some figures of Nudibranchs that Alder and Hancock had prepared for a Supplement to their Monograph, and which had been deposited in the Hancock Museum at Newcastle-on-Tyne. New figures drawn from living specimens of *Doris testudinaria*, *D. maculata*, *Pleurophyllidia Loveni*, *Iomanotus Genci*, *Cenia Cocksii*, and *Cumanotus Beaumonti* are added, also figures of *Lamellidoris luteocincta*, and a few figures giving details of anatomy and dentition.

The text divides naturally into three sections. The first section, consisting of ninety-two pages or nearly half of the part, is devoted to a general discussion of the Nudibranchiata under the headings variation and distribution, nomenclature, bionomics, embryology and larval stage anatomy, classification, affinities and relationships. The second section contains descriptions of certain genera and species, and the third a synopsis of families, genera, and species of the nudibranchiate fauna of the British Isles, a Bibliography and an Index.

After a short account of specific variation as exhibited in the Nudibranchiata and its supposed causes, the author discusses at considerable length the distribution of these animals in the North Atlantic and neighbouring seas.

Under the heading Bionomics, an interesting account of their life-history and habits is given; several examples of protective resemblance and warning coloration are mentioned; and the evidence brought forward in recent years by Grosvenor and other observers in favour of Strethill Wright's views, that the nematocysts (thread-cells) of certain nudibranchs are not developed in the body of the nudibranch but are derived from the various hydroids, &c., on which it feeds, is here referred to.

The most important portions of this work are probably those headed "anatomy," "classification," "affinities and relationships." Very complete descriptions of the anatomy of *Doris tuberculata* and *Aeolidi papillosa* are given, these species being selected on account of their considerable size and of being common on our coasts; they also represent the types of structure characteristic of the Holohepatica and Cladohepatica respectively, the two tribes into which the author thinks

it best to divide the Nudibranchiata. The Holohepatica he divides into nine families, and the Cladohepatica into twenty-two families, including the families Hermaeiidae, Phyllobranchidae, Elysiidae, and Limapontiidae, which are often separated from the Nudibranchiata as a distinct group Ascoglossa.

The species which form the subject of notices in the second section of this work, the author says falls into three classes, viz.:—"those figured in the drawings preserved at Newcastle", some "species which are not described in the Monograph" and a few "mentioned in the Monograph about which additional information is now furnished."

The descriptions are largely repetitions of the author's notes published in the *Journal of the Marine Biological Association* and in the *Proceedings of the Malacological Society of London*. Apparently the only new form described is a variety (*nigra*) of *Doto pinnatifida*, observed by the author at Plymouth, and the only species not previously recorded from the British Isles is *Doto cinerea*, Tr., "living specimens probably referable to this species" having also been seen by the author at Plymouth. *Dendronotus lacteus* (Thompson), described from a specimen obtained in Strangford Lough, and generally regarded as a white variety of *Dendronotus frondosus*, is again accorded specific rank. In this section the author gives his views as to the species of the genus *Lomanotus* and criticises the opinions recently expressed by Mr. N. Colgan and Mr. G. P. Farran.

The synopsis of families, genera, and species for the nudibranchiate fauna of the British Isles will prove most useful to the student, especially as forms or groups found in the adjacent parts of the north-eastern Atlantic have been included, enclosed in square brackets.

A great defect in this work is the almost entire absence of localities for the British species, except for some of those described in the second section. It would not have been difficult to have mentioned the different parts of the British coasts at which the various species have been obtained, for as the author remarks "nudibranchs have been systematically collected in comparatively few localities of the British Isles."

The following species included in the synopsis have been added to the British list since the publication of Part VII. of the Monograph:—*Doris verrucosa*, *D. maculata*, *D. testudinaria*, *Crimora papillata*, *Adalaria Loveni*, *Lamellidoris luteocincta*, *Pleurophyllidia Loveni*, *Lomanotus Genoi*, *Hancockia eulactylota*, *Hero formosa*, *Janolus flagellatus*, *Doto cuspidata*, *D. cinerea*, *Coryphella salmonacea*, *Cumanotus Beaumonti*, *Acolidiella sanguinea*, *Stiliger bellulus* and *Limapontia depressa*; *L. nigra*, *Elysia viridis*, *Acteonia corrugata* and *Cenia Cocksii* although recorded as British before the year 1855 were regarded by Alder and Hancock as belonging to a distinct group Pellibranchiata, and are also not described in Parts I-VII. of the Monograph. The following five species included by Alder and Hancock in the Monograph are not mentioned in the synopsis, viz.:—*Doris pusilla*, *Eolis elegans*, *E. arenicola*, *E. Couchii*, and *E. purpurascens*; the first three species were not only described but also figured.

The Bibliography contains a list of a considerable number of the papers published, principally by foreign authors, since 1855; it is not by any means complete, one important omission being Canon Norman's "Revision of British Mollusca" in the *Annals and Magazine of Natural History* for 1890.

A few errata may be pointed out:—descriptions are given of *Lamellidoris luteocincta* and *Lomanotus marmoratus*, but these species are not mentioned on page 93, in the classes of species noticed; pp. 140, 141, 142, 143, Alder's measurements of the lengths of *Elysia viridis*, *Limapontia nigra*, *L. depressa*, and *Acteonia corrugata* should be decimals of an inch, not of a millimetre; p. 147, *Doris verrucosa*, is not figured in the Monograph as stated.

The figures are excellent, but it is a matter of regret that figures are not given of other species recently found on British coasts, e.g. of *Doris verrucosa*, *Doto cinerea*, &c. On the whole, however, the author is to be congratulated on the production of a work forming a fitting Supplement to Alder and Hancock's classic Monograph and an important addition to the literature of British marine zoology.

A. R. N.

IRISH BOTANY FOR GERMAN READERS.

Die Flora von Ireland. Von T. JOHNSON. Vegetationsbilder herausgegeben von Dr. G. KARSTEN und Dr. H. SCHENCK. Achte Reihe, Heft 5—6. Tafel 25—36. 4to. Jena, 1910.

This handsome production consists of a series of twelve quarto plates from photographs, by R. Welch, with brief accompanying letterpress. The plates consist for the most part of photographs specially procured by Mr. Welch and the present writer for the purposes of his "Tourist's Flora of the West of Ireland;" others were taken for his "Open-air Studies in Botany;" and others again for the "Natural History of Lambay," in this Journal, and for the Report of the Kenmare Field Club Conference; none of the photographs were taken especially for the present publication. The plates are well produced, and the publishers have done full justice to Mr. Welch's excellent work. The letterpress consists of a sketchy introduction, and of brief notes, sometimes about the plant under review, sometimes about other things. The information given is not always accurate, as when *Sisyrinchium angustifolium*, which ranges up into Ulster, is described as occurring "very locally in the S. and S.W."

R. LL. PRAEGER.

THREE NEW SPECIES TO "CYBELE HIBERNICA"
AND "IRISH TOPOGRAPHICAL BOTANY."

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

Recently Professor Glück of Heidelberg, the author of *Biologische und Morphologische Untersuchungen über Wasser- und Sumpfgewächse*, 1905, and whose much more elaborate work on the same subject is now in the press, has been staying with me. He went through many of the aquatic plants in my herbarium, where he detected three species new to the Irish works mentioned above; they are:—

Utricularia ochroleuca, Hartm.—I gathered this near Kylemore, Galway, in 1875. This has been somewhat doubtfully recorded for Scotland, but we lacked till now positive identification of a specimen from the British Isles.

U. Bremii, Heer.—Near the Gap of Dunloe, Co. Kerry, where I found it also in 1875. This again has been often recorded, but the specimens have been flowerless, and so the identification has been quite conjectural. My specimens have good flowers. The flat, not curved lips easily distinguish it in the living state from *U. minor*, L. The suggestion which I gave in my *British Plant List* that *ochroleuca* (following Hartman) is a hybrid of *U. minor* and *U. intermedia*, is untenable, since it occurs in areas from which the latter is absent.

Elisma natans, Buchen.—This, although recorded for Ireland, is rejected by the authors of the *Cybele Hibernica*, and doubtless with good reason, as the creeping form of *Echinodorus ranunculoides*. Engelm., is often mistaken for the true plant. But Professor Glück, who has made especial study of the barren forms of this group, unhesitatingly refers my barren specimens from Killarney, gathered by me in 1875, and from Dunbeg Lake, Co. Clare (Bolton King) in 1882, to that species.

Allisma Plantago-aquatica, L., forma **natans**.—Toome Bridge, Co. Antrim.
Oxford.

NOTES.

BOTANY.

Draba incana in County Antrim.

A botanical visit which I paid to Torr Head, in the extreme north-east of County Antrim, on 12th July last, resulted in the finding of *Draba incana*, Liun. This is a new record for the county, and a notable extension of range in Ireland for the plant. It grows on white limestone rocks, at an elevation of about 900 feet. Immediately associated with it were *Arabis hirsuta*, *Geranium lucidum*, and *Cystopteris fragilis*.

W. J. C. TOMLINSON.

Belfast.

Alien Plants at Stranmillis, Belfast.

I send a list of introduced plants, collected last September at Stranmillis, near the River Lagan, on slob land, where city rubbish has been deposited for several years past.

Alyssum maritimum.	Lepidium virginicum.
Ambrosia trifida.	L. apetalum.
Amsinckia angustifolia.	L. perforatum.
Asphodelus fistulosus.	Linum usitatissimum.
Briza maxima.	Medicago denticulata.
Centaurea melitensis.	Melilotus alba.
C. Cyanus.	M. parviflora.
Cichorium Intybus.	M. arvensis.
Chenopodium polyspermum.	Neslea paniculata.
Elymus canadensis.	Oenothera biennis.
Eruca sativa.	Plantago media.
Erysimum orientale.	P. major var.
E cheiranthoides.	Salvia verticillata.
Hesperis matronalis.	Saponaria Vaccaria.
Helianthus petiolaris.	Silene noctiflora.
Hordeum jubatum.	Sisymbrium incisum.
Lactuca virosa.	S. orientale.
Lepidium campestre.	Thlaspi arvense.

I am indebted to Miss M. C. Knowles of the National Museum Dublin, for the naming of nearly all the plants in the above list.

N. CARROTHERS.

Belfast.

Campanula Trachelium in Co. Roscommon.

On the 16th July, 1910, on the occasion of an excursion to Lough Ree, two of the lady students detected a clump of *Campanula Trachelium* growing under a willow on the east side of the railway line about half-way between Athlone and Kiltoom stations. Whether it grows in a less artificial habitat in the neighbourhood I am unable to say, but as it is a rare species in Ireland its occurrence seems worth noting.

J. ADAMS.

Royal College of Science, Dublin.

Septoria Lepidii, Desm., a new Irish Fungus.

During a botanical excursion to the Devil's Glen, Co. Wicklow, on the 19th July, 1910, specimens of *Lepidium heterophyllum* were obtained which bore small black spots on the leaves. These were kindly examined for me by Sir Henry Hawley, Bart., who stated that they were due to the presence of the fungus *Septoria Lepidii*, Desm. This species has not been previously recorded from Ireland. During August last I also found the same fungus abundant on the fruits of *Lepidium heterophyllum* at Greyabbey, in Co. Down.

J. ADAMS.

Royal College of Science, Dublin.

ZOOLOGY.

The Habits of Worms.

On August 12th, I received from Mr. W. H. Patterson of Belfast, a consignment of worms accompanied by the following note:—

“This morning (August 11th), I came on some worms in what seemed to me an unusual place. I therefore procured a few and now send them. A neighbour of mine had his pond cleared of floating vegetation—two species of plants at least, of which specimens are enclosed—and brought away one or two cartloads of the material, which was thrown down on the top of a rubbish heap. This was about a week ago or less. The heap of weed is now dry and brown on the outside, but inside it is quite green and moist.

“The stuff lies in layers, as it was dragged from the pond, and when these layers are lifted, worms are found in the damp material. If they were not in it when it was carted there, they must have lost no time in making their way all through the mass, and did it in a week.”

The facts are sufficiently curious to justify a few remarks and enquiries. The vegetation was chiefly composed of Chara, but I unfortunately threw it away without identifying the species.

The worms belonged to four species, viz.—*Lumbricus rubellus*, *Allolobophora caliginosa*, *Dendrobaena subrubicunda* and *Eisenia foetida*.

As the two species first named were represented by adult forms it is probable they had come up from the rubbish-heap into the decaying vegetable matter. The others were chiefly young, and though they are often associated with rubbish-heaps we are well aware that they like to lay their eggs in moist places. The question arises: Were the eggs of these worms in the pond or in the rubbish heap? The eggs of *D. subrubicunda* are small, and grass green in colour. In Nitella or Chara they would be unobserved, while the heating of the matter through decomposition would probably hasten development.

We know so little about the habits of worms, their periods of incubation, &c., that one is fain to use every opportunity of adding to our knowledge, and urging others to make note of any phenomena which may increase our store of facts. I had hoped that there would have been some specimens of *Helodrilus oculatus* in the consignment, but in this I was disappointed.

HILDERIC FRIEND.

Swadlincote, Burton-on-Trent.

Worms in Pots.

Nearly every week correspondents refer to the injury done to plants in pots by worms. I am preparing for the Ray Society a monograph of British earth- and water-worms, and it is very desirable that accurate information should be supplied therein respecting the species which are harmful. As our knowledge of this subject is very imperfect, I should be greatly obliged if gardeners and others would send me specimens of living forms for identification.

HILDERIC FRIEND.

Swadlincote, Burton-on-Trent.

Abnormal Coleoptera.

In March last I took in moss from a wood near here an example of *Philonthus varius* which had a supplementary joint projecting sideways from the second joint of its left hind tarsus.

Among some beetles sent to me by Mr. R. Welch, from Tory Island was a specimen of *Ocytus olens*, which had two supplemental joints projecting from the third joint of its right antenna. There are signs that there may have been one or two additional joints to this attempt at a third antenna.

Canon Fowler (*Ent. Mo. Mag.*, xxii., p. 138), and Rev. Theodore Wood (*Ent. Mo. Mag.*, xxiv., p. 16), record abnormal tarsi in specimens of *Pelophila borealis* which I had sent them, but in each of these cases the tarsi were contracted, and in one case joints were missing, while in those mentioned above we have additional joints growing out of the ordinary ones.

W. F. JOHNSON.

Poyntzpass.

Hydroecia crinanensis in Ireland.

I have been fortunate enough to take the new species *Hydroecia crinanensis* during August this year near Londonderry. The specimens have all been examined by Mr. F. N. Pierce, so there can be no doubt of their identity.

H. R. SWEETING.

Sefton Park, Liverpool.

Kerry Mollusca.

The *Journal of Conchology* for July contains an article by J. R. le B. Tomlin, giving the results of a week's collecting in April, 1909, of land and fresh-water Mollusca at Clohane, Co. Kerry.

The Distribution of *Bythinia Leachii* in Ireland.

Since Mr. Welch first recorded¹ this shell as living in Ireland, its range over the central plain has proved to be considerably wider than was known at that time. In the Grand Canal it had then been traced from Dublin through the counties of Dublin and Kildare, Queen's and King's Counties, to Shannon Harbour. Mr. R. A. Phillips has since taken it in the part of this canal west of the Shannon at Ballinasloe in S. E. Galway, and has also proved it to occur in the southern branch of the same canal as far south as Tinnahinch in county Carlow, and in the River Barrow at Tinnahinch and Graignamanagh, in counties Carlow and Kilkenny respectively. In the Royal Canal it is abundant right in the heart of Dublin, also at Leixlip and at Maynooth. Westward of this it is as yet unknown in this waterway, and its absence at Mullingar rather surprised me. I have twice searched for it in the neighbourhood of this town, and in the same canal at Ballymahon in county Longford, but on each of these three occasions I looked for it in vain.

A. W. STELFOX.

Belfast.

¹ *Irish Nat.*, xviii., p. 1, 1908.

Some records of Land and Fresh-water Mollusca from the Counties Roscommon and Longford.

Roscommon and the adjoining county of Longford having been so little worked by conchologists, I took the opportunity of spending two days at Athlone in April of this year in order to add to the very scant list of species recorded from these two counties.

CO. ROSCOMMON:—The district covered was that lying between Athlone and Kiltoom on the west shore of Lough Ree. In the drains close to Athlone *Limnæa peregra*, *L. palustris*, *L. stagnalis*, *L. truncatula*, *Physa fontinalis*, *Aplexa hypnorum*, *Planorbis marginatus*, *P. contortus*, *Valvata piscinalis*, *V. cristata*, *Bythinia tentaculata* and *Sphærium corneum* were all common, while no sign of any species of *Pisidium* was seen. *Planorbis carinatus* was taken in the canal, but not in the drains. All the above fresh-water species also occurred in the roadside drains towards Kiltoom, with the exception of *Planorbis carinatus*, and the following additional species were taken:—*Succinea elegans*, *Ancylus fluviatilis* (Butterbay River), *Planorbis crista*, *P. vortex*, and *Pisidium milium* and two other species of this difficult genus. In a wood near Kiltoom slugs were particularly abundant, *Agriolimax agrestis*, *Limax marginatus*, *L. maximus*, *L. flavus*, *Arion ater*, *A. circumscriptus*, *A. intermedius*, all being observed, while nearer Athlone *Agriolimax lævis* and *Arion hortensis* were also seen.

The land species were typical of the central plain, the xerophiles being well represented, and the "western" or woodland species almost absent, as will be seen by the following list:—*Vitrina pellucida*, *Hyalinia cellaria* (*Vitreæ hibernica* of Kennard), *H. nitidula*, *H. crystallina*, *H. fulva*, *H. nitida*, *Helix rotundata*, *H. rupestris*, *H. pulchella* (*Vallonia excentrica*, Sterki), *H. hispida*, *H. rufescens*, *H. nemoralis*, *H. aspersa*, *H. ericetorum*, *H. intersecta*, *H. virgata*, *H. acuta*, *Cochlicopa lubrica*, *Pupa cylindracea*, *Clausilia bidentata* and *Vertigo edentula*.

CO. LONGFORD:—Cycling till I crossed the boundary between Westmeath and Longford at Tang Bridge and then collecting at intervals as far as Saint's Island, on the eastern shore of Lough Ree, I was able to accumulate quite a large number of land species, and by returning home through Ballymahon, a short visit to the Royal Canal at Pake's Bridge gave me a fair list of fresh-water ones.

Close to the county boundary at Tang Bridge, *Agriolimax agrestis*, *Arion ater*, *Vitrina pellucida*, *Hyalinia cellaria* (*Vitreæ hibernica* Kennard), *H. nitidula*, *H. nitida*, *Helix rupestris*, *H. rufescens*, *H. hispida*, *H. ericetorum*, *H. nemoralis*, *H. aspersa*, *Cochlicopa lubrica*, *Pupa cylindracea*, *Clausilia bidentata* and *Succinea putris* were found. The last species was particularly fine and darkly coloured and was hibernating at the base of a dry stone wall many yards from the nearest water.

Along the banks of the River Inny at Shrulce Bridge *Agriolimax lævis*, *Hyalinia fulva*, *Helix rotundata*, *H. intersecta*, *H. pulchella* (*Vallonia excentrica*, Sterki), *Carychium minimum*, *Succinea elegans*, *Limnæa palustris* and *L. truncatula* were added to the list, and in a marsh west of Castlecore, *Limnæa peregra*, *Valvata piscinalis* and *Sphærium corneum*.

The shore of Lough Ree near Saint's Island, was disappointing, owing to the height of the water in the lake, but *Arion hortensis*, *Helix virgata*, *Physa fontinalis*, *Planorbis marginatus* in drains, *P. carinatus* dead on lake shore, *Valvata cristata*, *Bythinia tentaculata* and a *Pisidium* were observed for the first time during the day. In the ruined church on the island or rather peninsula, the *Helices* showed signs of being particularly fine, but it being a late season they were still hibernating and required digging out. The fresh-water list having so far been very meagre, I pushed on towards Ballymahon, striking the Royal Canal at Pake's Bridge near that place. As it was getting late in the day, and I was still twenty-three miles from home, I could only spare time for a rapid survey of the canal, which gave promise of being exceptionally rich in molluscan life, as the following list will show:—*Succinea elegans*, *Amphipeplea glutinosa*, *Limnaea peregra*, *L. stagnalis*, *L. palustris*, *L. truncatula*, *Physa fontinalis*, *Planorbis carinatus*, *P. contortus*, *P. vortex*, *F. fontanus*, *Valvata piscinalis*, *V. cristata*, *Bythinia tentaculata*, *Neritina fluviatilis*, *Sphaerium corneum*, *Pisidium amnicum*, and other species of the same genus. *Amphipeplea* was particularly common on the submerged stonework of the bridge, with *Neritina fluviatilis*, a most interesting association. New records for the day were *Hyalinia pura* and *H. crystallina*, both living on the edge of the canal.

Belfast.

A. W. STELFOX.

Is *Hyalinia helvetica*, Blum, found in Ireland?

The above question put by Mr. A. W. Stelfox in last month's *Irish Naturalist* raises a point to which for some time past I have been giving some attention. The shells referred to in my note in the *Irish Naturalist* of February, 1894, which were sent by Dr. Scharff along with some of his from Bantry to the continental authorities, named and identified by them as *H. helvetica*, were not returned, and though I collected in the same district on several subsequent occasions I could not procure similar ones. It was not until within the past year or two that, on receiving several sets of *H. helvetica* from various English localities, my attention was again drawn to the subject, and I collected specimens of the genus in most of the southern Irish counties, but failed to find any that I could identify with the English shells, though some from Kilrush, Co. Clare, superficially resembled them and differed so much from typical *H. cellaria* as to lead Mr. A. S. Kennard to describe them as a new species under the name of *Vitrea Scharffi*. (*Proceedings of the Malacological Society*, vol. viii., p. 50).

Towards the close of last year, after some correspondence with Mr. Stelfox, he sent me for examination a very large series of *Hyalinæ*, comprising sets collected by himself and Mr. R. Welch in numerous northern, and western localities, but *H. helvetica* was not among them. Early this year, through the kindness of Dr. Scharff, Mr. Stelfox and I together examined all the Irish specimens of the group in the National Museum,

including some from Bantry and others labelled *H. helvetica*, comparing them at the same time with the large series of continental *H. helvetica* and *H. glabra* in the same collection, and found that all the Irish specimens there are forms of *H. cellaria*, which seems to be a much more variable species in Ireland than elsewhere.

As the matter now stands, there seems to be no doubt that the original Bantry and Whitegate shells were similar to the Kilrush ones mentioned above, and belong to a form of *H. cellaria*. The Sligo shells recorded by Mr. J. W. Taylor are, as Mr. Stelfox has pointed out, another form of the same species.

Mr. Stelfox's query must therefore, I think be answered in the negative, and all records for *Hyalinia helvetica* in Ireland regarded as erroneous or at least doubtful, until such time as genuine Irish specimens, which at present do not appear to exist, are forthcoming.

R. A. PHILLIPS.

Cork.

New Station for *Helix hortensis* in Ireland.

While working the banks of a small tributary stream of the Shannon, in Co. Limerick last August, I found a large colony of *Helix hortensis*. This, I think, is the first recorded instance of this shell in the county, and that it should have escaped observation hitherto is peculiar, as it was by no means scarce in the locality; in fact in the evenings the shells swarmed over the bushes, Blackberry and Sloe, which, with Willows, formed the home of the colony. The type was predominant, but var. *lutea* and var. *arenicola* were also represented. I may mention that I dissected the "darts" so as to leave no doubt as to the record.

HARRY FOGERTY.

Limerick.

The Red-backed Shrike in Ireland.

A specimen of the Red-backed Shrike (*Lanius colluris*) was caught, October 1st, 1908, at Wicklow Head light-house, and another was caught at the Fastnet Rock light-house, Co. Cork, September 26th, 1910. Both specimens are in my collection. The only other Irish record is the specimen obtained in Co. Down, August 10th, 1878, and now in Belfast Museum. The two lighthouse specimens are in the same plumage, and immature. Both birds were exhausted.

RICHARD M. BARRINGTON.

Fassaroe, Bray.

Hoopoe in Co. Down.

A female Hoopoe (*Upupa epops*) was shot on 28th September, 1910, at Rathcunningham, near Killyleagh, Co. Down. It is being mounted by Mr. Sheals of Belfast. This is only the sixth occurrence recorded for Co. Down.

ROBERT PATTERSON.

Glenbank, Holywood.

GEOLOGY.

Arenig Rocks at Courtown, Co. Wexford.

In view of the interest that has recently been aroused in the occurrence of Arenig rocks in the West of Ireland, it may be as well to draw attention to the existence of rocks of the same age on the Wexford coast near Courtown. These were discovered by Messrs. Mauge, Carruthers and myself upon an excursion made to that region during the visit of the British Association to Dublin in 1908. Close to Courtown Harbour, on the south, the beds yielded *Clonograptus flexilis* (Hall.), and some little distance further south a black shale band contained some "extensiform" Didymograpti. This occurrence of *Clonograptus flexilis* undoubtedly indicates the presence of beds low down in the Arenig Series, while the Didymograpti probably indicate beds belonging to a somewhat higher horizon.

G. L. ELLES.

Sedgwick Museum, Cambridge.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a Leopard from Mr. C. J. Roger, fourteen guinea-pigs from Mr. Watson, a sparrow-hawk from Mr. C. J. Wisdom, a Ring-Ouzel from Mr. R. M. Barrington, and a White Sparrow from Mr. T. Walpole. A young Grey Seal given by Mr. N. Seaver could not be reared, and died after a few days in the Gardens. A large number of birds have been lately deposited in the Gardens, including three Rheas, two Demoiselle Cranes, two Reeves Pheasants, three Mute Swans, two Black Swans, an Egyptian Goose and two Bernicle geese.

A young Llama was born in the Gardens early in October. Such an event has not occurred in Dublin for many years, and the graceful little creature will assuredly prove a great attraction to visitors. The new Aviary for eagles and falcons is now nearly finished, and will afford excellent accommodation for the birds of prey.

BELFAST NATURALISTS' FIELD CLUB.

SEPTEMBER 17. GEOLOGICAL SECTION.—The fine exposure of Cretaceous strata at-Kilcoan quarry on the west side of Island Magee was examined, and a large number of fossils obtained, chiefly from the "White Limestone" and "Chloritic Chalk and Sands." These included two very perfect specimens of *Trochus*; *Micraster cor-anguinum*, Klein; *Spondylus spinosus*. Sow; *Camerospongia fungiformis*, Goldf.; the phragmocones of belemnites; *Cidaris*-spines, &c. The mineral "Beekite" was noted on an *Ostrea semiplana*, and on a specimen of *Inoceramus*. The upper surface of the Chalk, where the Boulder-clay has been removed, shows very fine glaciation; two sets of striæ running S. 5° W. and E. and W. respectively were observed. So far as could be made out from the surface, the striæ produced from the west, were subsequent and superimposed on those made by the ice moving from the north.

The Lias a little south of Barney's Point was also examined, and yielded a large number of fossils.

NOTES ON SOME IRISH COLEOPTERA.

BY W. E. SHARP, F.E.S.

MANY years have elapsed since the present writer first had the privilege of contributing a few notes on the Coleoptera of Ireland to the pages of *The Irish Naturalist*, and since that time our knowledge of the distribution of the order in Ireland has been very materially increased—the excellent and exhaustive list of the Irish beetles, by Messrs. Johnson and Halbert, has been published, and although large areas in the island still remain unexplored by the student of its Coleoptera, still it seems improbable that much can be added to what are now the well-ascertained facts of Irish faunistic distribution.

The shores of the great northern lough, however, or those of the county of Dublin, can hardly be considered quite as unexplored territory, and the only apology that can indeed be offered for the following brief notes lies in the fact that the species encountered were those prevalent at a time of year when these localities have not, perhaps, often been visited by collectors, and that the occurrence and proportion of their beetle inhabitants vary to such an extent as to make the results of any approximately discriminative collecting at any particular time worth the recording.

It was a dull and rather chilly morning in mid-September, when the writer discovered himself walking along that straight and distinctly uninteresting road which leads from the town of Lurgan to the shore of Lough Neagh. The cultivated land passed, a more or less narrow strip of watery foreshore sustained a thick growth of coarse grass, Ragweed, various crucifers, &c., giving place, irregularly, to the shining mud and bare sand of the actual shore, and then, to the horizon, the quiet grey waters of the great lake.

The first operation was to sweep this coarse marsh herbage, and the two beetles revealed most abundantly by this process were *Homalota gemina*, Er., in profusion, and very commonly *Phyllotreta exclamatoris*, Thunb. Other captures were *Chryso-mela hyperici*, Forst., and *Cassida equestris*, F.

On the mud-flats of the shore itself the hoofs of wandering cattle had made little circular depressions which had become filled with water, and by turning down the edges of these *Laccobius minutus*, L., appeared in extraordinary abundance.

Beetles, on the whole, were decidedly scarce, but the weather was not quite propitious for their appearance, and there was very little of the matted drift and debris, which usually in such places harbours so many species. By shaking out the little that there was, the following species were taken:—single specimens of *Pelophila borealis*, Payk., and *Silpha dispar*, Herbst.; *Homalota hygrotopora*, Kr., and *H. volans*, Scrib. in abundance, and more or less commonly *Homalota gregaria*, Er., *Philonthus micans*, Grav., *Stenus ater*, Mam., *Stenus canaliculatus*, Gyll., *Stenus tarsalis*, Ljn., *Stenus melanopus*, Marsh., *Trogophæus biliniatus*, Steph., *Hydræna riparia*, Kug., and *Cercyon aquaticus*, Muls.

Much more productive was a day of warm sunshine spent shortly afterwards at Portmarnock, on the coast near Dublin. Here that so far exclusively Irish beetle (in the British Isles) *Otiorrhynchus auro punctatus*, Gyll., was soon discovered by sweeping a low grassy bank between the station and the shore, and by carefully discriminative beating and brushing the various plants which composed its vegetation, the beetle was localized on *Carduus arvensis*, which occurred in fine clumps here and there. From these thistles *O. auro punctatus* was beaten in abundance, and from the fact that very many of the specimens so obtained were quite immature and that these particular thistles had suffered very severely from the ravages of some insect, it seems a fair inference that *C. arvensis* forms the food plant, or at any rate a food plant, of the species in Ireland. Some tangles of sodden hay on the shore of one of the muddy creeks which run up from the sea were very full of common beetles—most of them hardly worth enumeration; but it may be worth while to record *Silpha tristis*, Ill., *Choleva nigrata* Er., *Philonthus albipes*, Grav., *Homalota luridipennis*, Maun., and *Laccobius alutaceus*, Thoms.

In heaps of cut herbage on the drier land *Chrysomela Banksii*, F., was quite frequent, and it was interesting to find here a few specimens of *Metabletus truncatellus*, L., a beetle which in England appears to be confined to the south and east, and usually attached to the Chalk.

To those who remember the wild weather of the boreal April of 1910, it will not be surprising that a visit of a couple of days to Lough Leane, in Kerry, at that season should have proved, from the coleopterist's point of view, little short of a

disastrous failure. The ascent of Mangerton was attempted and abandoned, and in fact the only possible collecting was confined to the sifting of moss, dead leaves, etc., in the woods about Torc Mountain during lucid intervals between hail- and rain-showers. Here it was interesting to the English collector to find that the Liosoma shaken from the moss was not the common *L. ovalulum*, Clair., but (in England) the very much rarer *L. oblongulum*, Boh. Under the bark of a fallen spruce a specimen of *Melanotus rufipes*, Herbst. was discovered, of that large and very elongate form which occurs in Scotland, and stands in many British collections as *M. castanipes*, Payk. This species probably passes the winter in the imaginal state, hibernating in its pupal cell, since the writer has found specimens in rotten wood in November, evidently from their immature colouration only just emerged from pupæ, and these individuals would, no doubt, appear in the open during the following May and June.

Besides numbers of common Geodephaga, Staphylinidae, &c., all generally abundant in Ireland, the moss, &c., yielded a few possibly less abundant species, such as *Chlœnius nigricornis* F., *Bradycellus distinctus*, Dej., *Mycetoporus clavicornis*, Steph., *Lathrobium punctatum*, Zett., *Stilicus similis*, Er., *Lesteva pubescens*, Maun., *Stenus Guynemeri*, Duv., *Stenus providus* var. *Rogeri*, Kr., and *Cryptohypnus iv.-guttatus*, Lap.

In moss on tree-trunks but not in that on the ground the Irish form of *Tachyporus obtusus*, L.—the var. *nitidicollis*, Steph.—was occasional; for the rest all that could be done was to deplore in suitable terms atmospheric conditions so inimical to the revelation of beetle life, for to the writer it seemed that a locality more varied in character and more likely to be prolific in its coleopterous fauna than that which encircles these famous lakes, it would be difficult to find in Ireland.

It may be of interest to add to these fragmentary notes—since Castlebar Lough (Mayo) appears to have been so far unexplored by the coleopterist—that on a visit there of a few hours the following species were taken by the lough side:—*Panagens crux-major*, L., *Aleochara brevipennis*, Grav., *Stenus ater*, Maun., *Homalota aquatica*, Thoms, and very abundantly *Homalota laticollis*, Steph., besides commoner species.

South Norwood, Surrey.

REVIEW.

BIRDS OF THE BRITISH ISLES.

The British Bird Book: An account of all the Birds, Nests, and Eggs found in the British Isles. Edited by F. B. KIRKMAN, B.A., Oxon. Illustrated by 200 coloured drawings and numerous photographs. London and Edinburgh: T. C. and E. C. JACK. In 12 sections 10s. 6d. net cash, each.

Ornithologists cannot but welcome an addition to the literature of their favourite subject, which is so ably edited and so beautifully illustrated as Mr. Kirkman's undertaking—so far as can be judged from its first section—promises to be. "The British Bird Book" has for its object the bringing up to date within the compass of a single work of our knowledge of the habits of British birds, to which, as is truly observed in the preface, large additions have been made since the publication of the existing standards. Nearly every species is to be illustrated in colours, and the book may fairly claim to be a new "History of British Birds"—relegating, however, to the limbo of an appendix or special supplementary chapter such rare stragglers to the Britannic area as the Alpine Chough and Nutcracker.

The opening Section deals only with the Crows and the Finches—the classification followed being that which places the former family at the head of the class. The Crows are dealt with chiefly by Mr. Kirkman himself, and the Finches by Mr. Edmund Selous. One cannot avoid remarking on the extraordinary difference that distinguishes the modes of treatment adopted by these two writers. It will scarcely meet an ordinary reader's ideas on the subject of proportion. Mr. Kirkman is careful to write as one whose primary business is to impart knowledge, though he is not slow to point out, when it seems advisable, the bearings that certain facts may have on the question of theory. Mr. Selous has certainly much to say that is of real interest; but he imparts his information in the midst of so large a dose of fancy-writing and sarcastic raillery at all "doxies" other than his own, as must tend to discourage the reader from turning over his pages in the pursuit of mere knowledge. It may be, as Mr. Kirkman hints in his preface, that Finches do not lend themselves to the same methodical treatment as Crows.

A feature of the book which ought to add much to its value is the special attention paid to such subjects as the nuptial displays of birds, and the respective parts played by both sexes in nest-building, incubation, and the feeding of the young. As might be expected, there is for many species a dearth of certain information; but if it were for that reason alone the summarizing of such evidence as exists is highly useful, as indicating—amongst other things—the gaps that remain to be filled. Even in those cases where it is fully ascertained that both sexes build, and that both incubate, the question of the manner in which the labour is apportioned between them too often remains—or perhaps nearly always does so—a *terra incognita*.

Mr. Kirkman has occasion, under the head of nearly every species, to refer to evidence showing the existence during the breeding season of a large number of adult unpaired birds—a fact of which he holds that no satisfactory explanation has yet been tendered. Referring to the suggestion broached some years ago in this Journal (vol. xii., pp. 158-160), that the habit the birds have of parcelling out the ground into nesting areas is the main cause, he objects that in the case of persecuted species like the Crow, Jay, and Magpie, the nesting areas are obviously much in excess of the pairs. Though this may be locally true, it seems at least open to doubt whether it is true of those parts of our islands in which the existence of large numbers of unmated birds chiefly calls for explanation. Mr. Kirkman himself seems scarcely to realise how common a bird the Magpie is in Ireland, for he tells us that “in this country”—meaning apparently the British Isles generally—Magpies’ nests “are not often seen, owing to the comparative scarcity of the species,” but that they “are a familiar sight in many parts of the Continent.” Of course a great deal depends on the size of the area which each pair thinks right to appropriate to itself. Speaking of the Chough, Mr. Kirkman seems disposed to accept the view that unpaired birds of that species seen in spring in the Isle of Man (Ralfe, “Birds of the Isle of Man,” p. 84), are individuals which have failed to secure nesting sites, owing to the resentment shown by the breeding Choughs at intrusion within their domains; and he quotes as supporting this view Mr. Ussher’s statement (“Birds of Ireland”, p. 84), that Choughs’ nests along suitable parts of the Waterford coast “occur on an average a mile apart.” This is very considerably in excess of the average distance between two Magpies’ nests in the better wooded parts of Ireland.

Mr. Kirkman is disappointingly meagre in what he says of the gifts of mimicry possessed by most of the Corvidæ, but in a special degree by the Jay. It does not seem to be realised how habitually the birds make use of this gift during the latter part of their breeding season. Mr. Kirkman quotes one instance (Durban and Matthew, “Birds of Devonshire”, p. 87), in which a pair of Jays exercised their mimetic powers when scolding an intruder who was examining their young—“now cawing like a rook, then mewling like a cat, and in their extreme agitation actually plucking off leaves, and biting off pieces of dead twigs from neighbouring trees.” All these actions—and especially the imitative ones—are habitual with Jays when they have young, so much so that the reviewer has sometimes been scolded in precisely the same way by as many as three pairs of parent Jays at different stages in the course of one walk through an Irish wood. The notes most constantly reproduced on such occasions in Co. Wexford are those of the Magpie, Cat, Blackbird, Squirrel, Sparrow-Hawk, and Hooded Crow. The obvious intention of the old birds is to lead the intruder to imagine that he is being threatened by a much larger number of creatures than are actually present; and the fact that practically the same set of cries—though with different degrees of frequency—are reproduced by every pair of parent Jays whose haunts are intruded on shows how largely the

performance must be considered instinctive. In most text-books the mimetic powers of the Jay are referred to as a sort of "accomplishment" that is carried to its chief perfection in captivity. It seems time that this view of the character of so well-known a gift should be dispelled.

The chapter on the Finches is not divided, like that on the Crows, into sub-chapters dealing with the different species, but follows a line of treatment which, no doubt, facilitates discursive writing on evolutionary and other topics requiring the survey of a comparatively wide field. Mr. Edmund Selous is so well known as an ardent advocate of the doctrine of sexual selection that it is unnecessary here to do more than refer to the views he expresses on that point, though the opinions of the unconverted are certainly shown through a somewhat distorted medium. But in touching on the interesting question of the development of the Crossbill, Mr. Selous seems to have fallen into faulty arguments through a cause which we should not have expected in so pre-eminent a bird watcher—*i.e.*, defective knowledge of the feeding habits of British finches in general.

Writing of the large form known as the Parrot Crossbill, Mr. Selous says "it is perfectly evident that in this bird we see the final or rather up-to-date result of certain individuals of the common kind having come to eat the seeds of the Scotch Fir as well as, and so gradually instead of, those of the larch and spruce, which form the staple of the latter. As more strength was needed to extract these, a stouter bill and larger body were gradually acquired by those birds which delighted to do so, till insensibly, and almost without knowing it, they found themselves Parrot Crossbills."

Here it is assumed that the earliest Crossbills did not feed on seeds so difficult to extract from their cones as those of the Scotch Fir, but were of a weak-billed form, and contented themselves with the less perfectly protected seeds of such trees as the spruce and larch. But if this had been the case, the acquisition of the peculiarly formed mandibles of the Crossbill would be quite inexplicable, since most, if not all, of our finches, are as well able as the Crossbill itself to extract the seeds of the spruce and larch.

Mr. Selous is unaware of this fact, and he remarks that the Greenfinch is probably the only British finch which, besides the Crossbill, possesses, even in a qualified degree, the power of extracting the seeds of conifers. He gives a pleasant description of the operation in which he has seen the Greenfinch engaged when attacking the "cones of some introduced trees of this family, the superior size of which may make it easier for him to pick out their seeds." But if he would pay a little more attention to the feeding habits of some of our smaller finches—notably the Lesser Redpoll, Siskin and Goldfinch—he would probably not be long in learning that the habit of shelling larch-cones and even spruce-cones is by no means limited to the strongest-billed members of the family.

The Lesser Redpoll makes the larch, next to the alder, his favourite feeding-tree in the winter months in south-eastern Ireland. Parties

of Goldfinches may also not rarely be seen in autumn probing the larch-cones; and the Siskin not only accompanies the Lesser Redpoll in its forays on the larch-grove, but may be seen in spring clinging to the cones of the spruce-fir and drawing out the winged seeds from beneath their scales. From these facts—the three birds just referred to being practically our smallest and weakest finches—it seems pretty evident that the Crossbill would never have needed its remarkable structural peculiarity unless it had wanted to perform some much more difficult task than that of shelling larch-cones and spruce-cones.

As was pointed out in an article in this Journal (vol. iii., p. 210), the toughness of the pine-cone, with which no other small bird seems able to grapple in its green state, is probably the Crossbill's *raison d'être*. In other words the Parrot-Crossbill represents the older, not the more up-to-date form. An extension in later years of the ranges of trees like the spruce and larch may have led to the Crossbills of certain areas saving themselves the trouble of opening pine-cones, and so degenerating into a type resembling our common Crossbills—though the latter is still quite capable of extracting pine-seeds when it likes. Variation in both directions may, of course, have taken place in later years; but it can scarcely be doubted that the Parrot-Crossbill, if not actually older than the common, is at least the nearer approach of the two to the common ancestor of both.

Mr. Selous is also severe on a suggestion offered by Mr. Ussher in the "Birds of Ireland" and elsewhere, that the reds and greens of the Crossbill plumage are protective, harmonising as they do with the hues of the bark and foliage of the Scotch firs. Among the arguments which he urges against this view is the fact that, according to Seeböhm, the staple food of the Common Crossbill is the seed of the spruce-fir, whose distribution it is described as following. Mr. Selous thinks it absurd to call on the tints of the pine to explain the colouring of a bird that feeds chiefly on the spruce. But as all the races and species of Crossbill present a very similar type of coloration, the colours in question must evidently have been evolved by the common parent of them all; and this, as we have just shown was probably a pine-feeding, and almost certainly not a spruce-feeding bird. The harmonising of the Crossbill's tints with those of *Pinus sylvestris* is therefore not necessarily so devoid of significance so Mr. Selous maintains.

Enough has been said to show that the succeeding sections of this work, in which such leading ornithologists as Messrs. W. P. Pycraft, E. L. Turner and F. C. R. Jourdain are participating as main contributors, may be expected to prove a welcome boon to the bird-loving world. No cost or pains seems to have been spared over the preparation of the coloured plates. In particular, Mr. Seaby's presentation of the Raven strikes the reviewer as lifelike and majestic in the extreme.

IRISH SOCIETIES.

ROYAL ZOOLOGICAL SOCIETY.

Recent gifts include a young male Chimpanzee from Dr. R. H. Kennan, a Green Monkey from Miss A. Peyton, a Leopard cub from Mr. G. W. B. Weir, a Badger from Mr. O. Murphy, and a Corn Bunting from Mr. W. J. Williams. The pair of West African Lions "Niger" and "Nigeria" have a litter of four fine cubs, all strong and healthy. The new Chimpanzee, "Mendiboy" by name, arrived in rather poor health and spirits, though it was hoped that he would soon be as well and cheerful as his companions, "Mr. James" and "Jenny," he died after a residence of only a few weeks in Dublin.

BELFAST NATURALISTS' FIELD CLUB.

OCTOBER 28.—ANNUAL CONVERSAZIONE.—The forty-eighth winter session was inaugurated by a conversazione in the Assembly Hall. The company, which numbered three hundred, included the Lord Mayor and party. A large number of exhibits were displayed on tables in the body of the hall, the various exhibitors giving informal lecturettes to those interested. By permission of the Lord Mayor of Belfast the insignia of the city of Belfast were on exhibition, and proved a source of much interest.

In the zoological section F. Balfour Browne showed a new and ingenious method of storing a working collection of insects. George Donaldson's exhibit of British lepidoptera included *Gonobteryx rhannoni* and living caterpillars of Fox Moth. N. H. Foster exhibited *Metoponorthus melanurus* and *Eluma purpurascens*, two survivors of the ancient Lusitanian fauna, which have only been found in the British Islands at Howth, County Dublin; also maps showing the progress of distributional records of woodlice in Ireland for the past five years. W. A. Green showed a collection of land and fresh-water mollusca; W. F. M'Kinney, Spanish and Australian shells and leaf insects from Ceylon; and H. Lamont Orr, wasps' nests combined. R. Patterson exhibited a stuffed specimen of the Kea, a sheep-killing parrot from New Zealand, a Grass Snake from Yorkshire, and cases illustrating the development of butterflies and moths. Professor Symington and Dr. Rankin showed photographs and skiagraphs of the jaws and teeth of an Orang, and R. J. Welch exhibited land and fresh-water mollusca collected during the Rosapenna Conference in July, 1910.

In the botanical section N. Carrothers had a series of types of Irish plants, W. F. M'Kinney, "Wooden pears" from New South Wales and a "vegetable caterpillar" from New Zealand; W. H. Phillips, dried specimens of British Ferns; Rev. C. H. Waddell, some rare plants from Antrim and Down. W. J. C. Tomlinson exhibited mounted plants from South Kent and South Hants. G. O. Sherrard (Dublin), showed microscopic slides exhibiting American gooseberry mildew and black scab of potatoes, and a slide of living eel-worms.

In the geological section R. Bell's prize collection of zeolites was shown in interesting conjunction with Victorian zeolites presented to the Field Club by the Director of the National Museum at Melbourne, and exhibited by Miss M. K. Andrews, who also exhibited rock specimens and a fine set of fossils from the Ballycastle coal-field, presented to the Club by W. F. de V. Kane. George Donaldson showed fish teeth from South American Greensand; William Gray, slabs of marble from Counties Armagh and Down; Dr. Rusk, clay concretions; and Joseph Wright, Pleistocene Foraminifera from high altitudes in the neighbourhood of Belfast. A. R. Dwerryhouse showed a series of thin sections to illustrate the occurrence in rocks of structures due to the solidification of entectic mixtures of their constituents—*e.g.*, quartz and felspar, orthoclase and oligoclase; a photograph of the limestone cavern of Gaping Ghyll, some recently-published geological maps of Arran and of parts of England and Wales, and a working model of an air-lift pump. J. A. Stendall had an exhibit of radium nitrate, which excited much interest.

The exhibitors in the miscellaneous section included Miss Elizabeth Andrews, pottery from lake village at Meare, Somersetshire; flint implements from Toome bar and the Bann; flint implements from kitchen-middens, Les Eyzies, Dordogne, presented to the Club by W. F. de V. Kane; early edition of "Letters on Basaltes of County Antrim," by Rev. William Hamilton, and "The Giant's Causeway," by W. H. Drummond. S. H. Douey, W. A. Green, and R. J. Welch showed photographs illustrating summer excursions, 1910; Francis Forth, model specimens of handrailing with drawings; W. A. Green, implements from Fiji, pegeen from Dingle Peninsula; Miss Olga Heyn, living marmoset from South America; Mrs. Hobson, sketch of ancient sweathouse near Ballyshannon, by Fred. W. Lockwood; A. B. Morris, nature photographs; Professor Symington, photographs of megalithic remains at Carnac and other places in Brittany; Miss L. A. Walkington, ancient candlesticks, cam and moulds for dip candles; Ivan Sutherland's exhibit of bauxite and aluminium included the first piece of aluminium produced from Irish bauxite in 1886.

At nine o'clock a lantern display of views, mainly taken on excursions during the summer 1910, was given by W. Gray, W. A. Green, D. J. Hogg, A. R. Hogg, H. L. Orr, S. H. Douey and R. Welch. Special mention is due to the series of cinematograph films illustrating wild nature shown by Mr. A. R. Hogg.

The President of the Club, R. J. Welch, M R I.A., then addressed the meeting. He expressed pleasure due to the presence of the Lord Mayor at the conversazione, and extended a welcome to the delegates from the Dublin Naturalists' Field Club, Messrs. R. Ll. Praeger and G. O. Sherrard.

The following new members were elected—the Lord Mayor and Messrs. Beattie, Holroyd, and Weir, LL.B.

DUBLIN MICROSCOPICAL CLUB.

OCTOBER 12.—The Club met at Leinster House. D. M'ARDLE exhibited *Anthoceros punctatus* L., one of the frondose Hepaticae, and a slide showing capsule, columella and spores. This curious liverwort differs from all others in the group when in a fertile state. The perianth is tube-shaped very minute; from it arises the curious capsule which is from 1 to 2 inches in length. When young it is grass green and not unlike very young shoots of some grasses; Buxbaum long ago compared the numerous capsules to the shoots of seedling onions. When ripening it turns brown first at the apex, and extends downwards, and dehiscence takes place by the bursting of two opposite longitudinal grooves hitherto covered by a thin pale membrane; the opening shows a central filiform columella surrounded by spores, with the dispersal of the spores are numerous elaters, flatish and curiously contorted, and from undulate to sinuately branched, others geniculate. The spores are dark brown, echinate, showing when young well-marked trigones. This is a monoecious species, the androecia are embedded irregularly in the upper portion of the frond, which is of a remarkable dull deep green colour with the margins slightly raised and crisped. The specimens were found growing in great abundance by the roadside in the wood of Gowran Castle demesne, which extends for upwards of 8 miles, the place where it was collected would be about half-way and in a direct line N.E. with Goresbridge. This is an addition to District 11, and has not been previously recorded from Co. Kilkenny. The species occurs in England, Scotland, on the Continent, and in N. America.

NOTES.

ZOOLOGY.

Supposed Occurrence of *Vitrea (Hyalinia) helvetica* in Ireland.

I am quite in agreement with Mr. A. W. Stelfox in considering that an error in identification has been made. Through the kindness of several correspondents I have been able to examine large series of *Vitreas* from many Irish localities, including a large number from Whitegate, E. Cork (these were a part of the collection from which the late Dr. O. Boettger and Dr. Westerlund identified the species), and up to the present no example of the *Vitrea helvetica* group has occurred to me. All conchologists are greatly indebted to Mr. Stelfox for his new test of the species in this very difficult genus, and so far I have found it infallible. There is no need here to discuss the question whether the English shell should be known as *V. helvetica*, Blum, or *V. ragesii*, B. B. W. What Mr. Stelfox and the other competent Irish conchologists state is that no shells of the *Helvetica* group occur in Ireland, and with this statement I am in agreement.

A. S. KENNARD,

Beckenham, Kent.

Abundance of Great Northern Divers.

On Tuesday, October 18, my brother, Major Pentland, and I were playing golf at Baltray, Co. Louth, with two friends; the tenth tee is close to the sea about a mile north of the Boyne and commands a fine view of the sandy shore. The tide was full; the sea calm, and great quantities of fry were about. When we climbed the hill to the tee, my brother called my attention to a number of divers quite close to us and we saw a very unusual sight. There were about twenty-six divers in sight; seventeen of them being within four hundred yards of us. All of them were either Great Northern or Red-throated Divers. All that were near enough for me to make certain of, were Great Northern Divers, and I am inclined to think they were all of that species, but I cannot be certain. However, they were all undoubtedly Divers (Colymbidæ). Every winter a couple of Great Northern Divers haunt the mouth of the Boyne and I have seen three or four about Clogher Head in the spring, but never more until this day. Of course, they were following the fry.

G. H. PENTLAND.

Black Hall, Drogheda.

Ruffs in Co. Derry.

On 13th August, Mr. W. Byron shot a pair of Ruffs (*Machetes pugnax*) on the shore of Bann not far from the mouth. They were immature birds male and female, the male an extra large specimen. There was evidently a flock on passage, as Mr. Byron saw others. This is the earliest date recorded for this species. The above pair is mounted and in our city museum.

D. C. CAMPBELL.

Londonderry.

Temminck's Stint.

On 29th September, I visited Chute Hall, Tralee, in company with the proprietor, Captain Chute, who has kindly consented to lend to the National Museum, Dublin, the only recorded Irish specimen of Temminck's Stint. It was obtained by his grandfather, Mr. Richard Chute near Tralee, in February, 1848 (Thompson, vol. ii., p. 302). I had the pleasure of selecting the specimen and sending it to Dr. Scharff; and it seems to be in very fair preservation considering its age, as the rest of the collection at Chute Hall appears to be. Since this specimen was obtained, more than 60 years ago, there has not, to my knowledge, been any other example of this species obtained in Ireland. It is not to be confounded with the Little Stint, which is also represented by a specimen at Chute Hall.

R. J. USSHER.

Cappagh, Co. Waterford.

Birds of Lough Neagh.

It may be worth recording that on 23rd May last, I found a pair of Oyster-catchers breeding on a small islet in Lough Neagh. They had four eggs laid on the small dry part of the recently submerged ground. A few pairs of Black-headed Gulls, and on a similar islet near by a few Terns, with one or two pairs of Sandpipers and Sedge-warblers with the inevitable Coots and Moorhens were the only other birds breeding there. The Mallards had brought out their clutches and were gone to the marshes inshore. Their nests can always be found there in the forks of low willow and alder bushes which are at the ducks' breeding time standing in 1 to 2 feet of water.

J. SINGLETON DARLING.

Lurgan.

Ravens in Sligo and Leitrim.

On August 15th, 1910, when shooting on Differeen Mountain in Leitrim, close to the Sligo boundary, I saw four Ravens in the air together. We saw them several times during the day, and the keeper, an old hand at observing birds, thought they were a brood of young birds driven away from the nesting ground of the old ones. No Ravens have nested for years on Differeen Mountain; on the mountains to the north and east there are always some nests. On August 23rd, the same mountain was shot again, and thirteen Ravens were seen in the day; there were four or five observers, all well accustomed to watch and note birds, so there can hardly have been any mistake. On the 28th August (Sunday) six Ravens were seen together flying over Hazlewood, which is about seven or eight miles from Differeen. They were seen several times during the afternoon. Since then the Ravens have visited the neighbourhood constantly, sometimes three or four together more often singly. The keeper on the property states that he remembers a somewhat similar visitation some sixteen years ago, but the birds were not so numerous as they are this year.

FREDERICK W. SHAW.

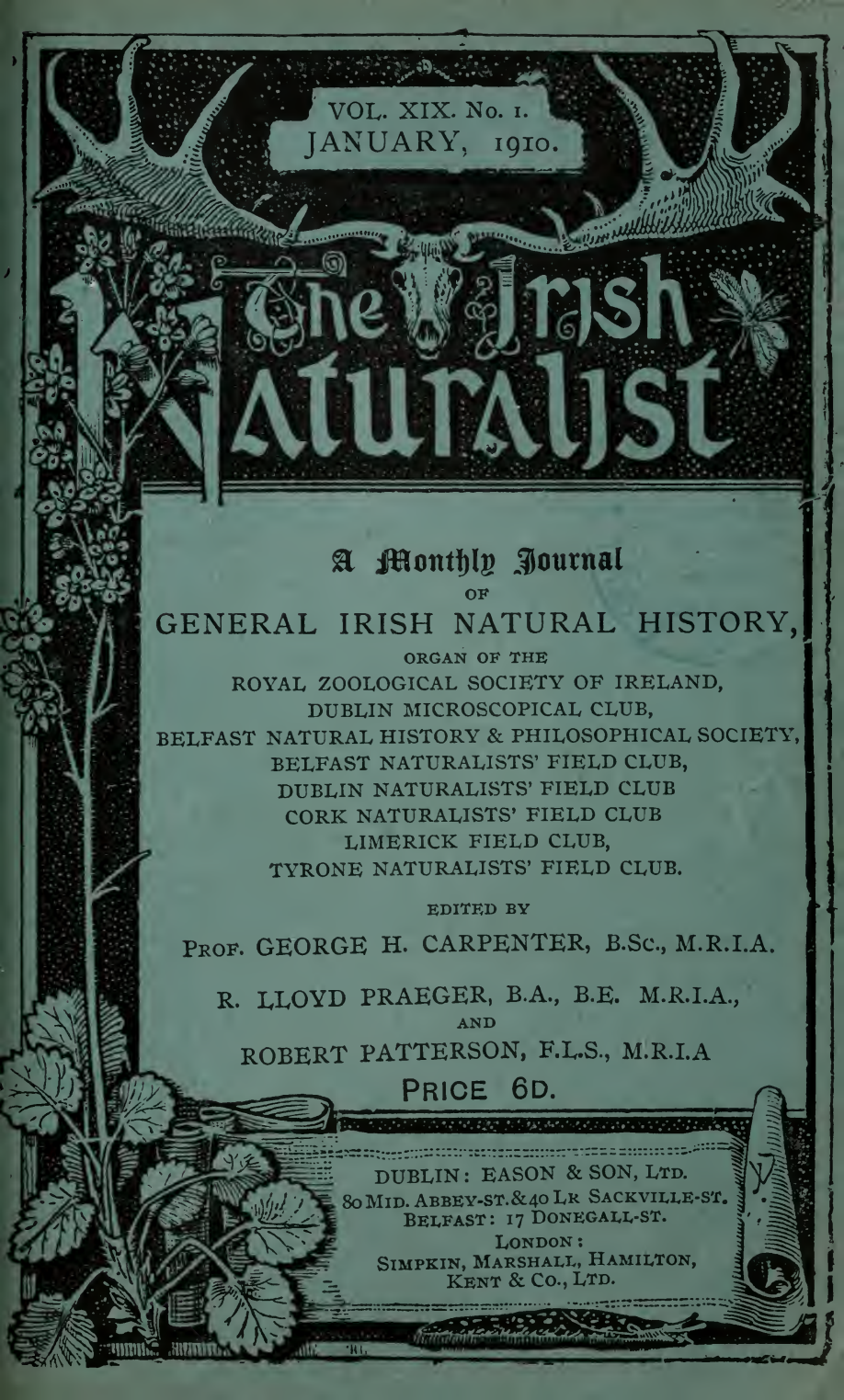
Bushy Park, Terenure.

The Shore Lark in Ireland.

I have long expected that that very interesting arctic breeding bird the Shore Lark (*Otocorys alpestris*) would extend its range to Ireland—when migrating southward in autumn, as its occurrences in Great Britain have been of increasing frequency since 1830, when it was first observed. On November 4th one was shot close to Wicklow Head Lighthouse and was sent to me in the flesh in a much damaged condition.

RICHARD M. BARRINGTON.

Fassaroe, Bray.



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DUBLIN NATURALISTS' FIELD CLUB
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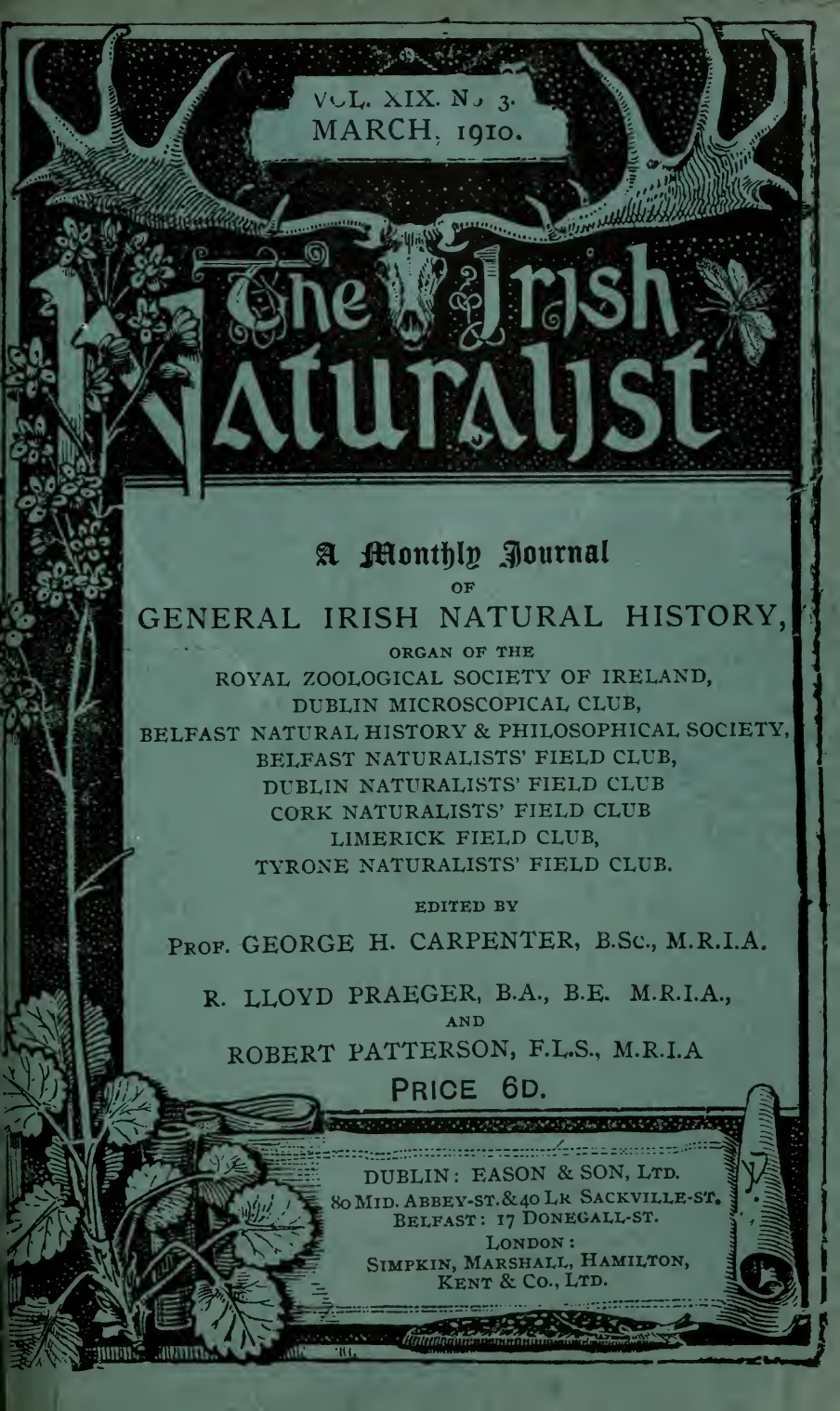
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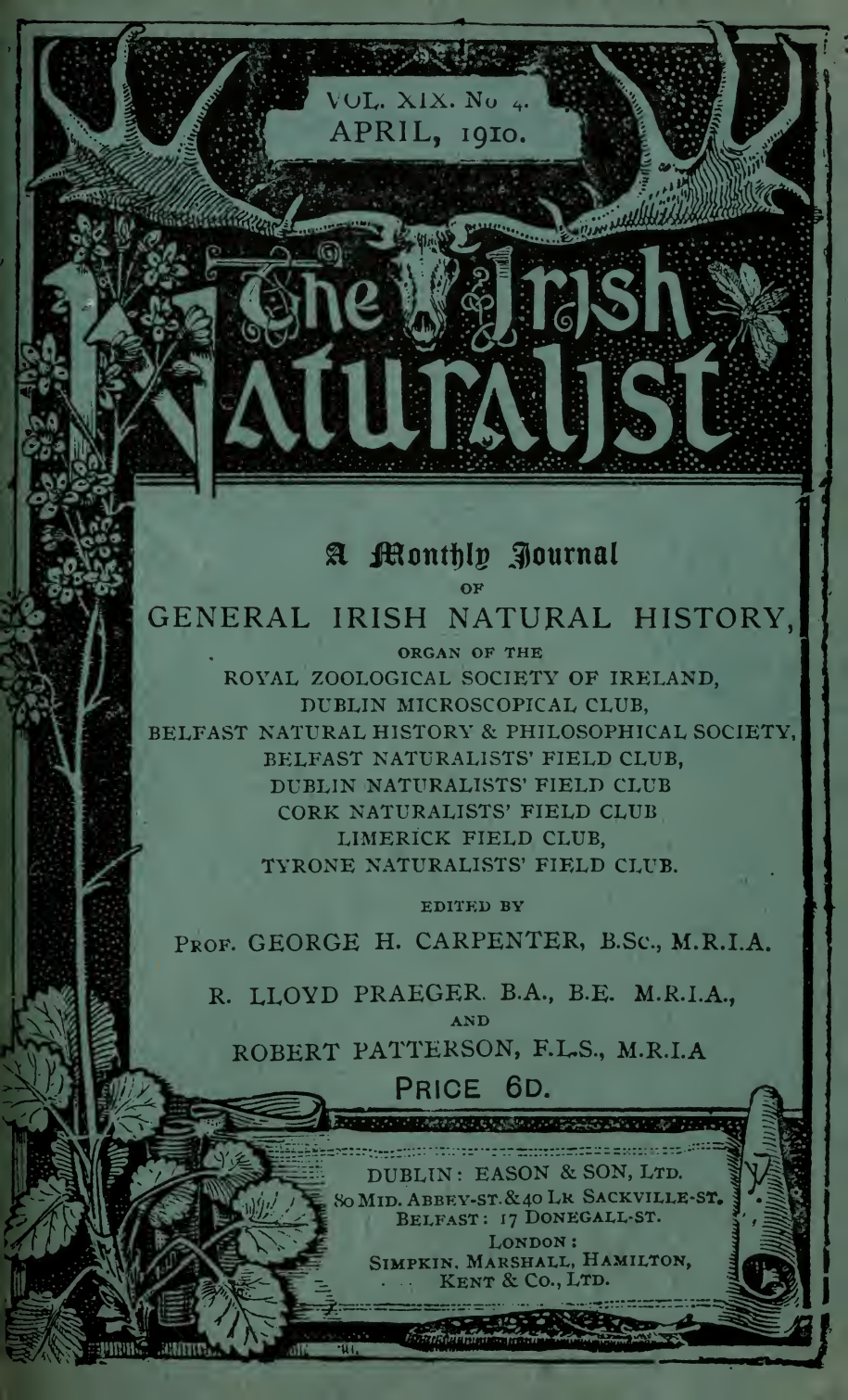
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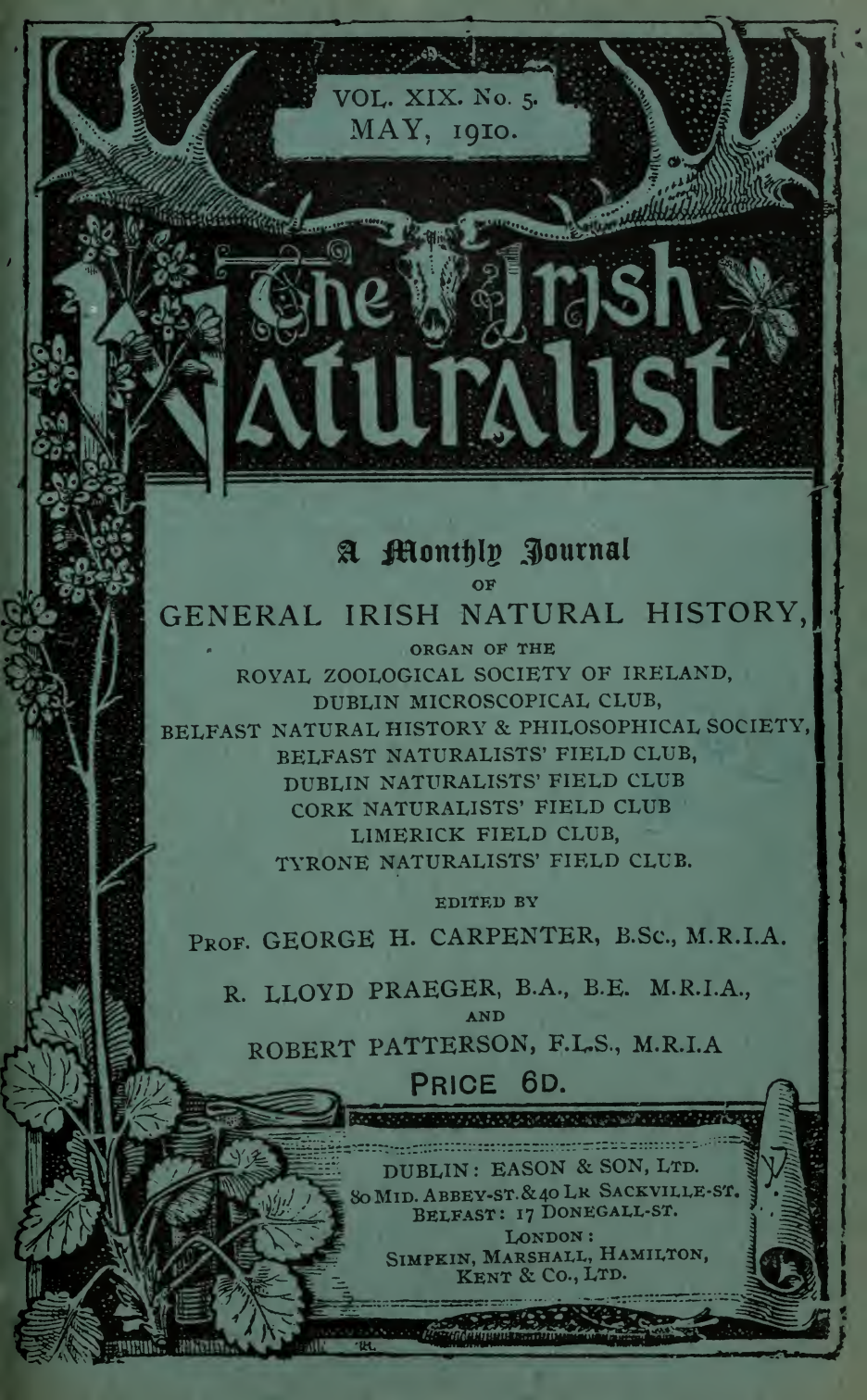
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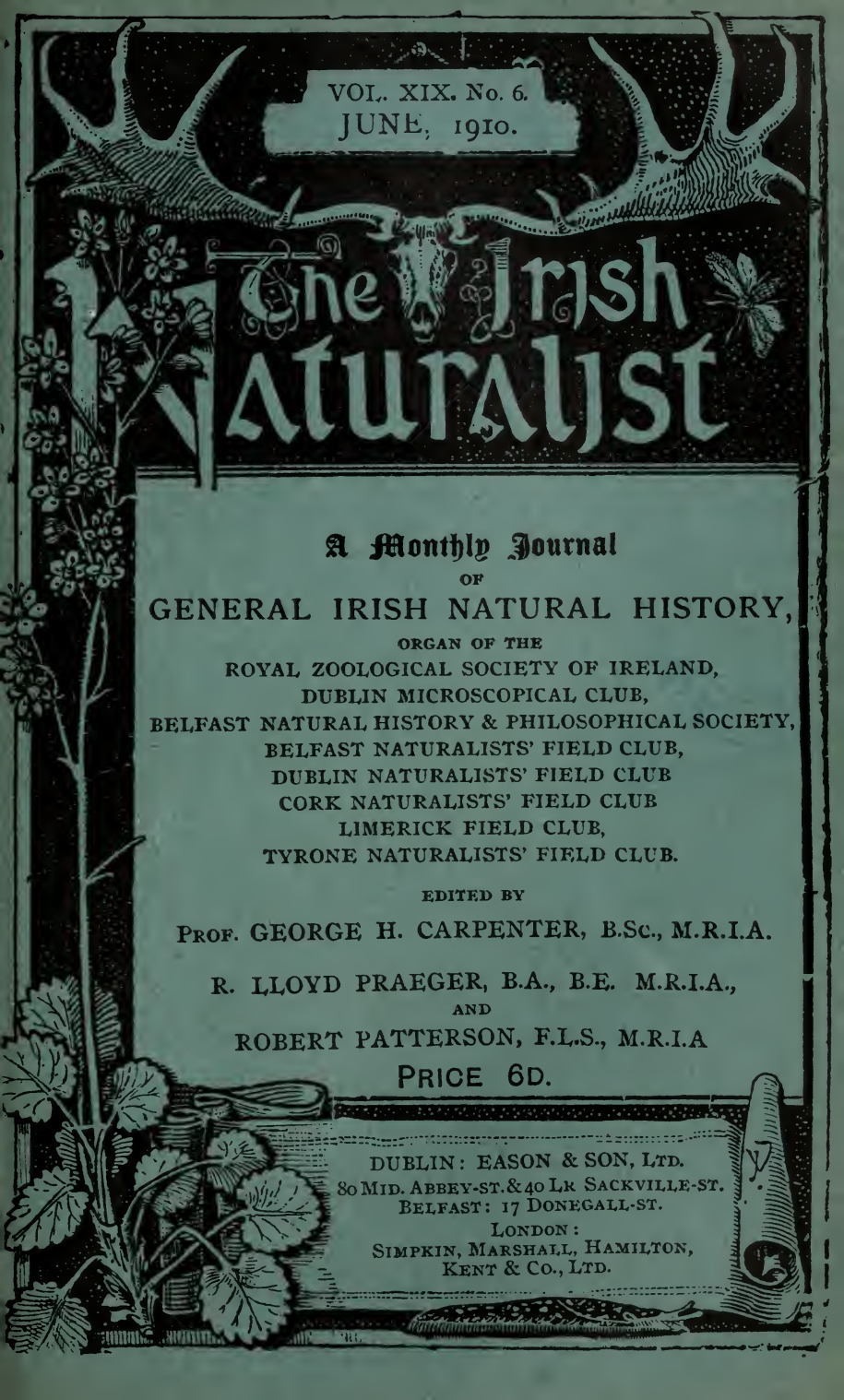
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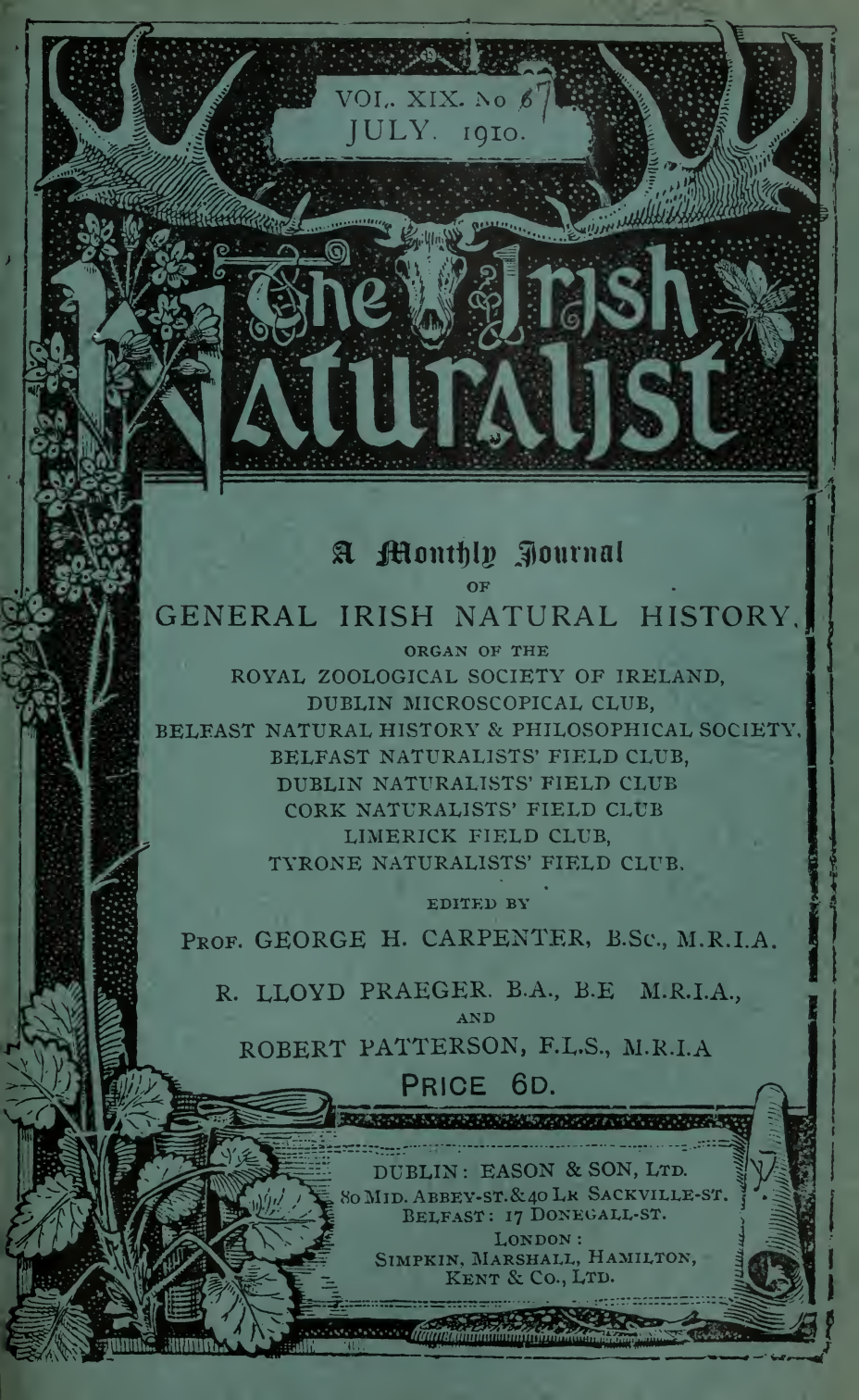
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